Integrated Blood Pressure Control

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

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

This article was published in the following Dove Press journal:
Integrated Blood Pressure Control

Bereket Beyene Gebre[1]
Bedilu Deribe[1]
Mintesnot Abeto[2]

[1]School of Nursing, College of Medicine and Health Science, Hawassa University, Hawassa, Ethiopia; [2]College of Health Science, Hawassa University, Hawassa, Ethiopia

Background: Hypertension and depression are among the most common public health issues affecting the population around the world. Like patients with other chronic medical conditions, hypertensive patients experience many intense emotions which increase their risk for the development of depression. Globally, depression is the leading cause of disability and 382 million people suffer worldwide.

Objective: The aim of this study was to assess the magnitude and factors associated with depression among hypertensive patients attending treatment follow up in the chronic OPD at Hawassa University Comprehensive Specialized Hospital (HUCSH) from March to May, 2019.

Methods: An institutional-based cross-sectional study was conducted with 310 hypertensive patients attending treatment follow up at the chronic Out-Patient Department of HUCSH at Hawassa from March to May, 2019. A validated patient health questionnaire (PHQ−9) was used to assess depression. The data were entered using EPI-data version 3.1 and analyzed in SPSS version 22. Binary logistic regression was used to determine the association of independent variables with dependent variables.

Results: The magnitude of depression among hypertension (HPN) patients was found to be 73 (24.7%). The independent predictors were sex 2.6 (1.16, 5.83), age 11.2 (2.98, 42), educational status, social support 2.55 (1.09, 5.94), family history of depression 7.12 (1.48, 34.26), hypertension 7.57 (2.67, 21.44), and medication adherence 11.6 (4.23, 31.78).

Conclusion: The magnitude of depression among HPN patients was high. So, continuous health information dissemination at a different level regarding factors affecting them should be given. Strengthening a referral linkage with a psychiatric unit for psycho-behavioral therapy will bring good clinical outcome. Besides, controlling hypertension was crucial to bring good clinical outcome.

Keywords: depression, magnitude, associate factor, patient health questionnaire, PHQ-9

Introduction

The World Health Organization International Classification for Diseases and Related Disorders (ICD-10) describes the criteria for a depressive episode, where at least 4 items, such as unhappiness/sense of empty/depressed mood, exhaustion or energy loss, loss of interest in activities, lack of emotional reactions, sleep disturbance, motor retardation, loss of appetite, weight loss, and loss of libido are

Correspondence: Bereket Beyene Gebre
Email bereket2007beyene@gmail.com

submit your manuscript | www.dovepress.com
DovePress
http://doi.org/10.2147/IBPC.S240015

present for a duration of two weeks.[1] Hypertension is elevated blood pressure of systolic, diastolic or both readings.[2] Depression affects 350 million people around the world with a lifetime risk of 7%.

Depression is likely to cause a 5.7% increase in the global burden of disease by 2020 and is to become the leading cause of disability worldwide by the year 2030. Approximately one-quarter of the adults were diagnosed with hypertension, and the proportion will reach about one-third by 2025.[3] Similarly, hypertension is one of the leading causes of global mortality and disability. In 2010, it had been estimated that 31.1% of the global population (1.39 billion) was hypertensive.[4] Patients with depression and/or anxiety represent a particularly vulnerable population as they are at higher risk of developing hypertension. In addition, patients with co-morbid hypertension and mental health disorders are a higher-risk population for cardiovascular disease-related mortality.[5] Depression and hypertension combined have a far more detrimental effect on health than individually and are reported to decrease the quality of life and cause an increased risk of myocardial infarction and stroke. Studies also suggest that the impact of co-morbid depression on patients with hypertension may have a major bearing upon physical functioning, quality of life, and healthcare utilization.[6] It is well known that both hypertension and depression emerge from a complex interaction of social, biological, and behavioral factors.[7] This study adds some behavioral and disease-related variables that have not yet been addressed. So, the aim is to fill the gap on the magnitude of depression among hypertensive patients and their associated factors in the study area.

