

Understanding the Psychosocial Factors Affecting Hypertension Management in Vulnerable Populations

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This study was cross-sectional and carried out using a mixed approach to
explore psychosocial determinants associated with the treatment of
hypertension among vulnerable individuals in Uzbekistan. From March to

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August 2025, 320 patients suffering from hypertension with at least one year since the disease onset were randomly sampled from six health care facilities in urban and rural settings in Tashkent and Fergana provinces. The research employed several instruments, including the Cohen Perceived Stress Questionnaire, Patient Health Depression Questionnaire, Perceived Social Support Scale, Adult Health Literacy Questionnaire, and the Morisky Medication Adherence Scale. Out of the sampled patients, thirty were randomly picked based on maximum diversity for semi-structured interviews, while qualitative data were analyzed using Brown & Clark's six steps of content analysis. It was observed that 65.9% of patients experienced blood pressure out of control, even though they were under medication. In a multivariate logistic regression, high stress level (OR=1.92), low social support (OR=1.69), poor adherence to medicine (OR=2.64), and low income level (OR=1.74) were found to be the independent predictors for poor control of blood pressure. From the qualitative data analysis, the following five themes emerged: economic strain, emotional exhaustion, breakdown in support networks, mistrust toward health care system, and fatalistic culture. About 80% of participants attributed financial burden of buying medication as the major barrier and 63% reported lack of family support.

INTRODUCTION

Although it is a definite disease state in biology, as mentioned by Cuffee et al. (2014), dealing with hypertension involves much more than that and requires some kind of knowledge in this particular sphere. On top of every measurement of blood pressure, according to Spruill (2010), there is always a person involved who fights with all their complicated belief system, fears, financial problems, and psychological barriers. All of the aforementioned become especially relevant when speaking about vulnerable patients, such as poor, urban, lonely, elderly, or ethnic minorities. In some cases, even a patient's willingness to treat themselves does not matter because they depend greatly on the conditions set in the environment that they have to function within (Djuachiriaty et al., 2024; Osman et al., 2026). However, Spruill et al. (2019) noted that current guidelines and hypertension control plans tend to overlook this aspect and only offer medical treatment and nutrition advice. As a result, failure to succeed becomes repetitive and cannot be overcome through either increasing a medicine dosage or changing the drug itself since there is something different at play here (Meng et al., 2012; Hasan et al., 2026; Guangju et al., 2026; Johnson, 2019).

However, Gorman and Sivaganesan (2007) noted that psychosocial issues such as stress caused by poverty, social alienation, job insecurity, and low health literacy create strong influences that impair blood pressure management. An individual does not take his medications as prescribed. It is not because of lack of diligence but because he cannot afford them, or

because he believes that chemical medicines are bad for his well-being, or because he is so preoccupied with his daily routine that he can no longer pay attention to taking pills (Bokka et al., 2024; Alaswad et al., 2026; Alshareef et al., 2025; Dolezsar et al., 2014). Only a few pieces of research from different countries have found depression, anxiety, and inadequate social support to be strong indicators of poor blood pressure control. However, Sims et al. (2012) showed that what is missing is an understanding of how they all work together in a specific context.

And here is the urgency of the problem that must be dealt with in such a country as Uzbekistan. Uzbekistan is experiencing a quick socio-economic transformation at the moment. On the one side, due to the processes of urbanization and change of lifestyle, the share of noncommunicable diseases is growing; on the other side, there are quite a lot of people in Uzbekistan who face problems like hidden unemployment, labor migration, and destruction of the family system. And here, usual recommendations, developed by European specialists, often do not work for such a person as a housewife of Uzbekistan, which became the head of her family, or an old man who does not live with his migrant children.

To date, all studies carried out in Uzbekistan have concentrated mainly on the incidence of hypertension and the efficacy of drugs (Brondolo et al., 2011; Irfan et al., 2024; Momani et al., 2025; McCubbin et al., 2011). Importantly, Elnaem et al. (2022) confirmed that it concerns all those processes taking place in the life of patients. We have no idea how the Uzbek patients interpret the fact that they suffer from hypertension does she/he see it as a real condition or just "too much stress"? What obstacles prevent them from consuming medicines regularly? To what extent can they believe in the competence of their doctors' recommendations? Have they been left with motivation or bitterness after their previous experience with the health care system? These kinds of questions should be answered not within the laboratory setting, but among patients and in their communities (Elnaem et al., 2022; Londoño Agudelo et al., 2021; Mills et al., 2020).

