Anxiety and Depression Symptoms Among Hypertensive Patients in the Outpatient Department of a Tertiary Hospital in La Union: A Cross-sectional Study

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Background: Hypertensive patients have a high risk of developing mental health conditions such as anxiety and depression. Conflicting studies are available regarding the association of blood pressure control among hypertensive patients diagnosed with comorbid anxiety and/or depression.
Objective: This study aimed to determine the association of hypertension control with anxiety and depression symptoms among patients in a tertiary hospital in La Union.
Methods: A cross-sectional analytical study was conducted among 382 hypertensive patients at the outpatient department of Ilocos Training and Regional Medical Center. A validated Filipino translation of the Hospital Anxiety and Depression Scale questionnaire was used to measure depression and anxiety symptoms. Descriptive statistics, such as frequency, percentages, mean, and standard deviation were used. The chi-square test and t-test were applied to compare anxiety and depression with socio-demographic profiles and blood pressure control through odds ratios.
Results: Out of the 382 participants, 23% have anxiety symptoms, 7.3% have depression symptoms, and 4.2% have both conditions. Age and low income were significantly associated with depression symptoms while living alone was statistically associated with anxiety symptoms. Low educational attainment was significantly associated with both depression and anxiety symptoms. While no association was found between depression symptoms and blood pressure control, the presence of anxiety symptoms increases the likelihood of poor blood pressure control.
Summary/Conclusions: Hypertensive patients may experience depression and anxiety symptoms. In addition, the presence of anxiety symptoms contributes to poor BP control. Hence, early detection and regular screening of mental health conditions should be implemented to improve health outcomes and reduce the burden of disease in this population.

Key words: anxiety, depression, hypertension

Background

The development of mental health issues has been observed in a significant number of patients with non-communicable diseases (NCDs).[1] The psychological stress, limitations in functional capacity, and overall burden of illness increase the risk of developing anxiety and depression symptoms.[2] Anxiety is the anticipation of future threats, while depression symptoms include the presence of sad, empty, or irritable mood, with somatic and cognitive changes affecting the individual's capacity to function.[3] The global prevalence of anxiety and depression among the general population is 4.05% and 3.8%, respectively, with approximately 301 million people with anxiety and 280 million people with depression.[4] One of the NCDs known to affect the physical, psychological, social, and environmental domains of health-related quality of life is hypertension.[5]

Hypertension is defined as an office BP of 140/90 mmHg or above in multiple readings using the proper standard blood pressure (BP) measurement[6,7]. A systolic BP/ diastolic BP reading of less than 140/90 mmHg is considered controlled hypertension. In contrast, uncontrolled hypertension is defined as a blood pressure of more than or equal to 140/90.[8] Hypertensive patients are more prone to develop anxiety and depression compared with the general population.[1] Cross-sectional studies conducted in Ethiopia and Nepal showed a 32.7% to 73.8% prevalence of anxiety among hypertensive patients, while the

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prevalence of depression among the same population was noted at 27.2% to 28.1%.[2,9] In the Philippines, the prevalence of anxiety and depression is 14.3 % and 26.9%, respectively, while the presence of both conditions was 13.7% in the medically ill.[10]

Several socio-demographic characteristics and clinical profiles are linked to the development of anxiety and depression among hypertensive patients. These include age, sex, marital status, educational attainment, employment, living status, monthly income, and family history of anxiety or depression.[5,9–14] The management and control of hypertension may be significantly affected by the presence of anxiety and depressive symptoms. A study conducted in the United States found that control of hypertension is faster among patients with anxiety and/or depression than those without either diagnosis.[15] However, this is in contrast with a study conducted in Northwest China and Pakistan showing a significantly increased risk of uncontrolled hypertension in depressed patients.[16,17]

While the relationship between hypertension, anxiety, and depression is already established, there are conflicting studies regarding the association between the control of hypertension and anxiety and /or depression. To date, limited studies are available regarding the association of anxiety and/or depression with hypertension control in the Philippines. With the increasing prevalence of hypertension and mental health problems, studies to determine the factors and associations of these conditions are essential to improve service delivery and emphasize the need for prevention, assessment, and treatment. This study aligns with the National Unified Health Research Agenda (NUHRA) 2017-2022 research priorities, which aim to enhance and extend healthy lives among patients with non-communicable diseases, specifically hypertension and mental health conditions.