Objective

General Objective

To assess the magnitude and associated factors of depression among hypertensive patients attending treatment follow up in the chronic Outpatient Department unit at Hawassa University Comprehensive Specialized Hospital, Hawassa, Southern Ethiopia, in 2019.

Specific Objective

To determine the magnitude of depression among hypertensive patients attending treatment follow up in the chronic Outpatient Department unit at Hawassa University Comprehensive Specialized Hospital, Hawassa, Southern Ethiopia, in 2019.

To identify associated factors of depression among hypertensive patients attending treatment follow up in the chronic Outpatient Department unit at Hawassa University Comprehensive Specialized Hospital, Hawassa, Southern Ethiopia, in 2019.

Methods

Study Design

An institutional-based cross-sectional study was conducted.

Study Area and Period

Hawassa University Comprehensive Specialized Hospital (HUCSH) is one of the teaching hospitals in Southern Ethiopia located in Hawassa town. This hospital serves more than 19 million people. The study was conducted from March 20 to May 20, 2019.

Population Source Population

The source population included all hypertensive patients attending treatment follow up in the chronic Outpatient Department unit at HUCSH during the data collection period.

The Study Population

The study population included sampled hypertensive patients attending treatment follow up in the chronic Outpatient Department unit at HUCSH during the data collection period.

Study Unit

The study unit included individual hypertensive patients who participated in the study.

Inclusion and Exclusion Criteria

Inclusion Criteria

All sampled hypertensive patients whose age was 18 and above who can give informed consent were included.

Exclusion Criteria

Sampled hypertensive patients who were mentally ill and seriously ill during the data collection period.

Sample Size Determination

The sample size was determined using a single population proportion formula. The p value from a previous study shows that the prevalence of depression in Northwest Ethiopia is 17.5%.[8] The margin of error (d) is 0.02

since the *p*value is 17.5% to increase the sample size. The study population (N) is about 332. So,

$$\text{Sample size} = \frac{z^2 \times p(1-p)}{d2}$$

$$\text{Sample size} = \frac{1.96^2 \times 0.175(1-0.175)}{(0.02)^2}$$

ni=1386. Since the study population is <10,000 we used the population correction formula

$$= \frac{ni \times N}{ni + N}$$

$$= \frac{1386 \times 332}{1386 + 332} = 268$$

Adding 10% non-respondent rates = sample size × 10%
Non-respondent=268 × 0.1=27
So, the total sample size = 268 + 27 = 295

Sampling Technique

In Hawassa University Comprehensive Specialized Hospital, 332 patients were registered in the HPN registration book and the sampling frame has been made from the list of patients who had been appointed for follow up during the study period. The 295 patients were selected consequently since patients visiting the health facility for follow up were random in nature. So, an exit interview was done to collect data from patients while they visit the chronic outpatient clinic for follow up.

Variables

Dependent Variable

Depression.

Independent Variable

Socio-demographics: age, sex, educational status, marital status, monthly income, occupation, family history of psychiatric illness, social support.

Behavioral factors: alcohol intake, physical exercise, smoking, dietary intake, chewing chat.

Disease and medication-related factors: co-morbidity, medication adherence, HPN control, duration of illness, complication.

Operational Definition

No depression: Patient Health Questionnaire 9 score was 0–4.

Depression: Patient Health Questionnaire 9 score was 5–27.

Adherent: Those sampled individuals who took at least 4 and above consecutive days out of 7 days, which is greater than or equal to 90% adherence to drugs.[20]

Non-adherent: Those sampled individuals who took less than 4 consecutive days out of 7 days, which is less than 90% adherence to drugs.[20]

Data Collection and Analysis

The initial English version of the questionnaire was translated into Amharic. Then it was back-translated into English independently by language experts to maintain the equivalence of the test questionnaire in Amharic. The questionnaires have 4 parts. Socio-demographic information, WHO guideline to assess the adherence measuring scale, and behavioral factors and disease and medication-related factors were gathered from patients' recorded data and own word. To make the assessment tool valid, a group of experts approved the tool used to assess the individual patient.