This study will serve to close the aforementioned critical gap. The main objective of this research will be to examine the influence of psychological factors in the treatment of hypertension among high-risk patients in urban and rural areas of Uzbekistan through the use of mixed methods and observation. The significance of this study is not related to testing any new drugs, but rather lies in identifying hidden obstacles that reduce the efficacy of all currently available treatments.

LITERATURE REVIEW

Psychosocial Pathways to Hypertension beyond the Biomedical Model

Although seemingly a physiological condition, hypertension is deeply connected to multiple psychological and social factors. Research has found that constant stress, including stress related to poverty, discrimination, and unemployment, triggers certain neuroendocrine processes and leads to development of constant hypertension (Spruill, 2010; Spruill et al., 2019). Not only do biological factors influence this process, but also the perception of life situations by a person is crucial. The patient who feels he or she is helpless in front of external stressors gets emotionally exhausted with time, and such exhaustion decreases their adherence to treatment (Djuachiriaty et al., 2024). Depression and anxiety that are more common among vulnerable groups also complicate regulation of blood pressure, not only biologically, but also psychologically, because it reduces patients' motivation to take care of themselves (Meng et al., 2012; Johnson, 2019). Nevertheless, modern clinical practice guidelines by Cuffee et al. (2014) pay most attention to medication and lifestyle changes and do not even consider the idea that without any action related to underlying psychosocial factors, the efficacy of pharmacotherapy will also suffer.

The Role of Social Support, Health Literacy, and Cultural Context in Vulnerable Groups

Alongside the personal determinants, the social environment in which the patient exists is also crucial for the success of the therapy. Social support, whether emotional or practical, aids the patient in staying on top of their treatment; at the same time, social isolation and loneliness make the patient more susceptible to missing their pills and failing to monitor their blood pressure (Gorman & Sivaganesan, 2007; Bokka et al., 2024). There are studies indicating that low health literacy prevents patients from comprehending the doctors' prescriptions and reading medication labels, and it constitutes a major hindrance, particularly for people living in rural and poor areas (Mills et al., 2020). However, the major drawback of the existing literature mentioned by Sims et al. (2012) is the ignorance of the cultural background of the population. As another example, in societies with fatalistic views about their well-being or in regions with disruptions of the natural family structure caused by labor migration, the difficulties which patients face do not relate only to the economical and educational spheres; rather, they pertain to the cultural sphere and the changes happening there (Brondolo et al., 2011; Elnaem et al., 2022). It is in such an environment that, in the study of Londoño Agudelo et al. (2021), listening to the voice of the patient and its interpretation becomes crucial.

METHOD

Study Design and Target Population

The study involved a cross-sectional study with mixed methods (quantitative and qualitative) approach between March and August 2025 in the provinces of Tashkent and Fergana, Uzbekistan. The target population of the study comprised hypertensive patients with at least one year history of disease living in peri-urban and underserved villages. Age greater than 30 years, readiness to participate, and ability to speak either Uzbek or Russian were among the criteria for inclusion into the study. Patients with severe cognitive disorders, renal failure stage 4/5, and malignant disease were not enrolled in the study. A sampling procedure was done using two stages of clustering where six health-treatment facilities in the target areas were chosen and 320 patients included in the quantitative part of the study out of those eligible clients. Thirty patients out of these 320 patients were conveniently chosen by maximum diversity in terms of age, sex, blood pressure management, and literacy level.

Data Collection Instruments

Quantitative data were obtained by means of a structured questionnaire consisting of several parts, the first of which was devoted to socio-demographic, socio-economic status, and medical data. The tools for psychosocial measurements included translated into Uzbek and Russian versions and validated Cohen's Perceived Stress Scale (PSS-10) for measuring stress, Patient Health Depression Questionnaire (PHQ-9) for identifying the presence of depression symptoms, Multidimensional Scale of Perceived Social Support (MSPSS) for assessing support level received from a patient's family and society in general, and Morisky Medication Adherence Questionnaire-4 (MMAS-4) for evaluating medication adherence level. Health literacy assessment was carried out by means of Shortened version of the Adult Health Literacy Questionnaire (S-TOFHLA). Systolic and diastolic blood pressure were measured by a calibrated digital device; two measurements were made, after 5 minutes of rest, and their mean value was taken as the final blood pressure result. Semi-structured interviews were conducted within the qualitative part of research using the questions guide that had been developed beforehand and included such aspects as patient's lived experience with the disease, beliefs about his/her blood pressure condition, obstacles to taking medication, visit experience at medical institutions, and economic and family pressures on managing disease.

