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Psychological stress among hypertensive male patients in Jordan: prevalence and associated factors

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Abstract

Background Hypertension is a global, modifiable risk factor for cardiovascular and cerebrovascular disorders, imposing a significant burden due to its high mortality and morbidity rates. This study aimed to assess the prevalence and severity of psychological stress among hypertensive patients in Jordan and identify the factors associated with psychological stress.

Methods This descriptive, cross-sectional study was conducted on hypertensive patients at three community healthcare clinics in Jordan from May to July 2024. A sample of 276 hypertensive male patients was randomly selected, representing 85% of the total patients in the selected clinics. Patients were selected via systematic random sampling. A self-administered questionnaire on psychological stress using the Depression, Anxiety, and Stress Scale (DASS-42) was employed. The data were collected through Google Forms and analyzed using SPSS statistical software (version 27).

Results A total of 276 hypertensive males participated in the study, and the mean score of psychological stress was 16.02(± 7.59). The prevalence of psychological stress was 55.1%, with 60 (39.5%) experiencing mild stress and 57 (37.5%) experiencing moderate stress. Chronic diseases and inadequate exercise were significantly associated with psychological stress (p -values: 0.003 and < 0.001 , respectively). Participants reporting stressful work were more than four times more likely to experience psychological stress than those who did not report work-related stress (OR = 4.06; 95% CI: 2.00–8.25; $p < 0.001$). A stressful home environment and insufficient sleep were also significantly associated with psychological stress ($p = 0.026$ and $p < 0.001$, respectively).

Conclusions The results highlight a strong association between psychological stress and hypertension. Factors such as chronic diseases, insufficient exercise, occupational stress, a stressful home environment, and inadequate sleep contribute to psychological stress among hypertensive patients. These findings provide valuable insights for healthcare providers in developing tailored interventions to alleviate stress while managing hypertension.

Keywords Psychological stress, Hypertension, Associated factors, Descriptive study, Hypertensive patients

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Background

Hypertension (HTN) is defined as persistently elevated blood pressure ($\geq 140/90$ mmHg) [1]. It remains a global health challenge with profound mortality and morbidity impacts. Approximately 30% of hypertensive individuals are undiagnosed, 54% of diagnosed cases receive treatment, and only 34% achieve adequate control [2]. Annually, 9.4 million deaths result from hypertension-related complications, with an estimated 1.58 billion adults expected to be affected by 2025 [3]. In the United States, approximately 1 in 2 adults, a total of 116 million, have HTN with blood pressure $\geq 140/90$ [4, 5]. The incidence of HTN is 30% in Africa and 27% in Asia [6]. Among Arab nations, HTN affects approximately 30% of the population [7], including 26.3% of adults in Egypt [8], 27.6% in Palestine with a greater impact on adult males than females [9], and 34% in Jordan among adult men and 29% among adult females. Approximately 40% of affected individuals are unaware of their hypertensive condition, and the incidence is nearly 1 in every 3 individuals with high blood pressure [10]. This high prevalence is partly attributed to rising obesity rates and other lifestyle-related risk factors [11].

HTN is recognized as a modifiable risk factor for cardiovascular and cerebrovascular disorders [12], substantially increasing the risk of stroke, dementia, chronic renal disease, coronary artery disease, coronary heart disease, and heart failure severity [13]. Preventive strategies including weight management, a nutrient-rich diet, regular physical activity, and limited alcohol intake, are advocated globally [14]. Current hypertension management guidelines stress early detection, lifestyle changes, and pharmacotherapy targeting blood pressure below 130/80 mmHg for individuals with additional risk factors [15]. Psychological stress is increasingly implicated as a modifiable risk factor for HTN. Defined as a systemic response to environmental threats or demands, stress activates the Sympathetic Nervous System (SNS) and the Hypothalamic-Pituitary-Adrenal (HPA) axis, which release stress hormones (e.g., epinephrine, norepinephrine, and cortisol) that elevate heart rate and vascular resistance [16]. Chronic stress results in prolonged SNS and HPA activation, leading to sustained hypertension. Long-term exposure to stress hormones can also impair vascular function, exacerbate renal salt retention, and increase cardiovascular strain, leading to increased HTN risk [17].

