ORIGINAL RESEARCH

Prevalence and Predictors of Depression Symptoms Among Afghan Hypertensive Patients: Secondary Analysis of a Multi-Center Cross-Sectional Study

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Background: Although depression is a frequently occurring mental disorder in patients with hypertension, little is known about the symptoms of depression among Afghan hypertensive patients.

Objective: This study aimed to analyze the prevalence and predictors of depression symptoms among Afghan hypertensive patients.

Methods: This was a secondary analysis of a multi-center cross-sectional study conducted between August and December 2022 across three major provinces in Afghanistan. Socio-demographic and clinical characteristics of the eligible participants were used in the analysis. A score of ≥ 5 on the PHQ-9 (Patient Health Questionnaire) was considered the cut-off point for labeling hypertensive patients as screening positive for depressive symptoms. We performed binary logistic regression to determine the predictors of depression symptoms among hypertensive patients.

Results: Out of 853 hypertensive patients, 51.8% (95% CI: 48.4–55.2%) had depressive symptoms. Binary logistic regression revealed that low monthly household income [AOR=1.42, 95% CI (1.01–1.97), low education level [2.41 (1.57–3.71)], physical inactivity [1.81 (1.22–2.71)], poor blood pressure control [2.41 (1.57–3.71)], and the presence of medical comorbidity [1.59 (1.15–2.19)] were the predictors of depression symptoms.

Conclusion: This study showed a high prevalence of depressive symptoms among Afghan hypertensive patients. Moreover, we found that low monthly household income, physical inactivity, low education level, poor blood pressure control, and the presence of medical comorbidity were the predictors of depression symptoms. Our findings suggest that hypertensive patients should be screened for mental health symptoms, and those most at risk for depression should seek supportive counseling.

Keywords: hypertension, depression, determinants, Afghanistan

Introduction

Hypertension remains a pressing public health concern, contributing largely to global disability and mortality (19% of all deaths).[1] In Afghanistan, hypertension is considered one of the major healthcare problems.[2] The estimated prevalence of hypertension among the Afghan adult population is approximately 25%.[3,4] Existing evidence highlights significant challenges in managing hypertension, partly due to an undermined health system and persistent sociopolitical and economic instability.[2,5] Mental health is sensitive to chronic medical conditions and their health and economic consequences.[6]

   Depression in patients with hypertension has generally been associated with dire consequences, including a higher likelihood of uncontrolled hypertension, poor medication adherence, financial stress, and a decreased quality of life (QOL).[7–10] In a multi-center study, depression was associated with a substantially higher risk of cardiovascular death.[11]

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Moreover, higher rates of clinical inertia and uncontrolled hypertension were reported in another study.[12] Together, early findings suggest that depression in patients with hypertension is associated with adverse outcomes and should be an issue of great importance for policymakers and clinicians.

Previous research has reported on depression symptoms prevalence among hypertensive patients.[7,13,14] A meta-analysis encompassing 41 studies found that the pooled prevalence of depression in hypertensive patients was 26.8%.[13] Another meta-analysis by Dutta et al showed that the prevalence of depression among Indian hypertensive patients was 39.8%.[15] According to a single-center study from Afghanistan, 58.1% of hypertensive patients were estimated to have depression symptoms.[16] This study also reported a comorbid depression-anxiety prevalence of 28.2% in hypertensive patients.[16] However, more representative data are needed to guide policy efforts and specific interventions targeted at hypertension treatment in the country.

Several studies have identified factors associated with depression symptoms in hypertensive patients.[7,13,16] These include female gender, older age, low education level, presence of comorbid illness, poor blood pressure (BP) control, single marital status, physical inactivity, family history of depression, low social support, poor medication adherence, and lower socioeconomic status.[7,15,17,18] A previous study conducted in Afghanistan found that older age and diabetes mellitus are associated with depression symptoms in hypertensive patients.[16] More details on context-specific factors predicting depression symptoms among hypertensive patients might further focus interventions on the patients most affected.

In a meta-analysis of 27 randomized clinical trials (RCTs), combination treatment for depression and hypertension significantly improved blood pressure control.[14] Furthermore, it enhanced the efficiency of anti-hypertensive therapy.[14] Moreover, an observational cohort study in Estonia found that depression therapy improves adherence to anti-hypertensive medications (AHMs).[19] Despite these benefits, almost no data are available on the screening and management of depression symptoms among hypertensive patients in Afghanistan.