The general objective of this study was to determine the association of hypertension control with anxiety and depression symptoms among patients at the outpatient department (OPD) of Ilocos Training and Regional Medical Center (ITRMC) using the Hospital Anxiety and Depression Scale for Filipinos (HADS-P) questionnaire. Specifically, this study aimed to (1) determine the prevalence of anxiety and depression symptoms among hypertensive patients, (2) determine the relationship between anxiety and depression symptoms and socio-demographic profiles, and (3) determine the association of blood pressure control with anxiety and depression symptoms.

Methods

A cross-sectional analytical study was used to determine the association of anxiety and depression with BP control among hypertensive patients using the Hospital Anxiety and Depression Scale for Filipino (HADS-P) questionnaire. Convenience sampling methodology was used and all patients were recruited as they came to the OPD for consultation.

The study was conducted from July 2024 to September 2024 at the Community and Family Medicine (CFM) and Internal Medicine (IM) OPD of Ilocos Training and Regional Medical Center, an 800-bed capacity tertiary hospital in La Union. Individuals consulting at the OPD who fit the following criteria were included: patients aged 19 years old and above, diagnosed with hypertension by a health professional according to ACC/AHA guidelines, and on oral anti-hypertensive medications for a minimum of 2 weeks.[18] The exclusion criteria were as follows: patients with established psychiatric illness or are currently on anti-anxiety or anti-depressant medications, diagnosed with dementia or Alzheimer's disease, with known comorbid conditions such as cancer, end-stage chronic kidney disease, and congestive heart failure, physically disabled, pregnant, patients with trouble understanding the questionnaire, patients on hypertensive urgency with an elevated blood pressure of >/= 180/120 and those with active symptoms needing immediate medical intervention such as headache, dizziness, shortness of breath, dyspnea, orthopnea, chest pain, changes in vision, neurologic deficits, and seizures.[8] The research assistant discussed the objectives, the purpose of the study, and consent to participate with the participants before signing of informed consent.

A trained healthcare worker measured each participant's blood pressure using a validated electronic upper arm blood pressure monitor after resting for at least 5 minutes.[18] The blood pressure was taken thrice at a 1–2-minute interval and the average of the last two readings were averaged to get the participant's blood pressure.[8] The participants were asked to answer a two-part questionnaire. The first part was a structured questionnaire designed to collect the socio-demographic profile of the participants. The second part was a 14-item questionnaire for screening anxiety and depression symptoms. The original version of HADS had several translations into over 50 languages. The Filipino version was validated by De Guzman et al. with a sensitivity of 75%, a specificity of 70%, and a PPV of 75%. The HADS-P questionnaire was also used in other studies.[10,12,19,20] Answers to each question were recorded on a four-point Likert scale (0-3), and scores ranged from 0 to 21. The cut-off score for the HADS was established at =/> 8 on either of the subscales for depression and anxiety.[12,20] Primary care counseling was provided to patients scoring 8 or higher. Appropriate written referrals to the Department of Psychiatry were made to participants with possible anxiety or depression based on the cutoff score.

The sample size was computed using Raosoft.com online sample size calculator tool.[19] A total of 64,197 patients were seen at the DCFM and IM OPD in 2023. The calculated sample size was 382 participants set at 95% confidence interval with a 5% margin of error.

Descriptive analysis was conducted using Epi InfoTM (Version 7.2.5.0). Descriptive statistics, such as frequency and percentages for categorical variables and mean and standard deviation for continuous variables, were calculated to describe the sociodemographic profile and prevalence of anxiety and depression among hypertensive patients.[20] The chi-square test and t-test were used to compare anxiety and depression across socio-demographic profiles of hypertensive patients.[20] The Chi-square test was also used to determine the association between anxiety and depression and blood pressure control through odds ratios.