Long-term psychological stress limits adaptation to physical and biological challenges such as cardiovascular strain, immunological suppression, metabolic malfunction, cognitive impairment, and endocrine abnormalities [18]. Limited social bonds can increase stress reactivity and elevate blood pressure over time [19, 20]. Psychosocial stressors can increase blood pressure in individuals

predisposed to biological and psychological factors, leading to structural changes in the heart and blood vessels, inflammation, and vasoconstriction [21, 22]. Psychological stress is a potentially modifiable risk factor for high blood pressure [23]. It may lead to changes in the neuroendocrine and immunological systems, increasing the risk of cardiovascular diseases such as HTN [17]. Unregulated blood pressure, limited educational status, physical inactivity, and poor household income are significantly associated with anxiety and psychological stress symptoms [24]. The presence of psychological stress not only increases the occurrence of HTN but also correlates with inadequate management of HTN, unhealthy lifestyle behaviours, and failure to adhere to treatment plans [25].

Another study showed that the prevalence of psychological stress among hypertension patients was 84.3%. The predominant psychological stresses identified in the patients included financial reliance on others, residing in rental accommodations, having a marriageable daughter due to linked dowry concerns, bereavement, sleep disturbances, and indebtedness, among others. Individual psychological stress results in diminished adherence to therapy and inadequate blood pressure regulation [26]. A research study conducted by Bhelkar et al. (2018) explained that elevated psychological stress levels were markedly associated with hypertension. Excess weight and obesity, together with insufficient physical activity, were substantially associated with hypertension. Psychological stress has been identified as an independent risk factor for hypertension [27]. Approximately one-third of Jordanian people suffer from hypertension [10], and many Jordanians experience moderate to severe psychological stress and anxiety because the economic crisis and challenging economic circumstances are impacting their lifestyle and health status [28]. Another study was conducted by Nour et al. (2024) aimed to evaluate the prevalence of psychological stress among hypertensive men as well as determine the risk factors causing psychological stress in Jordan. The main findings showed that psychological stress is the main modifiable risk factor of hypertension, which may reduce blood pressure and maybe prevent the onset of hypertension should be implemented [29].

Our study specifically focuses on male hypertensive patients in Jordan, a group that hasn't been deeply explored in the context of the unique socio-economic stressors they face. In Jordan, men often carry the cultural expectation of being the main financial supporters of their families, and this responsibility is amplified by the ongoing economic crisis and high unemployment rates. These socio-economic pressures can significantly increase stress levels, adding a distinct layer to the experience of hypertension in this population. By focusing on this group, our study sheds light on an

under-researched area of hypertension management that goes beyond purely biological factors. Additionally, while many studies on hypertension focus primarily on biological mechanisms, our research integrates cultural and economic factors specific to the Jordanian context. We examine how economic instability, family pressures, and work-related stressors contribute to psychological stress among hypertensive men [10, 28–30], which distinguishes our study from others that do not consider these social dimensions. This broader view not only highlights the psychosocial influences on hypertension but also underscores the importance of considering these factors when developing management strategies for hypertensive patients in Jordan.

While the link between psychological stress and HTN is well-established, specific research into stress among hypertensive Jordanian men is sparse. This study focuses on this under-researched demographic, minimizing sex-related variables by exclusively including men to provide a clearer analysis of stress-related HTN dynamics. It aims to assess the prevalence and severity of psychological stress in hypertensive male patients in Jordan and identify contributing factors. The findings will offer health-care practitioners and policymakers evidence to support the integration of psychological care within HTN management protocols, ultimately aiming to enhance patient outcomes and quality of life.