Research on the prevalence and predictors of depression symptoms among Afghan hypertensive patients is limited.[20] Previous research regarding the prevalence and associated factors of depression in hypertensive patients was undertaken at a single outpatient department.[16] Therefore, we conducted this multi-center study to analyze the prevalence and predictors of depression symptoms among Afghan hypertensive patients. The findings of this study may help policy-makers and clinicians to develop effective interventions for patients with both depression and hypertension.

Methods
Data Source
This was a secondary analysis of a multi-center cross-sectional conducted between August and December 2022 across three major provinces in Afghanistan. Briefly, the study sites were Mirwais Regional Hospital in Kandahar province, Paktia Regional Hospital in Paktia province, and Ibn Sina Hospital in Kabul province. Each of these hospitals has a designated site for hypertension treatment services. The study population consisted of randomly selected adult hypertensive patients (who received anti-hypertensive treatment for at least three months) visiting the study sites for follow-up treatment during the study period. Details on the sample size, sampling procedure, and data collection procedures are described previously.[3]

Study Variables
Outcome Variable
In our study, depression was classified as the outcome variable and assessed using the Pashtu version of the Patient Health Questionnaire (PHQ-9). The PHQ-9 consists of nine items and mainly evaluates depressive symptoms over the past two weeks using a 4-point (0–3) Likert scale.[21] The PHQ-9 severity ratings were used to define levels of depression: none/minimal depression (0–4), mild depression (5–9), moderate depression (10–14), moderately severe depression (15–19), and severe depression ($\geq$ 20).[21] A score of $\geq$ 5 on PHQ-9 was considered the cut-off point for labeling hypertensive patients as screening positive for depressive symptoms.[3,21] The Pashtu version of PHQ-9 has been used in multiple previous studies,[3,22,23] and demonstrated acceptable internal reliability in this study (Cronbach's α=0.92).

Independent Variables

The sociodemographic variables we examined included age, sex, education, residence, marital status, occupation, income, and Body Mass Index (BMI).

Clinical characteristics were current smoking status, physical activity, disease duration, knowledge of hypertension, number of AHMs, hypertension control status, presence of medical comorbidity, and compliance with antihypertensive treatment. Compliance was assessed using the Hill-Bone compliance scale, which is described in detail elsewhere.[3,22]

Blood pressure was measured in accordance with the American Heart Association's guidelines for blood pressure assessment.[21] To measure BP, we used a portable sphygmomanometer, recording the average of three readings.[3,21] Hypertensive patients, with medical treatment who had a systolic blood pressure (SBP) greater than or equal to 140 mmHg and/or diastolic blood pressure (DBP) greater than or equal to 90 mmHg were classified as having poor BP control.[3]

In this study, we have employed the term "presence of medical comorbidity" to denote a chronic health problem, such as cardiovascular disease (CVD), chronic kidney disease, Diabetes Mellitus (DM), and chronic respiratory diseases, that a patient might have suffered in addition to hypertension.

Statistical Analysis

We used Statistical Package for the Social Sciences (SPSS) version 26 for data analysis in July 2024. Descriptive statistics, such as frequency and percentage were used to describe sociodemographic and clinical variables using tables and graphs. We conducted bivariate analysis for all independent covariates. Variables with a p-value of < 0.25 were retained in the multivariable logistic regression model. The binary logistic regression was conducted to determine the predictors of depression symptoms in the sampled population. A p-value of <0.05 was considered significant.

Results

As shown in Table 1, there were 853 patients receiving anti-hypertensive follow-up treatment in the designated study sites between August and December 2022. The mean age was 47.5 (SD 9.5) years, with 45.5% of the patients in the 40–49 years age group. Of all the participants, around half (431; 50.5%) were males, 445 (52.2%) were urban residents, and most patients (777; 91.1%) were married. The majority (584; 68.5%) of patients had no formal education, 239 (28%) were self-employed, and 397 (46.5%) lived in families with more than eight members. Moreover, 573 (67.2%) had a household income < 10,000/month (equivalent to 150 USD, July 2024), and 195 (22.9%) of them were overweight/obese (Table 1).

Table 1 Socio-Demographic Characteristics of the Hypertensive Patients (n=853)

Variables	Frequency (%)
Age (In completed years)	
18–29	20 (2.3)
30-39	124 (14.5)
40–49	388 (45.5)
50-59	232 (27.2)
≥ 60	89 (10.4)
Sex	
Male	431 (50.5)
Female	422 (49.5)

(*Continued*)

Table 1 (Continued).