Participation in this research study was completely voluntary, without any form of coercion. A signed informed consent was obtained before data collection. Refusal to participate or withdraw from this study did not involve any penalty or loss of benefits to which the subject is otherwise entitled. The participants were allowed to ask any questions regarding any aspect of the study at any time. Participants could withdraw from the study at any point and for any reason. There was no potential source of conflict of interest as this study was funded

by the principal investigator and not by any individual or organization. The study also included vulnerable participants such as elderly patients; hence, family members were allowed to assist if needed to ensure the well-being and autonomy of the elderly participants throughout the study. There are no monetary incentives for the participants, but snacks were provided to the participants after the data collection. Participants were assured that all information was kept with utmost privacy and confidentiality. All questionnaires were given codes using alphanumeric coding and were stored in a locked cabinet to ensure anonymity among respondents. Ethical clearance was obtained from the Cagayan Valley Medical Center Research Ethics Review Committee. Throughout the research study, necessary measures were implemented to protect the participants from any potentially harmful effects.

Results

Sociodemographic Characteristics and Prevalence of Anxiety and Depression Among Participants

A total of 382 adult hypertensive patients on antihypertensive medications for more than 2 weeks were recruited at the outpatient department of ITRMC. The average age is 60.5 ± 10.8 years. Most participants were female and married. Education levels vary, with the highest percentage having completed high school, followed by those with college education. Employment status reveals that almost half of the participants were unemployed. Majority lived with their family or relatives. Economically, most participants were classified as poor, and very few fall into the higher-income categories. A family history of depression or anxiety was reported among 6.8% of the participants. The Hospital Anxiety and Depression Scale (HADS-P) results showed that out of the 382 participants, 88 (23%) have anxiety symptoms, 28 (7.3%) patients have depression symptoms, and 16 (4.2%) have both conditions as presented in Table 1.

Table 1. Socio-demographic profile and prevalence of anxiety and depression among the study population

Characteristics	Hypertensive Patients
Age (mean ± SD, years)	60.5 ± 10.8
Sex, n (%)	
Female	269 (70.4)
Male	113 (29.6)
Marital Status, n (%)	
Single	53 (13.9)
Married	247 (64.7)
Widowed	68 (17.8)
Separated/Annulled/ Divorced	10 (2.6)
Co-habiting	4 (1)
Education, n (%)	
Elementary	77 (20.2)
High School	159 (41.6)
Vocational	33 (8.6)
College	104 (27.2)
Post-graduate	9 (2.4)
Employment status, n (%)	
Employed	90 (23.6)
Unemployed	166 (43.4)
Retired	126 (33.0)
Living status, n (%)	
Living alone	46 (12.0)
Living with family or relatives	336 (88.0)
Monthly household/ family income, n (%)	
Poor	323 (84.6)
Low income	35 (9.2)
Lower middle income	18 (4.6)
Middle middle income	3 (0.8)
Upper middle income	2 (0.5)
Rich	1 (0.3)
Family history of depression/ anxiety, n (%)	
Yes	26 (6.8)
No	356 (93.2)
HADS - P result/ score of >/= 8, n (%)	
Anxiety	88 (23.0)
Depression	28 (7.3)
Both Anxiety and Depression	16 (4.2)

Factors Associated with Anxiety and Depression Symptoms in People with Hypertension

Age and low income are significantly associated with depression. Living alone is linked with anxiety, while lower educational attainment is strongly associated with both anxiety and depression. In this study, there is a significant association between age and depression, with younger participants (mean age 56.7 ± 9.98) more likely to experience depression ($p = 0.046$). Monthly household income is also significantly associated with depression ($p = 0.003$). Those in the poorest income categories are more prone to depression. Participants who live alone are more likely to experience anxiety ($p = 0.006$) than those living with their families. Educational attainment, particularly among those completing only elementary and high school education, is significantly associated with both anxiety ($p = 0.002$) and depression ($p = 0.011$). Other factors, such as sex, marital status, and family history of depression or anxiety, show no significant associations with anxiety or depression, as presented in Table 2.