Quality Control

To assure the quality of the study finding, training for 4 data collectors and 2 supervisors had been given. A pretest on 5% on "Adare General Hospital" was carried out. In addition to this, checking, editing, clearing the data, and monitoring have been done by supervisors.

Data Processing and Analyzing

After checking the collected data visually for completeness, the responses were cleaned, edited, coded, and entered into the computer using Epic-data 3.1 version. The data were then exported to SPSS version 20.0. The data were checked for missing values before analysis. The descriptive analysis including frequency and cross tabs was used to assess the frequency of variables with independent variables. Binary logistic regression was carried out to assess the association of the dependent variable with independent variables and to determine predictors of poor adherence using odds ratios with 95% confidence interval. Finally, a forward stepwise logistic regression model with all independent variables having *p*value <0.05 was fitted and the adjusted odds ratio was calculated to identify independent predictors of adherence to medication among HPN patients.

Plan for Dissemination

It was disseminated to Hawassa University CBE office of the College of Medicine and Health Science and to the

School of Nursing. It was also disseminated to the Hawassa Comprehensive Specialized Hospital.

Ethical Consideration

The study was conducted after approval of the ethical review committee of Hawassa University College of Medicine and Health Science. Permission to conduct the study was obtained from authorities at HUCSH. Written informed consent was obtained from each study participant by assuring privacy and confidentiality throughout the data collection period in the Hospital. An individual who was unwilling to participate from the beginning or at any part of the interview was allowed to withdraw. There was no risk or hazardous procedures putting the participants at harm.

Results

Socio-Demographic Characteristics

A total of 295 adult hypertensive patients were included in the study with a response rate of 100%. Among them, 189 (64.1%) were males (see Table 1).

Magnitude of Depression Among Hypertension

According to this study, the magnitude of depression among HPN patients was found to be 73 (24.7%).

Socio-Demographic Factors Associated with Depression

From the socio-demographic variables affecting depression among hypertensive patients, sex, age, marital status, residence, educational status, occupation, social support, and family history of depression were found to be associated in the binary logistic regression (BLR) (see Table 1).

Behavioral Characteristics and Factors Associated with Depression

From the total of 295 hypertensive patients, 261 (88.5%) did not smoke cigarettes/tobacco and 275 (93.2%) did not do regular physical activity. From the behavioral factors that affect depression among hypertensive patients, drinking alcohol and smoking cigarettes/tobacco were found to be associated in binary logistic regression (see Table 2).

Disease and Medication-Related Characteristics and Factors Associated with Depression

From the respondents, 212 (71.6%) were found to have adhered to medication and their hypertension was also controlled. In our study from disease and medication-related characteristics and associated factors, those respondents having uncontrolled hypertension, not adhered to medication, and those who stay with the disease longer than 20 years were found to be associated significantly in binary logistic regression (see Table 3).

Independent Factors of Depression

From 18 variables entered into BLR, 13 variables with $p<0.05$ were entered into forward logistic regression. Then, 8 variables were found to be independently associated. These were sex, age, marital status, educational status, social support, family history of depression, hypertension status, and medication adherence (see Table 4).

Discussion

In this study, the prevalence of depression was found to be 24.19%. The finding was in line with the cross-sectional study done in Ebinet, Northwest Ethiopia (17.5%),[9] Nigeria (26.7%),[10] and Saudi Arabia (20.7%).[11] In our study, females were 2 times more likely to be depressed than males. This is low when compared to that of studies done in Saudi Arabia[12] and Nepal[13] in which females were 4 times more likely to develop depression. This might be due to sociocultural variation of the respondents.

This study also indicated that increasing age is a predictor of depression among hypertensive patients. This study is also supported by 3 different studies done in Nepal.[14–16] This is an implication that the physiologic change in an individual patient with increased age makes them depressed.