Methods

Study design and population

This study has a descriptive, cross-sectional design and was conducted with hypertensive patients at three community healthcare clinics in Jordan from May 4 to July 28, 2024. The sample size for biomedical research was calculated via MedCalc software (Version 22.009). The criteria for the sample size calculation included a two-sided confidence level of 95%, a power of 80%, and an expected outcome (prevalence of stress among hypertensive cases) of 84.3%, based on the results of the previous literature [30]. The required sample size was 204 participants, which was increased by 20% to 245 to account for potential dropout rates. All male hypertensive patients visiting community healthcare clinics during the study period were invited to participate through systematic random sampling. The sampling included the following steps: a list of male hypertensive patients visiting the selected community healthcare clinics was established from clinic records, and the females were excluded from the list. Instead of selecting participants randomly from the entire list, systematic random sampling involves selecting patients at regular intervals. The total number of eligible patients from the three healthcare clinics was 985 hypertensive male patients, so the researcher selected every 4th patient on the list. A random starting point was

chosen to begin the selection process, starting from the 4th patient on the list, and every 4th patient was invited to participate in this study to complete the total number of participants.

Males may face unique social and cultural pressures, occupational stressors, or health-seeking behaviours that influence their likelihood of developing high blood pressure. Females were excluded because many physiological factors can increase the likelihood of psychological stress, including pregnancy and menstrual disturbances, as well as hormonal factors that may affect the reliability of the study's findings. Ultimately, 276 individuals responded and completed the Google Form survey, accounting for 85% of the total HTN patients in the selected clinics in Jordan. A sampling fraction of 3 was used, with the initial participant chosen via an automated number generator (<http://calculator.net>); subsequently, participants were selected at regular intervals of 5 without a control or comparison group.

Inclusion criteria

- Male adults aged 20 years and above with a confirmed diagnosis of HTN on the basis of clinical assessment and/or previous medical records.
- HTN was considered stable at the time of recruitment, as determined by the treating physician [31].
- Participants who provided online informed consent.

Exclusion criteria

- Patients were diagnosed with HTN within the previous year.
- Patients showed signs and symptoms of acute illness.
- Patients under 20 years old.
- Patients with self-reported psychiatric disorders, such as major depressive disorder, according to the DSM-5 [32].
- Individuals unable to read Arabic or navigate a Google Form.

Data collection instruments

A self-administered questionnaire consisting of three sections was used. The first section includes sociodemographic data, including age, marital status, education, occupation, and economic status. The second section focused on clinical factors adopted from a previous literature study [13]. It consisted of chronic diseases, smoking, substance abuse, sleep status, physical activity, the home environment, and HTN medication. The last section presents the psychological stress scale. A 14-item psychological stress scale adapted from the Depression, Anxiety, and Stress Scale (DASS-42) was used [33].

The DASS-42 is recognized for its sensitivity to varying degrees of psychological stress from mild to severe. This sensitivity is essential in a community whose psychological stress levels might fluctuate considerably due to the complex strains of health issues, economic difficulties, and social obligations. The measure facilitates a detailed comprehension of stress intensity among individuals [34].

DASS-42 is a self-administered tool created by Lovibond (1995) and has 42 items, with 14 items allocated to each subscale. Participants used a 4-point Likert scale (0=did not apply to me at all, 3=applied to me most of the time) [35]. Psychological stress levels were categorized based on scores: normal (0–14), mild [15–18], moderate [19–25], severe [26–33], and extremely severe (34 and above) [36]. The original English version of the DASS-42 has exhibited strong internal consistency, with Cronbach's alpha 0.88 [35]. The validated Arabic version was developed by Moussa et al. (2017) [34], and the test-retest reliability of the Arabic version has been validated in the prior investigation, demonstrating robust correlations (between 0.80 and 0.90) across all subscales. The scale has exhibited strong internal consistency, with Cronbach's alpha 0.85. The DASS-42 serves as a reliable instrument for assessing psychological stress among Arabic-speaking adults, including those in the present study.