Statistical Analysis and Content Analysis

Analysis of quantitative data was done in Statistical Package for Social Sciences version 26. Multivariate logistic regression was applied to

determine psychological factors that predict blood pressure control (outcome of interest: below 140/90mm Hg). Only those variables which had significance value less than 0.2 on the univariate analysis were incorporated in the final multivariate logistic regression model. The magnitude of the association was measured as odd ratio (OR) and 95% confidence interval. In qualitative data analysis, the transcription of the interviews was done, followed by analysis according to the six steps recommended by Brown and Clark. Coding was done independently by two researchers, and extraction of subthemes and themes was done from the interview transcripts.

RESULTS

A total of 365 patients participated in the screening procedure, of which 320 became eligible participants in the quantitative phase. Out of 320, 30 diverse patients underwent qualitative interviews. Baseline demographic and clinical characteristics have been given in Table 1.

Table 1. Baseline Sociodemographic and Clinical Characteristics of Participants

Characteristic	Value
Age, years (mean $\pm$ SD)	56.2 $\pm$ 11.4
Female sex, n (%)	198 (61.9)
Rural residence, n (%)	185 (57.8)
Education $\leq$ secondary school, n (%)	216 (67.5)
Monthly household income $\leq$ minimum wage, n (%)	183 (57.2)
Unemployed or informal worker, n (%)	142 (44.4)
Living alone, n (%)	67 (20.9)
Duration of hypertension, years (mean $\pm$ SD)	7.3 $\pm$ 5.2
Systolic BP, mmHg (mean $\pm$ SD)	152.4 $\pm$ 15.8
Diastolic BP, mmHg (mean $\pm$ SD)	91.3 $\pm$ 10.2
Uncontrolled hypertension ($\geq$ 140/90 mmHg), n (%)	211 (65.9)
Number of antihypertensive medications (mean $\pm$ SD)	1.8 $\pm$ 0.8

Over half of the respondents were living on incomes that were lower than the minimum wage, while around 66 percent had uncontrolled blood pressure even when using medications. There were also many people (approximately 21 percent) who were living alone.

Table 2. Distribution of Psychosocial Measures in the Study Sample

Measure	Mean $\pm$ SD	n (%) above clinical threshold
Perceived Stress Scale (PSS-10) score	18.9 $\pm$ 6.1	172 (53.8) (score $\geq$ 18)
PHQ-9 depression score	8.2 $\pm$ 4.9	114 (35.6) (score $\geq$ 10)
MSPSS total social support score	4.8 $\pm$ 1.7	148 (46.3) (score $<$ 5)
S-TOFHLA health literacy score	23.5 $\pm$ 7.8	139 (43.4) (inadequate/marginal)
MMAS-4 medication adherence score	1.9 $\pm$ 0.9	127 (39.7) (low adherence, score $<$ 6 on recoded scale)

Scores on questionnaires showed that there is a very high level of perceived stress and social support among this particular population. In addition, more than a third of the patients were suffering from depression and non-adherence to medication.

Table 3. Blood Pressure Control Status Stratified by Key Demographic Factors

Factor	Controlled (n=109)	Uncontrolled (n=211)	P-value
Age $\geq$ 60 years, n (%)	41 (37.6)	103 (48.8)	0.06
Female sex, n (%)	72 (66.1)	126 (59.7)	0.28
Rural residence, n (%)	55 (50.5)	130 (61.6)	0.06
Low income, n (%)	50 (45.9)	133 (63.0)	0.004
Living alone, n (%)	16 (14.7)	51 (24.2)	0.05

Management of blood pressure was significantly worse among individuals with low income and among individuals living alone. Rural location and advanced age also seemed to have some effect on uncontrolled blood pressure; however, statistical significance for these two factors was not reached.

Table 4. Univariate Associations between Psychosocial Factors and Uncontrolled Hypertension

Psychosocial Factor	OR (95% CI)	P-value
High perceived stress (PSS-10 $\geq$ 18)	2.45 (1.52–3.95)	$<$ 0.001
Depression (PHQ-9 $\geq$ 10)	2.18 (1.33–3.57)	0.002
Low social support (MSPSS $<$ 5)	1.98 (1.23–3.19)	0.005
Inadequate health literacy (S-TOFHLA)	1.76 (1.09–2.84)	0.02
Low medication adherence (MMAS-4)	3.12 (1.92–5.08)	$<$ 0.001
Living alone	1.83 (1.00–3.34)	0.049

Univariate analyses showed that all psychosocial variables were significantly related to having uncontrolled hypertension. Poor adherence to medicine had the highest odds ratio, followed by high levels of perceived stress.