Concerning marital status, our study indicated that those who had widowed/divorced were found to be much more likely depressed than when compared to married ones. Our study result also confirmed that those who did not have social support had been found to be more depressed compared to those who responded that they had social support. This study result is higher than a study done in public hospitals of Eastern Ethiopia.[17] The difference could be that the study participants involved in "Harar" hospitals were those admitted patients in a ward.

Table 1 Socio-Demographic Characteristics and Factors Associated with Depression Among Respondents of Hypertensive Patients in HUCSH, Hawassa, Southern Ethiopia, 2019 (n=295)

No.	Variables	Category	n	%	Depression Status		PCOR (95% CI)	pvalue
					Depressed n (%)	Not Depressed n (%)		
1	Sex	Male	189	64.1	35 (18.5)	154 (81.5)	1	0.001
		Female	106	35.9	38 (35.8)	68 (64.2)	2.45 (1.4, 4.2)	
2	Age	18–39 years	62	21	8 (12.9)	54 (87.1)	1	
		40–60 years	185	62.7	35 (18.9)	150 (81.1)	1.57 (0.68, 3.6)	0.283
		Greater than 60 years	48	16.3	30 (62.5)	18 (37.5)	11.2 (4.3, 28.9)	0.001
3	Marital status	Married	177	60	29 (16.4)	148 (83.6)	1	
		Single	98	33.2	28 (28.6)	70 (71.4)	2.04 (1.12, 3.6)	0.018
		Widowed and divorced	20	6.8	16 (80)	4 (20)	20.4 (6.3, 65.4)	0.001
	Residence	Rural	150	50.8	46 (30.7)	104 (69.3)	1.9 (1.12, 3.32)	0.017
		Urban	145	49.2	27 (18.6)	118 (81.4)	1	
4	Educational status	Illiterate	68	23.1	39 (57.4)	29 (42.6)	14.7 (4.13, 52.9)	0.001
		Read and write	82	27.8	20 (24.4)	62 (75.6)	3.54 (0.98, 12.8)	0.053
		1st–8th grade	41	13.9	7 (17.1)	34 (82.9)	2.26 (0.53, 9.5)	0.26
		9th–12th grade	68	23.1	4 (5.9)	64 (94.1)	0.68 (0.14, 3.2)	0.63
		College and university	36	12.2	3 (8.3)	33 (91.7)	1	
5	Occupation	Professional	75	25.4	10 (13.3)	65 (86.7)	1	0.01
		Non-professional	220	74.6	63 (86.3)	157 (71.4)	2.6 (1.2, 5.3)	
6	Current income	Less than 1000 ETB	87	29.5	28 (32.2)	59 (67.8)	2.29 (0.85, 6.1)	0.099
		1000–3599 ETB	98	33.2	22 (22.4)	76 (77.6)	1.3 (0.5, 3.79)	0.51
		3600–10,799 ETB	75	25.4	17 (22.7)	58 (77.3)	1.41 (0.5, 3.42)	0.50
		Greater than 10,799 ETB	35	11.9	6 (17.1)	29 (82.9)	1	
7	Social support	Yes	133	45.1	20 (15)	113 (85)	1	0.001
		No	162	54.9	53 (32.7)	109 (67.3)	2.74 (1.5, 4.89)	
8	Family history of depression	Yes	20	6.8	12 (60)	8 (40)	5.2 (2.05.13.45)	0.001
		No	275	93.2	61 (22.2)	214 (77.8)	1	

Note: 1: reference category.

Regarding educational status, this study reveals that those illiterate and able to read and write were more likely found to be depressed than those having an educational level above primary school. This study result was much higher than the study done in China.[18] This is due to difference in economic level and difference to use a cutoff point to diagnose depression.