Variables	Frequency (%)
Residence	
Urban	445 (52.2)
Rural	408 (47.8)
Marital status	
Single	19 (2.2)
Married	777 (91.1)
Widowed/Divorced	57 (6.7)
Educational status	
No formal education	584 (68.5)
Primary	93 (10.9)
Secondary	92 (10.8)
High school graduate	67 (7.8)
Higher studies	17 (2.0)
Employment status	
Self-employed	239 (28.0)
Public employed	43 (5.0)
Private/NGO employed	24 (2.8)
Housewife	273 (32.1)
Unemployed	274 (32.1)
Household members	
≤8	456 (53.5)
>8	397 (46.5)
Monthly household income (in Afghanis)	
< 10,000	573 (67.2)
10,000–20,000	207 (24.3)
> 20,000	73 (8.5)
BMI status	
Underweight	10 (1.2)
Normal weight	648 (75.9)
Overweight	138 (16.2)
Obese	57 (6.7)

Abbreviations: BMI, Body Mass Index; NGO, Non-Governmental Organizations.

Of the total participants, 452 (53%) had hypertension for more than five years, 659 (77.3%) had uncontrolled hypertension, 415 (48.7%) had a family history of hypertension, and more than one-third (328; 38.5%) had a medical comorbidity. Further, 575 (67.4%) patients had poor knowledge of hypertension, 333 (39%) were on three or more AHMs, and 359 (42.1%) had poor compliance with anti-hypertensive treatment. Moreover, most (683; 80.2%) patients were physically inactive, and nearly one-third (245; 28.7%) of them were currently smoking (Table 2).

Out of 853 hypertensive patients, 442 had depressive symptoms according to the PHQ-9 scale, giving a depression prevalence of 51.8% (95% CI: 48.4–55.2%). The prevalence of mild, moderate, moderate to severe, and severe depression was 10.9%, 27.4%, 13%, and 0.5%, respectively (Figure 1).

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Table 2 Clinical Characteristics of the Hypertensive Patients (n=853)

Variables	Frequency (%)
Duration of hypertension (years)	
1–5	401 (47.0)
≥ 5	452 (53.0)
Family history of hypertension	
Yes	415 (48.7)
No	438 (51.3)
Knowledge of hypertension	
Good	278 (32.6)
Poor	575 (67.4)
Comorbid medical disease	
Yes	328 (38.5)
No	525 (61.5)
Number of AHMs	
Monotherapy	230 (27.0)
Dual therapy	290 (34.0)
≥ 3	333 (39.0)
Blood pressure control status	
Controlled	194 (22.7)
Uncontrolled	659 (77.3)
Compliance with anti-hypertensive treatment (HB-compliance scale)	
Good compliance	117 (13.7)
Moderate compliance	377 (44.2)
Poor compliance	359 (42.1)
Currently smoking	
Yes	245 (28.7)
No	608 (71.3)
Physical activity	
Yes	169 (19.8)
No	684 (80.2)
Level of physical activity (n=169)	
Low	45 (26.6)
Moderate	85 (50.3)
High	39 (23.1)

Abbreviations: AHMs, Anti-Hypertensive Medications; HB, Hill-Bone.

As shown in Table 3, binary logistic regression indicated that low monthly household income [AOR=1.42, 95% CI (1.01–1.97), low education level [1.67 (1.19–2.33)], physical inactivity [1.81 (1.22–2.71)], poor blood pressure control [2.41 (1.57–3.71)], and the presence of medical comorbidity [1.59 (1.15–2.19)] were associated with depressive symptoms among the sampled patients (Table 3).
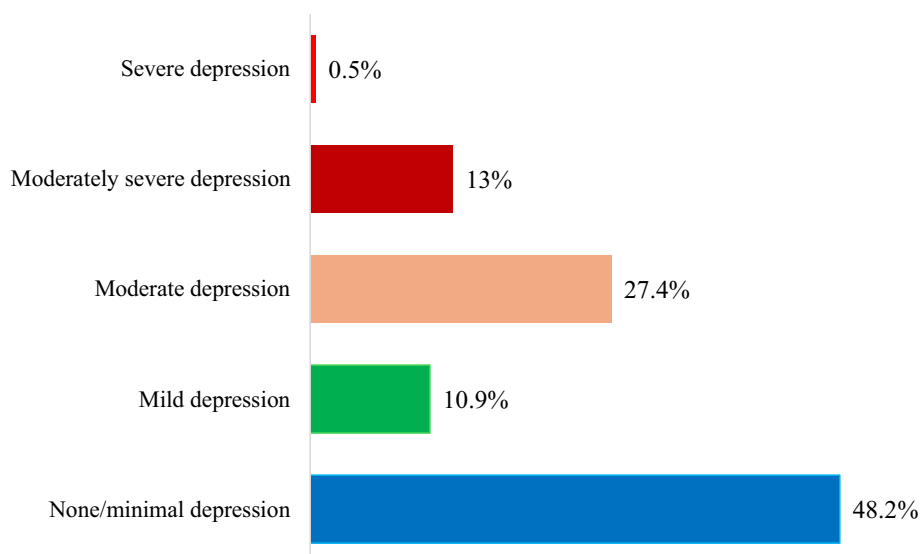
Discussion