Data collection procedures

Data were collected from HTN patients attending community healthcare clinics using Google Form link. Patients accessed the form via a link provided through WhatsApp during their clinic appointments and SMS reminders. The sample was recruited during the patient's visit to the clinic, and they were sent the questionnaire through WhatsApp. The questionnaire was answered at home so that the patient is comfortable, and we get more reliable and realistic results. The instructions emphasized the importance of providing precise and comprehensive information. The form was designed to anonymize responses, with data securely stored within Google's cloud infrastructure. Healthcare personnel regularly reviewed the collected data for completeness and accuracy and contacted patients if necessary to resolve any inconsistencies.

Statistical analysis

The data were organized, tabulated, and analyzed via SPSS statistical software (version 27) (IBM; Illinois, Chicago, USA). Normality was assessed via the one-sample Kolmogorov-Smirnov test, confirming parametric assumptions. Descriptive statistics were calculated, including means and standard deviations (SDs) for numerical variables and frequencies with percentages for categorical variables. Differences between subgroups were evaluated via the chi-square test. Multiple logistic

regression analysis was performed to identify independent predictors, with statistical significance set at a p -value < 0.05.

Ethical considerations

The study protocol was reviewed and approved by the Institutional Review Board of Central South University in China and the Jordanian Ministry of Health. All ethical considerations were followed throughout the study. The participants received a detailed explanation of the study's objectives and sufficient time to complete the questionnaires. Online informed consent was obtained before participation, ensuring confidentiality and privacy. Data were collected solely for research purposes, with participation being voluntary and the right to withdraw at any time.

Results

General characteristics of the participants

This study included 276 hypertensive male patients with nearly half aged between 41 and 60 years, and a notable majority being married. Educationally, 157 (56.9%) had a university degree, and 111 (40.2%) were employed in the government or private sectors. More than half of the participants had no other chronic diseases and had enough sleep time. Most of the participants were non-smokers, and nearly half engaged in regular exercise. Furthermore, half of the participants reported not taking antihypertensive medications, and a similar proportion experienced work-related stress (Table 1).

Psychological stress levels and severity

The analysis revealed that more than half of the participants had psychological stress with a proportion of 55.1%. The mean psychological stress score was 16.02 (± 7.59), with a substantial proportion of 39% reporting mild and 37% moderate psychological stress. Alarming, nearly one-quarter of the participants experienced severe to extremely severe psychological stress (Table 2).

Associations between psychological stress and demographic factors

The analysis of demographic factors revealed that educational level and economic status were significantly associated with psychological stress (p -values = 0.04 and 0.041, respectively). Participants with postgraduate education reported higher levels of psychological stress compared to those with lower educational attainment. Similarly, participants reporting insufficient economic levels were significantly more likely to experience psychological stress than those reporting sufficient financial stability. On the other hand, there are no significant associations between age, marital status, and occupation with psychological stress (p -value > 0.05) (Table 3).

Table 1 Demographic data and clinical characteristics of the study participants

Demographic Data and Clinical Characteristics		Study Participants (n = 276)	
		No.	%
Age	20–40 years	85	30.8
	41–60 years	124	44.9
	More than 60	67	24.3
Marital status	Single	96	35
	Married	180	65
Educational level	Preuniversity	77	27.9
	University	157	56.9
	Postgraduate	42	15.2
Occupation	Nonemployee	45	16.3
	Student	48	17.4
	Governmental	58	21.0
	Private sector	53	19.2
	Retired	45	16.3
Economic level	Not enough	88	31.9
	Enough	188	68.1
	Chronic diseases	No	157
Smoking	Cardiac diseases	20	7.2
	Diabetes	33	12.0
	Other	66	23.9
Drug abuse	No	209	75.7
	Yes	67	24.3
Exercise	No	251	90.9
	Yes	25	9.1
Medication of hypertension	No	157	56.9
	Yes	119	43.1
Does the work cause stress	No	146	52.9
	Yes	130	47.1
Home environment with cause stress	No	153	55.4
	Yes	123	44.6
Sleep status	Not enough sleep	104	37.7
	Enough sleep	172	62.3

Table 2 Prevalence of psychological stress and severity

DASS-42 Level	Study participants (n = 276)	
	Frequency	Percent (%)
No Psychological Stress	124	44.9
Psychological Stress	152	55.1
Mild	60	39.5
Moderate	57	37.5
Severe	29	19.1
Extremely severe	6	3.9
Total Mean (± SD)	16.02 (± 7.59)	