Table 5. Multivariable Logistic Regression Model for Predictors of Uncontrolled Hypertension

Variable	Adjusted OR (95% CI)	P-value
High perceived stress	1.92 (1.12–3.30)	0.02
Depression (PHQ-9 ≥ 10)	1.58 (0.89–2.81)	0.12
Low social support	1.69 (1.01–2.84)	0.046
Inadequate health literacy	1.41 (0.83–2.39)	0.20
Low medication adherence	2.64 (1.56–4.48)	<0.001
Low income	1.74 (1.04–2.91)	0.03
Living alone	1.55 (0.82–2.93)	0.18

Following adjustment for all covariates, high stress perception, low social support, poor medication compliance, and low income were independently associated with uncontrolled BP. Depression and low health literacy were statistically insignificantly associated with one another following covariate adjustment.

Table 6. Medication Adherence Levels and Their Association with Psychosocial Distress

Adherence Level (MMAS-4)	n (%)	Mean PSS-10 Score	Mean PHQ-9 Score	Mean MSPSS Score
High adherence	114 (35.6)	16.2 $\pm$ 5.4	6.1 $\pm$ 3.8	5.4 $\pm$ 1.5
Medium adherence	79 (24.7)	19.5 $\pm$ 5.8	8.5 $\pm$ 4.2	4.8 $\pm$ 1.6
Low adherence	127 (39.7)	21.3 $\pm$ 6.3	10.1 $\pm$ 5.1	4.3 $\pm$ 1.8
P for trend	—	<0.001	<0.001	<0.001

With the decline in adherence to medication, there was an increase in average stress and depression scores, while social support decreased significantly. This pattern shows that there is a very strong connection between treatment adherence and psychosocial health.

Table 7. Health Literacy Categories and Blood Pressure Control Status

Health Literacy Level	n (%)	Controlled BP, n (%)	Uncontrolled BP, n (%)	P-value
Adequate	181 (56.6)	75 (41.4)	106 (58.6)	0.002
Inadequate/Marginal	139 (43.4)	34 (24.5)	105 (75.5)	

Individuals with low or marginal health literacy were found to be much less successful in achieving their desired blood pressure level. This difference of 17% highlights the significance of the capacity to comprehend health information.

Table 8. Summary of Qualitative Themes and Subthemes from In-depth Interviews

Main Theme	Subthemes	Illustrative Quote
Economic Strain as a Wall	Cost of medications, prioritizing food over health, hidden transportation costs	"I know I should take the pill every day, but when I have to choose between bread for my grandchildren and my medicine, the bread wins."
Emotional Exhaustion	Anxiety about the future, internalized stigma of being "sick", fatigue from chronic stress	"I'm tired of thinking about my pressure, tired of being afraid. Some days I just give up."
Fragmented Support Networks	Absence of migrant children, emotional loneliness, lack of practical help	"My son calls from Russia once a month and says 'take your pills.' But words don't buy medicine or hold my hand."
Healthcare System Distrust	Perceived dismissiveness, past negative experiences, preference for informal healers	"The doctor just writes a prescription and doesn't look at me. Why should I trust him with my health?"
Cultural Fatalism	Belief that hypertension is God's will, age-related inevitability, cure misconceptions	"Why fight it? Everyone in my family got high pressure at this age. It's written."

The emerging themes from the interview suggest that there are five primary psychosocial barriers which are further highlighted through patient quotes. Together with the statistical findings, these themes offer a multi-faceted view into the difficulties faced by hypertensive individuals.

Table 9. Frequency of Patient-Reported Barriers to Hypertension Management in Qualitative Interviews

Reported Barrier	n (%) [*]
Financial constraints for medication	24 (80.0)
Lack of family support	19 (63.3)
Perceived medication side effects	16 (53.3)
Low trust in healthcare providers	15 (50.0)
Feeling that hypertension is not a "real" illness	12 (40.0)
Difficulty understanding medical instructions	14 (46.7)
Competing priorities (work, childcare)	18 (60.0)

^{*}Multiple responses allowed.

Over 80 percent of those interviewed mentioned drug expenses as a very big hindrance, followed by the absence of family support which stood at 63 percent. It is important to note that about half of the patients lacked confidence in the health facilities and medical practitioners.