Association of Anxiety and Depression with Hypertension Control

Lastly, table 3 highlights the relationship of anxiety and depression with blood pressure control. Participants with anxiety are 62% more likely to have uncontrolled hypertension (OR 1.62, $p = 0.049$). In contrast, those with no anxiety are significantly less likely

Table 2. Socio-demographic profile associated with anxiety and depression.

Variables	HADS – P Anxiety		p value	HADS – P Depression		p value
	Absent	Present		Absent	Present	
Age (mean ± SD), years	60.6 ± 10.8	60.2 ± 11	0.639	60.8 ± 10.8	56.7 ± 9.98	0.046
Sex, n						
Female	202	67	0.180	247	22	0.326
Male	92	21		107	6	
Marital Status, n						
Single	34	19		48	5	
Married	195	52	0.219	228	19	0.371
Widowed	54	14		66	2	
Separated/	8	2		9	1	
Annulled/ Divorced	3	1		3	1	
Co-habiting						
Education, n						
Elementary	49	28	0.002	65	12	0.011
High School	118	41		147	12	
Vocational	27	6		31	2	
College	92	12		102	2	
Post-graduate	8	1		9	0	
Employment status, n						
Employed	64	26	0.284	83	7	0.635
Unemployed	129	37		152	14	
Retired	101	25		119	7	
Living status, n						
Living alone	28	18	0.006	45	1	0.153
Living with family or relatives	266	70		309	27	
Monthly household/ family income, n						
Poor						
Low income	246	77		296	27	
Lower middle income	30	5		35	0	0.003
Middle Middle income	13	5	0.568	18	0	
Upper middle income	3	0		3	0	
Rich	1	1		2	0	
	1	0		0	1	
Family history of depression/ anxiety, n	17	9	0.146	24	2	0.941
Yes	277	79		330	26	
No						

Independent Samples T test, at significance level of p<0.05.
Chi-square Test of Association, at significance level of p<0.05.

Table 3. Association of anxiety and depression with blood pressure control.

	Uncontrolled Hypertension	Controlled hypertension	OR (95% CI)	P value
No Anxiety*	172	41	0.238	<0.001
Anxiety**	122	47	1.62	0.049
No Depression*	197	57	0.0812	<0.001
Depression**	16	12	0.94	0.878
Both Anxiety and Depression**	160	9	1.66	0.323

Chi-square Test of Association, at significance level of p<0.05
*HADS-P score <8
**HADS-P score >/= 8

to have uncontrolled hypertension at 76.2% (OR 0.238, $p < 0.001$). In terms of depression, a significant association is found between the absence of depression and controlled hypertension (OR 0.0812, $p < 0.001$), where patients are 91.88% less likely to have uncontrolled hypertension. However, the presence of depression is not significantly associated with blood pressure control. Participants experiencing both anxiety and depression show no significant association with blood pressure control.

Discussion

This study explored the association of hypertension with anxiety and depression symptoms among hypertensive patients at the outpatient department of ITRMC using the HADS-P questionnaire. The prevalence rates of anxiety, depression, and both conditions were 7.3%, 23%, and 4.2%, respectively. Key findings of this study showed that age and low income were significantly associated with depression, while living alone was linked with anxiety. Lower educational attainment was strongly associated with both anxiety and depression. In terms of hypertension control, anxiety significantly correlates with uncontrolled hypertension, while depression does not significantly impact blood pressure control.