SD: Standard Deviation

Table 3 Association between demographic data and psychological stress scores

Demographic data		Study participants (n = 276)			
		No Psychological Stress	Psychological Stress	Chi-square test	(p-value)
Age	20–40 years	38 (44.7%)	47 (55.3%)	0.56	0.63
	41–60 years	55 (44.4%)	69 (55.6%)		
	More than 60	31 (46.3%)	36 (53.7%)		
Marital status	Single	40 (41.7%)	56 (58.3%)	0.63	0.42
	Married	84 (16.7%)	96 (53.3%)		
Educational level	Preuniversity	48 (62.3%)	29 (37.7%)	3.64	0.04*
	University	84 (53.5%)	73 (46.5%)		
	Postgraduate	20 (47.7%)	22 (52.3%)		
Occupation	Nonemployee	19 (42.2%)	26 (57.8%)	1.24	0.28
	Student	19 (39.6%)	29 (60.4%)		
	Governmental	29 (50.0%)	29 (50.0%)		
	Private sector	24 (45.3%)	29 (54.7%)		
	Retired	20 (44.4%)	25 (56.6%)		
Economic level	Other	13 (48.1%)	14 (51.9%)	4.88	0.041*
	Not enough	33 (37.5%)	55 (62.5%)		
	Enough	91 (48.4%)	97 (51.6%)		

* Significant p-value less than 0.05

Clinical characteristics and psychological stress

Several clinical factors showed significant associations with psychological stress. Chronic diseases, particularly diabetes, were strongly linked to higher levels of psychological stress (p-value=0.003). The participants who were not playing regular exercise were significantly associated with psychological stress (p-value<0.001). Moreover, participants reporting work-related stress, a stressful home environment, and insufficient sleep were all significantly more likely to experience elevated psychological stress levels (p-values<0.001) (Table 4).

Factors affecting psychological stress

Further multivariate analysis identified several key predictors of psychological stress. The students' participants have significantly lower odds of experiencing

Table 4 Association between clinical characteristics and psychological stress score

Clinical Characteristics		Study participants (n = 276)			Chi-square test	(p-value)
		Total No.	No Psychological Stress	Psychological Stress		
Chronic diseases	No	157	81 (51.6%)	76 (48.4%)	2.49	0.003*
	Cardiac diseases	20	9 (45.0%)	11 (55.0%)		
	Diabetes	33	9 (27.3%)	24 (72.7%)		
	Other	66	25(37.9%)	41(62.1%)		
Smoking	No	209	101 (48.3%)	108 (51.7%)	1.41	0.23
	Yes	67	23 (34.3%)	44 (65.7%)		
Drug abuse	No	251	109 (43.4%)	142 (56.6%)	0.40	0.52
	Yes	25	15 (60.0%)	10 (40.0%)		
Exercise	No	157	56 (35.7%)	101 (64.3%)	16.41	< 0.001*
	Yes	119	78 (65.0%)	41 (35.0%)		
Medication of hypertension	No	146	72 (49.3%)	74 (50.7%)	2.36	0.15
	Yes	130	52 (40.0%)	78 (60.0%)		
Work cause stress	No	146	87 (59.6%)	59 (40.4%)	20.82	< 0.001*
	Yes	130	37 (28.5%)	93 (71.5%)		
Home environment	No	153	87 (56.9%)	66 (43.1%)	18.36	< 0.001*
	Yes	123	37 (30.1%)	86 (69.9%)		
Enough sleep	No	104	25 (24.0%)	79 (76.0%)	18.36	< 0.001*
	Yes	172	99 (57.6%)	73 (42.4%)		