Besides, this study also showed that those who had family history of depression, not adhered respondents, and those having uncontrolled hypertension were found to be 7, 7 and 11 times more likely depressed than those who had depressed respectively. This was higher than the study done in India in which those having family history of depression were AOR (95% CI) 3.562 (1.972–6.585),

Table 2 Behavioral Characteristics and Factors Associated with Depression for Hypertensive Patients in HUCSH, Hawassa, Southern Ethiopia, 2019 (n=295)

No.	Variables	Category	n	%	Depression Status		COR (95% CI)	*p* value
					Depressed	Not Depressed		
1	Alcohol drinking	Yes	45	15.3	10 (22.2)	35 (77.8)	1	0.001
		No	250	84.7	63 (25.2)	187 (74.8)	5.2 (2.05, 13.45)	
2	Smoking cigarette	Yes	34	11.5	14 (41.2)	20 (58.8)	1	0.021
		No	261	88.5	59 (22.6)	202 (77.4)	0.41 (0.19, 0.87)	
3	Chewing chat	Yes	48	16.3	15 (31.3)	33 (68.8)	1	0.256
		No	247	83.7	58 (23.5)	189 (76.5)	0.67 (0.34, 1.32)	
4	Physical activity	Regular	20	6.8	10 (22.2)	35 (77.8)	1	0.3
		Irregular	275	93.2	63 (25.2)	187 (74.8)	1.93 (0.55, 6.8)	
5	Dietary regimen	Less than or equal to 2 servings	252	85.4	64 (25.4)	188 (74.6)	1	0.53
		Greater than 2 servings	43	14.6	9 (20.9)	34 (79.1)	0.77 (0.35, 1.7)	

Note: 1: reference category.

Table 3 Disease and Medication-Related Characteristics and Factors Associated with Depression Among Hypertensive Patients in HUCSH, Hawassa, Southern Ethiopia, 2019 (n=295)

No.	Variables	Category	n	%	Depression Status		COR (95% CI)	*p* value
					Depressed	Not Depressed		
1	Duration of illness	<10 years	190	64.4	37 (19.5)	153 (80.5)	1	
		11–20 years	83	28.1	25 (30.1)	58 (69.9)	1.78 (0.96, 3.21)	0.055
		>20 years	22	7.5	11 (50)	11 (50)	4.1 (1.6, 10.26)	0.002
2	Co-morbid	Yes	90	30.5	27 (30)	63 (70)	1.48 (0.84, 2.58)	0.167
		No	205	69.5	46 (22.4)	159 (77.6)	1	
3	Complication	Yes	119	40.3	31 (26.1)	88 (73.9)	1.12 (0.65, 1.92)	0.669
		No	176	59.7	42 (23.9)	134 (76.1)	1	
4	Hypertension	Control	212	71.9	42 (19.8)	170 (80.2)	1	0.002
		Uncontrolled	83	28.1	31 (37.3)	52 (62.7)	2.4 (1.38, 4.2)	
5	Medication	Not adhered	83	28.1	30 (36.1)	53 (63.9)	2.22 (1.27, 3.89)	0.005
		Adhered	212	71.9	43 (20.3)	169 (79.7)	1	

Note: 1: reference category.

not adhered to medication were AOR (95% CI) 3.396 (1.809–6.375), and those having uncontrolled hypertension were AOR (95% CI) 4.334 (2.377–7.904)[19] and this finding is low. This might be due to the socio-demographic characteristics of the respondents. So, provision of continuous health information dissemination at a different level and controlling those patients with hypertension were crucial to bring good clinical outcome. Additionally,

Table 4 Independent Predictors Associated with Depression Among Hypertensive Patients in HUCSH, Hawassa, Southern Ethiopia, 2019 (n=295)