The prevalence rate of depression reported in this study was comparatively lower than in cross-sectional studies conducted among hypertensive patients in developing countries such as Nepal, Ethiopia, Morocco, and Nigeria[2,9,21,22] Similarly, the prevalence rate of anxiety was also lower compared to studies in Nepal, Ethiopia and Nigeria.[2,9,21,23] Variations in the prevalence of anxiety and depression between this study and other studies may be attributed to different settings, socio-demographic differences of study participants, differences in the screening or diagnostic instruments used, availability of mental health services, and psychosocial factors such as coping mechanisms, social support, and cultural differences.[1,9,20] Age and depression are significantly correlated with younger participants more likely to experience depression. This is contrary to previous studies with higher rates of anxiety and depression in the hypertensive older population.[5,9,24] The coping skills developed over time may make them less likely to have depression. The social stigma or generational attitudes may result in the underreporting of depressive symptoms among the elderly. Having a lower income was also associated with depression. Higher rates of mental health conditions such as anxiety and depression were reported among low-income groups.[11–14]. The additional stress of expensive medical treatment on top of daily expenses may contribute to the development of depression. Living alone was also significantly associated with anxiety. A study in Nepal showed that individuals who lived alone experienced not just anxiety but also depression.[13] In this study, lower educational attainment was strongly associated with both anxiety and depression, which was consistent with the studies conducted in Ethiopia and Nepal.[9,13] The argument could be that people with lower educational attainment may have limited awareness about the disease, and exposure to misinformation from social media creates fear and uncertainty resulting in anxiety. In contrast, a study conducted in the Philippines revealed significantly higher anxiety levels among college graduates.[20] This may be due to societal or familial expectations to succeed in life despite financial pressures and competitive job market conditions.

In terms of hypertension control, limited studies are available regarding its association with anxiety, while studies in China and Pakistan showed a correlation between depression and uncontrolled hypertension.[16,17] This research study found that anxiety significantly correlates with uncontrolled hypertension while there is no significant correlation between depression and uncontrolled hypertension. A systematic review and meta-analysis study by Pan in China suggests that anxiety and hypertension have a bidirectional association. Anxiety was identified as an independent risk factor for hypertension, with noted nocturnal and early morning blood pressure elevations in patients with anxiety. [25] Anxiety contributes a significant role in the pathophysiology of hypertension as a psychosomatic component resulting in altered autonomic regulation of the heart.[26] The presence of negative feelings and emotions in anxious patients may negatively impact medication adherence resulting in poor control of the disease.[21,27] Anxiety was also identified as one of the most common barriers that hinders lifestyle modification together with depression and stress.[28] Contrary to our findings, several studies have shown that people with anxiety and/or depression had better control of hypertension than those without either diagnosis.[15] This finding may be due to higher utilization rates of healthcare services by patients with anxiety than those without mental health conditions, resulting in better control of the disease.

These findings underscore the socio-demographic factors and psychological conditions that influence hypertension management, with anxiety being a more critical factor in blood pressure control compared to depression. Other factors such as sex, marital status, employment status, and family history of depression or anxiety were found to have no significant associations with anxiety and depression in hypertensive patients.

This study has several limitations. The participants were recruited through a single center, potentially limiting the generalizability of current findings. The participants may not represent the entire population since patients with severe conditions were excluded from the study. The HADS-P questionnaire screens for the presence of anxiety and depression symptoms but is not a diagnostic tool for the definitive diagnosis of anxiety and/or depression.

Conclusions and Recommendations

A lower prevalence of anxiety and depression symptoms was noted among hypertensive patients who consulted at ITRMC compared to most of the existing literature. However, those with anxiety symptoms demonstrated higher rates of uncontrolled hypertension compared to those without anxiety or depression.

Healthcare providers should implement routine screening programs for mental health conditions in hypertensive patients at the first contact of care and reassessment during subsequent follow-ups to ensure early detection and management of such conditions. Collaboration among primary care physicians, specialists, and mental health professionals may help improve patient outcomes and decrease the disease burden among patients. The researchers suggest a multicenter setting in future studies to enhance the generalizability of results and random sampling

methodology to ensure adequate representation of key subgroups. Statistical methods like multiple regression are recommended to adjust for the impact of confounding variables. Prospective studies may be conducted to monitor and assess disease outcomes over time.

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