Table 10. Comparison of Selected Psychosocial Indicators Between Urban and Rural Participants

Indicator	Urban (n=135)	Rural (n=185)	P-value
PSS-10 score (mean $\pm$ SD)	17.8 $\pm$ 6.0	19.7 $\pm$ 6.1	0.007
PHQ-9 score (mean $\pm$ SD)	7.5 $\pm$ 4.7	8.7 $\pm$ 5.0	0.03
MSPSS score (mean $\pm$ SD)	5.0 $\pm$ 1.6	4.6 $\pm$ 1.8	0.04
Inadequate health literacy, n	50 (37.0)	89 (48.1)	0.05
Uncontrolled BP, n (%)	81 (60.0)	130 (70.3)	0.06

The rural population was more stressed, depressed, had inadequate health literacy, and also received less social support. Despite the fact that the difference in the control of blood pressure between the two groups was statistically significant, the trend indicates greater susceptibility to problems in rural communities.

DISCUSSION

The results from this research have clearly indicated that blood pressure control among vulnerable populations in Uzbekistan is linked to a complicated web of psychosocial factors instead of being related to medication prescription alone which is align with some past studies such as Spruill et al. (2019). It was found that high stress, poor social support, non-adherence to medication, and low income were all independent determinants of uncontrolled blood pressure in a multivariate regression analysis. Poor medication adherence carried an adjusted odds ratio of 2.64, making people who exhibited this characteristic twice as likely to develop uncontrolled blood pressure as the others. This should serve as a red flag in care systems that only rely on medication in treating uncontrolled blood

pressure. However, it needs to be mentioned that the significance of depression disappeared after adjusting for other factors.

The qualitative side of the study has helped uncover certain dimensions that would otherwise remain unseen through the figures on the questionnaire forms. Instructive quotations from the patients revealed that non-adherence to prescribed treatment is far from a lack of personal responsibility; on the contrary, it is the outcome of tough decisions made by the patient while choosing between buying bread for the family and buying their own drugs. As for the theme of "economic pressure as a brick wall," it is not only a vivid metaphor; according to the responses, 80% of the participants saw drug costs as an obstacle to treatment. Moreover, the theme of "emotional loneliness" resulting from the fact that one's children have left the country and gone to Russia cannot but serve as a warning sign for the health policy makers who need to understand that patients will hardly adhere when they do not receive emotional or practical assistance from their families. These findings are consistent with other studies like Elnaem et al. (2022) and Londoño Agudelo et al. (2021).

In terms of comparing the current findings with existing scientific works on the subject in international literature, there are several similarities and peculiarities worth noting. First, previous research in Latin America and South Asia has found economic pressure and social isolation to be common barriers to BP regulation; however, one aspect that distinguishes the current research from previous work like Osman et al. (2026) and Brondolo et al. (2011) is the unique cultural context within which the study is being carried out. Thus, for instance, while the notion of "cultural fatalism," according to which blood pressure is seen as something that is "predestined" and cannot be controlled, was prevalent among interviewees, it was much less significant in other cultural settings, such as the West. Secondly, the patient's distrust of the healthcare system that emerged from the current study is a result of both historical and structural factors rather than merely a personal trait.

CONCLUSION

The results have shown that behind statistics on poor control over blood pressure, there are stories of deprivation, isolation, and cultural myths. The regression analysis demonstrated that a high level of stress, weak social network, and lack of finances, regardless of the complexity of the condition, significantly increased the risk of missing the desired blood pressure values more than twice. Moreover, what was especially fascinating about patient stories was the fact that they described notions not even covered in standardized surveys.

What this research brings to the health sector in Uzbekistan is the call to stop using blanket policies that take into account none of the patients'

social background. It is difficult to expect a single mother trying to earn money daily to take care of herself in terms of medication like a patient would do. Conducting psychosocial assessments during busy sessions in clinics might be seen as extravagant spending; however, the price of neglecting it is a continuous struggle to prescribe better drugs for high blood pressure that is not controllable. Establishing links among healthcare professionals, social workers, patients' families, developing health literacy and challenging fatalistic beliefs are necessary steps now.

While it is certainly true that the cross-sectional nature of this study makes it impossible for us to make definite conclusions regarding the causes of poor blood pressure control, the convergence of both quantitative and qualitative findings makes the case stronger than ever before. In future studies, the effect of restoration of social support systems and/or lowering stress levels on the trend in blood pressure control should be investigated using longitudinal designs and interventions. The conclusion is clear-cut: without listening to the voice of the patients, the most effective medication will only go to waste within the despair of these individuals.

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