No.	Variables	Categories	COR (95% CI)	AOR (95% CI)	*p* value
1	Sex	Male		1	0.019
		Female	2.45 (1.4, 4.2)	2.6 (1.16, 5.83)**	
2	Age	18–39 years		1	
		40–60 years	1.57 (0.68, 3.6)	1.34 (0.44, 4.03)	0.599
		>60 years	11.2 (4.3, 28.9)	11.2 (2.98, 42)**	0.001
3	Marital status	Married		1	
		Single	2.04 (1.12, 3.6)	1.8 (0.75, 4.3)	0.015
		Widowed/di vorced	20.4 (6.3, 65.4)	44.9 (8, 250)**	0.001
4	Educational status	Illiterate	14.7 (4.13, 52.9)	29.3 (4.68, 184.3)**	0.001
		Read and write	3.54 (0.98, 12.8)	5.8 (1.01, 34)**	0.048
		1st–8th grade	2.26 (0.53, 9.5)	3.4 (0.44, 26.13)	0.239
		9th–12th grade	0.68 (0.14, 3.2)	1.49 (0.2, 10.87)	0.69
		College and university		1	
5	Social support	Yes		1	0.03
		No	2.74 (1.5, 4.89)	2.55 (1.09, 5.94)**	
6	Family history of depression	Yes	5.2 (2.05.13.45)	7.12 (1.48, 34.26)**	0.014
		No		1	
7	Hypertension	Control		1	0.001
		Uncontrolled	2.4 (1.38, 4.2)	7.57 (2.67, 21.44)**	
8	Medication adherence	Not adhered	2.22 (1.27, 3.89)	11.6 (4.23, 31.78)	0.001
		Adhered		1	

Notes: 1: reference category. **Significant association.

psycho-behavioral therapy should be strengthened in patients having familial history of depression.

Limitation

Recall bias may exist as the respondents responded to the last two weeks' situation while depressed using PHQ-9.

Conclusion

The magnitude of depression among HPN patients was found to be high. The independent predictors were sex, age, marital status, educational status, social support, family history of depression, medication adherence, and hypertension.

Recommendation

So, continuous health information dissemination at a different level regarding factors affecting them and controlling those patients with hypertension was crucial to bring good clinical outcome. Besides, strengthening a referral linkage with the psychiatric unit for psycho-behavioral therapy will bring good clinical outcome.

Abbreviation

CBE, Community-based education; HPN, Hypertension; HUCSH, Hawassa University Comprehensive Specialized Hospital; PHQ-9, Patient Health Questionnaire with 9 items; WHO, World Health Organization.

Data Sharing Statement

The data supporting the findings were available in public repositories.

Ethics and Consent Statement

The study was conducted after approval of the ethical review committee of Hawassa University College of Medicine and Health Science. Permission to conduct the study was obtained from authorities at HUCSH. Written informed consent was obtained from each study participant by assuring privacy and confidentiality throughout the data collection period in the Hospital. An individual who was unwilling to participate from the beginning or at any part of the interview was allowed to withdraw. There was no risk or hazardous procedures putting the participants at harm.

Acknowledgments

First of all, I would like to acknowledge Hawassa University College of Medicine and Health Science Community-based education office (CBE) for provision of ethical clearance. I would also like to acknowledge Hawassa University Comprehensive Specialized Hospital for providing permission for the study to be conducted in the chronic outpatient clinic.

Author Contributions

The authors contributed in conception and design, acquisition of data or analysis and interpretation of data. They also take part in drafting the article or revising and approval of the manuscript before it has been published with accountability of the work done in the manuscript.

Disclosure

The authors report no funding and no conflicts of interest in this work.