Depression is a prevalent mental disorder among patients with hypertension.[13] It carries a heightened risk of poor prognosis, financial stress, and functional impairment.[7] In this multi-center cross-sectional study, we found that more than half (51.8%) of the patients had depressive symptoms. Moreover, we found that low monthly household income,

Table 3 Logistic Regression Analysis Results on Predictors of Depression Symptoms Among Afghan Hypertensive Patients; Crude and Adjusted Odds Ratios with 95% CIs

Covariates	Categories	Depression		COR (95% CI)	P-value	AOR (95% CI)	P-value
		Yes	No				
Residence	Rural	224	184	Ref	0.08	-	-
	Urban	218	227	1.13 (0.98–1.30)			
Educational status	Educated	123	146	Ref	0.016	Ref	0.002
	Uneducated	319	265	4.40 (2.51–7.74)		1.67 (1.19–2.33)	
Employment status	Employed	275	304	Ref	<0.001	-	-
	Unemployed	167	107	1.72 (1.28–2.31)			
Marital status	Currently married	397	380	Ref	0.177	-	-
	Currently unmarried	45	31	0.72 (0.44–1.16)			
Household income	5000–10,000	329	244	1.99 (1.49–2.66)	<0.001	1.42 (1.01–1.97)	0.038
	> 10,000	113	167	Ref		Ref	
Currently smoking	Yes	139	106	1.32 (0.97–1.77)	0.068	-	-
	No	303	305	Ref			
Physical activity	Yes	55	114	Ref	<0.001	Ref	0.003
	No	387	297	2.70 (1.89–3.85)		1.81 (1.22–2.71)	
Time since diagnosis	1–5 years	169	232	Ref	<0.001	-	-
	> 5 years	273	179	2.09 (1.59–2.75)			

(Continued)

Table 3 (Continued).

Covariates	Categories	Depression		COR (95% CI)	P-value	AOR (95% CI)	P-value
		Yes	No				
Family history of hypertension	Yes No	254 188	161 250	2.09 (1.59–2.75) Ref	<0.001	- 	-
Hypertension knowledge	Satisfactory Unsatisfactory	116 326	162 249	Ref 1.82 (1.36–2.44)	<0.001	- 	-
No of AHMs	Single Multiple	101 341	129 282	Ref 1.54 (1.13–2.09)	0.005	- 	-
Hypertension status	Controlled Uncontrolled	52 390	142 269	Ref 3.95 (2.78–5.63)	<0.001	Ref 2.41 (1.57–3.71)	<0.001
Medical comorbidity	Yes No	198 244	130 281	1.75 (1.32–2.32) Ref	<0.001	1.59 (1.15–2.19) Ref	0.004
Compliance with treatment	Yes No	230 212	264 147	Ref 1.65 (1.25–2.17)	<0.001	- 	-

Abbreviations: AHMs, Anti-Hypertensive Medications; COR, Crude Odds Ratio; AOR, Adjusted Odds Ratio; CI, Confidence Interval.

low education level, physical inactivity, poor blood pressure control, and medical comorbidity were significant predictors of depressive symptoms in the studied population.

Literature documenting the prevalence of depression among hypertensive patients in low and middle-income countries (LMICs) showed various results. For example, in Ethiopia, 32.4% of hypertensive patients were found to have depression.[7] In contrast, in India, the prevalence rate of depressive symptoms among hypertensive patients was about 39.8%.[15] The prevalence of depression (51.8%) in our sample of hypertensive patients was comparable to previous findings (58.1%) in Afghanistan,[16] but notably higher than in LMICs.[7,15,18] Compared to LMICs, persistent sociopolitical instability, higher illiteracy rates, financial stress, limited psychosocial help, and more traumatic life events could be factors in Afghanistan that may contribute to our observation of higher levels of depression in our study.[24] Taken together, our findings call on clinicians to screen for depression symptoms in hypertensive patients, and those most at risk for depression should be given supportive counseling.