* Significant *p*-value less than 0.05

psychological stress compared to other occupational groups (OR=0.158, 95% CI: 0.032–0.793, *p*-value=0.025), while retired individuals also had significantly lower odds than others (OR=0.249, 95% CI: 0.063–0.979, *p*-value=0.047). In contrast, participants who reported smoking had nearly twice the odds of experiencing psychological stress compared to nonsmokers (OR=2.094, 95% CI: 0.991–4.423, *p*-value=0.053). Regular exercise was a protective factor, reducing the odds of psychological stress by more than half (OR=0.412, 95% CI: 0.219–0.775, *p*-value=0.006). Additionally, participants reporting a stressful work environment were over four times more likely to experience psychological stress than those who did not report work-related stress (OR=4.062, 95% CI: 2.000–8.250, *p*-value<0.001). A stressful home environment and lack of adequate sleep also significantly increased the odds of psychological stress (OR=2.106, 95% CI: 1.095–4.048, *p*-value=0.026; and OR=1.190, 95% CI: 0.094–0.384, *p*-value<0.001, respectively) (Table 5).

OR: odds ratio. *Significant: *p*-value less than 0.05.

Discussion

Psychological stress among hypertensive male patients is a critical concern that significantly influences the management and outcomes of hypertension [25]. Psychological stress is widely recognized as a potential contributor to both the development and exacerbation of HTN [23]. Various studies have explored the prevalence of psychological stress among hypertensive individuals, with some focusing specifically on male patients. These studies highlight the substantial burden of psychological stress

in hypertensive men, which is influenced by societal and biological factors [37–39]. Men might experience and report stress differently than women do, potentially leading to an underestimation of its prevalence among hypertensive men. Societal expectations around masculinity may also contribute to higher levels of unexpressed psychological stress [37].

Our study found a high prevalence of psychological stress among hypertensive male patients, with 55.1% of participants experiencing psychological stress. Notably, nearly 70% of these participants reported mild to moderate levels of stress, highlighting a pressing need for enhanced mental health support for hypertensive men. The high prevalence of psychological stress among hypertensive male patients in Jordan might be ascribed to several interrelated variables. The current economic crisis in the country has profoundly affected the everyday lives of numerous citizens, resulting in financial instability, unemployment, and restricted access to resources. This economic pressure can exacerbate stress levels, especially among males who may have a cultural or family obligation to support their families. Additionally, Jordan's healthcare infrastructure faces challenges such as limited access to comprehensive health education and mental health services, compounding the stress experienced by hypertensive patients in managing their condition effectively. Chronic or unmanaged emotional distress can exacerbate HTN and lead to adverse cardiovascular outcomes [40]. The observed prevalence rates in our study diverge from those reported in the literature, possibly due to variations in assessment tools,

Table 5 Multiple logistic regression of predictor factors affecting the psychological stress score

Variables		B	p-value	OR	95% Confidence Interval	
					Lower Bound	Upper Bound
Marital status	Married	0.332	0.440	0.717	0.309	1.667
Reference Single:						
Educational level:	University	1.779	0.206	0.169	0.011	2.667
Reference Postgraduate		0.577	0.478	1.782	0.361	8.785
Preuniversity						
Occupation	Nonemployee	1.167	0.075	0.311	0.086	1.124
Reference: Other		1.843	0.025*	0.158	0.032	0.793
Student		0.822	0.226	0.440	0.116	1.665
Governmental		0.850	0.218	0.428	0.111	1.654
Private sector		1.390	0.047*	0.249	0.063	0.979
Retired						
Chronic diseases	Cardiac Diseases	0.039	0.953	1.040	0.281	3.852
reference: No Chronic Disease		0.682	0.264	0.506	0.153	1.674
Diabetes		0.368	0.844	0.692	0.018	27.139
Other						
Smoking	Yes	0.739	0.053	2.094	0.991	4.423
Reference: No Smoking						
Drug abuse	Yes	1.048	0.061	0.351	0.117	1.051
Reference: No						
Exercise	Yes	0.886	0.006*	0.412	0.219	0.775
Reference: No						
Anti-hypertensive medication	Yes	0.682	0.11	1.977	0.857	4.564
Reference: No						
Economic level	Not enough	1.130	0.240	3.094	0.470	20.352
Reference: Enough						
Work environment	Yes	1.402	0.001*	4.062	2.000	8.250
(Reference) No stress						
Home environment	Yes	0.745	0.026*	2.106	1.095	4.048
(Reference) No stress						
Sleep	Not enough	1.660	0.001*	1.190	0.094	0.384
(Reference) Enough						
Age	41–60 years	0.472	0.469	0.624	0.174	2.238
(Reference) 20–40 years		0.672	0.155	0.511	0.202	1.291