References

1. Hussien G, Tesfaye M, Hiko D, Fekadu H. Assessment of prevalence and risk factors of depression among adults in Gilgel Gibe Field Research Center, South West Ethiopia. *J Depress Anxiety*. 2017;6 (01):260. doi:10.4172/2167-1044.1000260
2. NICE. *Hypertension: Clinical Management of Primary Hypertension in Adults*. London: National Institute for Health and Care Excellence; 2011. Available from: http://www.nice.org.uk/guidance/cg127/chapter/key-priorities-for-implementation. Accessed March 11, 2020.
3. Li Z, Li Y, Chen L, Chen P, Hu Y. Prevalence of depression in patients with hypertension: a systematic review and meta- analysis. *Medicine (Baltimore)*. 2015;94:e1317. doi:10.1097/MD.0000000000001317
4. Kumar CS, Kulkarni VG. Prevalence of depression inpatients attending general medicine outpatient department for hypertension December 08, 2018.
5. Mahmood S, Hassan SZ, Tabraze M, et al. Prevalence and predictors of depression amongst hypertensive individuals in Karachi, Pakistan. *Cureus*. 2017;9:e1397.
6. Saboya PM, Zimmermann PR, Bodanese LC. Association between anxiety or depressive symptoms and arterial hypertension and their impact on the quality of life. *Int J Psychiatry Med*. 2012;40 (3):307–320. doi:10.2190/PM.40.3.f
7. WHO Depression. *Depression: A Global Public Health Concern*. Geneva: World Health Organisation; 2012. doi:10.1002/da.22048.
8. WHO A. *Global Brief on Hypertension*. Geneva: World Health Organisation; 2013. doi: 10.1016/S0140-6736(13)60772-2.
9. Legas Molla G, Mulat Sebhat H, Nasir Hussen Z, Belete Mekonen A, Fekadu Mersha W, Mekonen Yimer T. Depression among Ethiopian adults: cross-sectional study. *Psychiatry J*. 2016;Article ID 1468120.
10. Igwe MN, Uwakwe R, Ahanotu CA, Onyeama GM, Bakare MO, Ndukuba AC. Factors associated with depression and suicide among patients with diabetes mellitus and essential hypertension in a Nigerian teaching hospital,2013.cross-sectional study. *Afr Health Sci*. 2013;13(1):68–77. doi:10.4314/ahs.v13i1.10
11. Al-Dabal BK, Koura MR, Al-Sowielem LS. Magnitude of depression problem among primary care consumers in Saudi Arabia. *Institution Based Cross-Sectional study. Int J Med Sci Public Health*. 2015;4 (2):205–210. doi:10.5455/ijmsph.
12. Vivian Kapil V, Ramya Revathi R, Zubaida Sultana S. A cross sectional study of depression among patients with hypertension in a tertiary care. *Hospital*. 7(3):March-2018: ISSN No 2277-8179 | IF: 4.758 | IC Value: 93.98.
13. Neupane D, Panthi B, McLachlan CS, Mishra SR, Kohrt BA, Kallestrup P. Prevalence of undiagnosed depression among persons with hypertension and associated risk factors: a cross-sectional study in urban Nepal. *PLoS One*. 2015;10(2):e0117329. doi:10.1371/journal.pone.0117329
14. Kohrt BA, Hruschka DJ, Worthman CM, et al. Political violence and mental health in Nepal: prospective study. *Br J Psychiatry*. 2012;201 (4):268–275. doi:10.1192/bjp.bp.111.096222
15. Luitel NP, Jordans MJ, Sapkota RP, et al. Conflict and mental health: a cross-sectional epidemiological study in Nepal. *Social Psychiatry Psychiatric Epidemiol*. 2013;48(2):183–193. doi:10.1007/s00127-012-0539-0
16. Kohrt BA, Speckman RA, Kunz RD, et al. Culture in psychiatric epidemiology: using ethnography and multiple mediator models to assess the relationship of caste with depression and anxiety in Nepal. *Ann Hum Biol*. 2009;36(3):261–280. doi:10.1080/03014460902839194
17. Tilahun H, Awoke N, Geda B, Mesfin F. Depression and associated factors among adult inpatients at public hospitals of Harari regional state, Eastern Ethiopia. *Hindawi Psychiatry J*. 2018;(Article ID 6743520):6. doi:10.1155/2018/6743520
18. Gan Z, Li Y, Xie D, et al. The impact of educational status on the clinical features of major depressive disorder among Chinese women. *J Affect Disord*. 2012;136(3):988–992. doi:10.1016/j.jad.2011.06.046
19. Ashok VG, Ghosh SS. Prevalence of depression among hypertensive patients attending a rural health centre in Kanyakumari. *Natl J Community Med*. 2019;10(3):172–175.
20. World health organization guideline (WHO), 2012. doi:10.1094/PDIS-11-11-0999-PDN