In terms of educational attainment, patients with a low level of education had a higher risk of developing depression symptoms, which is consistent with previous studies from LMICs.[25,26] Moreover, the relationship between educational attainment and depression symptoms in chronic medical conditions is consistently reported across studies.[27] We argue that limited access to crucial healthcare information and difficulties in navigating healthcare resources could be associated with symptoms of depression in such patients. Other factors linked to low education levels, such as limited employment opportunities and financial stress, may also contribute to depression symptoms.[25] Our study was conducted in a country where numerous sociocultural and political barriers to education have historically existed, especially for women.[28] The majority of participants (68.5%) in this study had no formal education, and a great need for targeted mental health services and counseling is warranted. Therefore, interventions to curtail mental health symptoms in hypertensive patients should prioritize patients with lower levels of education.

Previous studies have suggested that household socioeconomic status is one of the demographic factors contributing to depression symptoms in hypertensive patients, and those with lower socioeconomic status were more likely to have depression symptoms.[7,15,29] Our findings support this, showing that patients with a low monthly household income were at high risk of developing depression symptoms. Low income alone is a risk factor for depression, and the challenges in managing this chronic medical condition superadd to the psychological burden, exacerbating the symptoms of depression.[15,27] The persistent economic difficulties in Afghanistan, which are now compounded by the arduous economic conditions, and by the global economic sanctions imposed in August 2021, may place Afghan hypertensive

patients under further financial stress.[30] In terms of policy relevance, policy efforts and interventional strategies against depressive symptoms should specifically focus on low-income patients.

This study found a higher depression prevalence among physically inactive hypertensive patients, which was consistent with studies conducted in India,[31] and Korea.[32] In a meta-analysis of 18 studies, Gan et al reported that physical inactivity was associated with a 3.42 times greater risk of developing depression in adults with hypertension.[25] Moreover, the benefits of physical activity in mitigating complications related to hypertension are well documented.[33] In Afghanistan, many sociocultural and infrastructural challenges present important obstacles to sufficient physical activity.[34] Considering these challenges, physical inactivity remains high (80.2%), as indicated by our findings. The study's findings will help clinicians encourage their patients to engage in sufficient physical activity, not only to alleviate depression symptoms but also to control blood pressure and prevent further cardiovascular complications.

The odds of depression were 2.41 times greater in patients who had poor blood pressure control. Depression is also a risk factor for uncontrolled hypertension,[35] and several studies report that depression is prevalent in patients with uncontrolled hypertension.[3,7,15,18,31] In our previous study, we also found that patients with depressive symptoms were 1.9 times more likely to have uncontrolled hypertension.[3] Non-adherence to AHMs is linked to depressive symptoms in hypertensive patients.[22] Both uncontrolled hypertension and non-adherence to AHMs increase the risk of cardiovascular complications to a greater extent. Therefore, patients with uncontrolled hypertension should be given supportive psychotherapy.

Consistent with previous studies,[7,15,17,18] we observed a higher depression prevalence in patients with concomitant medical conditions. Generally speaking, comorbid medical patients have a high risk of depression due to the added physical and emotional burden of managing multiple health conditions.[36] Additionally, the complexity of treatment regimens and the potential for reduced quality of life can further exacerbate depressive symptoms.[9] Hence, attention should also be given to hypertensive patients with medical comorbidities for screening and management of depression.

Limitations

This study has some limitations. First, depressive symptoms were self-reported, which may introduce bias (social desirability bias) into our findings. Second, PHQ-9 based diagnosis of depression symptoms, rather than clinical diagnosis, can be highly variable. However, PHQ-9, as a diagnostic tool for depression symptoms, has good psychometric properties in patients with chronic medical conditions.[21] Third, the secondary data limited our investigation of diverse factors predicting depression symptoms. Therefore, future studies should consider other potential factors, such as social support level, the use of anti-depressants, and history of mental health problems in their analysis. Finally, the cross-sectional study design precludes us from establishing causality between depression symptoms and study variables.

Conclusion

This study showed a high prevalence of depressive symptoms among Afghan hypertensive patients. Moreover, we found that low monthly household income, physical inactivity, low education level, poor blood pressure control, and the presence of medical comorbidity were the predictors of depression symptoms. Our findings suggest that hypertensive patients should be screened for mental health symptoms, and those most at risk for depression should seek supportive counseling.

Data Sharing Statement

The primary data used to support the findings of this study are available from the corresponding author upon request.

Ethical Approval

The Ethics Committee at the Faculty of Medicine, Kandahar University approved the use of secondary data for this study. For data collection in the primary study,[3] all participants provided written informed consent, and ethical principles outlined in the Declaration of Helsinki and the Good Clinical Practice (GCP) guidelines were meticulously followed.

Disclosure

The authors report no conflicts of interest in this work.

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