study locations, and demographics [37, 40]. For example, Li and others (2015) reported a lower prevalence of psychological stress symptoms (26.8%) among hypertensive patients, which might be attributed to the use of different measurement tools, such as Zung's self-rating stress scale, which has high sensitivity but lower specificity than the DASS-42, which provides balanced sensitivity and specificity [38, 41].

Our findings also exceed those from hospital-based studies, such as [24], which reported a 28.8% prevalence, and [42], which reported a 63% prevalence of moderate psychological stress among hypertensive individuals. This discrepancy could reflect differences in study settings and populations. Educational level and economic status were significant factors influencing psychological stress in our study. Our study revealed that individuals with postgraduate education reported greater psychological stress. This result is consistent with some research suggesting that higher education is associated with increased psychological stress [30, 33]. Jordanian individuals with postgraduate education often hold positions of greater

responsibility, such as leadership roles. These roles tend to come with more pressure, longer working hours, and higher expectations, all of which can contribute to elevated psychological stress levels. In addition, inadequate economic status was linked to greater psychological stress, which is consistent with existing research connecting financial strain to mental health issues [37, 38].

A study reported an 84.3% prevalence of psychological stress among hypertensive patients, with predominant stressors including financial dependency, living in rental housing, dowry-related pressure associated with having a marriageable daughter, bereavement, sleep disturbances, and debt [26]. Previous research has shown that approximately one-third of Jordanians are affected by hypertension, with many experiencing moderate to severe psychological stress and anxiety due to ongoing economic crises and adverse socio-economic conditions, which profoundly affect their lifestyle and general health. A recent study by Nour et al. (2024) assessed the prevalence of psychological stress among hypertensive men in Jordan and identified associated risk factors, confirming

that psychological stress is a significant modifiable risk factor for hypertension. Reducing psychological stress may not only lower blood pressure but also help prevent the onset of hypertension highlighting the importance of integrating stress management into hypertension prevention and treatment programs [10, 28, 29].

Our study revealed that the presence of chronic diseases and inappropriate exercise were associated with psychological stress among hypertensive patients. Chronic illnesses can impose a significant burden on the Jordanian population, resulting in ongoing health issues and restrictions on everyday activities [43]. Engaging in unsuitable physical activity might worsen this stress by either not increasing physical well-being or inducing discomfort. These factors may diminish patients' capacity to manage their illness, intensify psychological strain, and negatively affect overall well-being. These findings align with other studies showing significant associations between chronic diseases, exercise, and psychological stress, underscoring the interplay between physical and mental well-being. Chronic diseases contribute to psychological stress due to daily management challenges [44, 45]. In addition, another study reported that regular exercise was associated with lower psychological stress, which aligns with an association between physical activity and mental health [46].

Our research revealed that hard work in one's occupation was one of the factors most strongly associated with psychological stress. In the Jordanian population, the combination of high job expectations, limited resources, and lack of control in the workplace can significantly increase psychological stress levels, especially for those who are responsible for controlling HTN. Moreover, the challenge of balancing job and domestic responsibilities, together with economic constraints, intensifies this psychological stress. In Jordan, the psychological stress experienced by hypertensive patients may be exacerbated by cultural and socioeconomic characteristics, including societal expectations and employment uncertainty [47]. Several studies have reported a relationship between the nature of occupational work and psychological stress. These studies noted that an increase in a hardening of occupational work was associated with psychological stress conditions and an increase in blood pressure [48–50]. Perceived psychological stress among workers is positively associated with HTN [51].

Furthermore, this study revealed that a stressful home environment and a lack of sufficient sleep are key factors contributing to psychological stress. Recurrent exposure to conflicts within the family, financial burdens, or caring obligations can intensify anxiety and emotional stress, thereby worsening the difficulty of treating a chronic illness such as HTN. The patient's capacity to relax may be restricted by this atmosphere, potentially increasing

blood pressure and exacerbating health-related consequences. Moreover, the absence of emotional assistance and perennial stress experienced at home might lead to problems for patients in successfully following treatment regimens. Optimal work-life balance and stressful family responsibilities in the home, as well as effective integration, are significant contributors to the psychological stress of hypertensive individuals [52]. Another study revealed that stressful life events and family conflicts in the home were more strongly associated with the level of perceived psychological stress [53]. Additionally, stressful home environments, along with inadequate sleeping patterns, are strongly associated with increased psychological stress levels [54, 55]. Addressing these factors is crucial for developing comprehensive mental health interventions [56].

Strengths and limitations

This study's strengths include its high response rate and the use of a random sampling approach, reducing the possibility of bias. By focusing specifically on the relationship between psychological stress and HTN, this study offers valuable insights. This study was conducted in community healthcare clinics in Jordan. Hence, these clinics offer a wide variety of demographics, ensuring that the results accurately represent the experiences of a diverse group of individuals. In addition, the questionnaire was conducted at the participants' residences, promoting more precise and objective answers. The main limitations of this study exclusively included male participants, therefore constraining the generalizability of the findings to the broader community. In addition, the study did not employ an instrument particularly crafted to assess psychological stress, which may constrain the accuracy and validity of the stress-related findings. A cross-sectional design was used in the study, which reduced the ability to make causal relationships. Lastly, the participants in this study were not included in the comparison groups, which may have impacted the accurate identification of the underlying factors contributing to psychological stress.

Conclusions

The results highlight an association between psychological stress and hypertension disease, as more than half of Jordan's hypertensive males experienced psychological stress. There are factors associated with psychological stress, including chronic diseases, insufficient exercise, occupational stress, a stressful home environment, and insufficient sleep. For healthcare providers, this study underscores the need for tailored psychological interventions targeting hypertensive patients. These interventions include cognitive-behavioural therapy to address negative thinking with mindfulness activities such as meditation

and deep breathing, as well as group counselling therapy for reducing stress and enhancing overall health outcomes. For policymakers, these findings highlight the importance of integrating mental health considerations into hypertension management protocol and advocating for broader public health initiatives to improve the mental health of chronic patients. We suggest that future research studies should encompass both male and female participants to enhance the understanding of gender variations in psychological stress. Future studies should utilize more specialized data instruments to evaluate psychological stress.

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Author contributions

A.A. (Ali Aldirawi) conceptualized the research project, led the article's production, conducted the data analysis, interpreted the findings, and wrote the manuscript. F.A. (Fadwa Alhalaqa) critically reviewed the manuscript, provided input and feedback on all aspects, and made significant revisions. A.A.W. (Abdallah Alwawi) contributed significantly to reviewing and modifying the original manuscript, performed the language review, corrections, and editing of the manuscript. S.A. (Samer Abuzerr) participated in the review process, offered valuable input on the draft, and modified manuscript elements. All authors contributed significantly to the development of the manuscript, reviewed the draft versions, and approved the final version of the manuscript for submission. A.A.W. (Abdallah Alwawi) served as the corresponding author.

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Data availability

The data in this article will be shared at a reasonable request by the first author.

Declarations

Consent for publication

NA.

Competing interests

The authors declare no competing interests.

Ethics approval

The study protocol was reviewed and approved by the Institutional Review Board of Central South University in China and the Jordanian Ministry of Health. All procedures performed in the study were in accordance with the ethical standards of the institutional research committees and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. All ethical considerations were followed throughout the study. The participants received a detailed explanation of the study's objectives and sufficient time to complete the questionnaires. Online informed consent was obtained before participation, ensuring confidentiality and privacy. Data were collected solely for research purposes, with participation being voluntary and the right to withdraw at any time.

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