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ASSESSING THE PSYCHOSOCIAL FORCES SHAPING HYPERTENSION IN A PERI-URBAN COMMUNITY OF LAHORE

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Abstract

Hypertension, or high blood pressure, is a condition characterized by persistently elevated pressure within the arteries. It represents a significant public health concern and contributes to social stagnation within the community

Objectives: *To assess the relationship between different psychosocial factors and hypertension in Lahore peri-urban male community.*

Subjects & Methods: *Population based Case-Control study was conducted in the peri-urban community of Lahore from August 2025-October 2025 after taking approval from IRB, RLKUMC. In this study cases and controls were recruited in 1:1 ratio, enrolling a total of 200 adult male participants (100 cases and 100 controls) who were selected according to predefined criteria from the population residing in peri-urban Lahore, in the vicinity of Hameed Latif Teaching Hospital, after obtaining informed consent. Data was collected using a pretested questionnaire The data was then compiled and analyzed using SPSS version 25*

Results: *In bivariate analysis, hypertension was found significantly associated with aggression, stress, anxiety, smoking, depression, financial burden, social isolation, lack of exercise, poor sleep, unhealthy dietary habits, hostility, lack of support, feeling insecurity, missing congregational prayers, and lack of recitation of the Holy Qur'an without understanding. The odds ratios for these factors range from 3.6 to 17.4.*

Conclusion: *Hypertension was found significantly associated with various psycho-social factors*

INTRODUCTION

Systemic hypertension is an important risk factor for chronic disease burden. Despite recent medical advances, it remains rampant as a precursor of atherosclerotic cardiovascular disease. Hypertension is defined as the level of blood pressure (BP) at which the benefits of treatment unequivocally outweigh the risks of treatment, in which the office systolic BP values are ≥140 mmHg and/or diastolic BP values are ≥90 mmHg in younger, middle-aged and older people, as documented by clinical trials. BP values should be targeted to a range of 120-129/<80 mmHg, and 130-139/<80 mmHg in patients less than 65 years old and those aged ≥65 years, respectively.(1)

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Chronic stress is a leading contributor to hypertension(2).When stressed, the body releases "fight or flight" hormones like adrenaline, which causes a temporary spike in heart rate and blood pressure leading to development of emotional stress. Chronic stress leads to prolonged high levels of cortisol, which can increase blood pressure Persistent stress can contribute to inflammation in the circulatory system and affect blood vessels, increasing the risk of heart attack and stroke. Aggression(3),anxiety(4), and poor coping mechanisms can activate the sympathetic nervous system and the hypothalamic–pituitary–adrenal (HPA) axis, leading to sustained increases in heart rate, vascular resistance, and circulating stress hormones such as cortisol. Over time, these physiological responses contribute to persistently elevated blood pressure.

Depression(5) and social isolation(6) are also linked to hypertension, partly due to their impact on lifestyle behaviors—such as reduced physical activity(7), poor sleep(8), and unhealthy dietary patterns(9)—and partly through direct neuroendocrine effects. Additionally hostility(10),job strain(11), or low perceived social support(12) tend to show higher blood pressure readings and increased risk of developing chronic hypertension.

Hypertension reflects the interaction of psychosocial, behavioral, and physiological factors. Stress, anxiety, and insecurity may promote behaviors such as smoking, poor diet, and physical inactivity, while simultaneously activating neuroendocrine pathways, including the HPA axis and sympathetic nervous system, leading to sustained elevations in blood pressure. Overall, psychological stressors do not act in isolation but interact with biological and behavioral pathways, making them important determinants in both the onset and progression of hypertension.

Social factors play a substantial role in shaping the risk and progression of hypertension. Elements such as socioeconomic status, education level, occupation, and living conditions influence lifestyle patterns, access to healthcare, and exposure to chronic stressors. Individuals from lower socioeconomic backgrounds(13) often face greater financial strain, limited healthcare access(14), inadequate nutrition(15), and higher levels of environmental stress(16)—all of which contribute to elevated blood pressure.

Social support is another important determinant. People with strong family and community networks tend to experience lower stress levels, better coping abilities, and healthier behaviors, which collectively reduce hypertension risk. Insecure feeling and high-demand work environments(17) can heighten stress responses and negatively impact cardiovascular health. Cigarette smoking has been reported as a major cause of hypertension(18). The body releases a surge of hormones when under stress. These hormones cause the heart to beat faster and the blood vessels to narrow. These actions increase blood pressure for a time. There's no proof that stress by itself causes long-term high blood pressure Feelings of insecurity and related chronic stress/anxiety are linked to an increased risk of developing long-term high blood pressure(19).

Overall, social determinants shape both behavioral choices and physiological stress pathways, making them critical contributors to the development and persistence of hypertension in communities.

Dietary habits play an important role in generating hypertension. Diet plays a significant role in the production of hypertension by influencing blood pressure through various factors, primarily by overeating in social gatherings(20),alcohol intake(21),high sodium intake(22), and a lack of potassium, fiber, and other minerals(23). High consumption of saturated fats, sugar, and alcohol also contributes to hypertension, while a diet rich in fruits, vegetables, whole grains, and lean protein can help manage and prevent it. Religious practices, such as congregational prayers, may act as stress-buffering and social cohesion variables, potentially influencing blood pressure regulation (24).

Hypertension is rapidly becoming a major health concern within urban communities. Yet, only limited effort has been devoted to understanding

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how diverse psychosocial factors influence its development in our population. This created a pressing need to undertake the present study, aimed at uncovering the psychosocial determinants linked to hypertension. The research also sought to compare its findings with previous evidence and to equip students with the knowledge and confidence to raise community awareness about these contributing factors, ultimately helping to enhance the overall health and well-being of the population.

This study was conceived to illuminate the underlying forces that give rise to hypertension within our community and to explore how the common individual can be guided and empowered to prevent its onset.

METHODOLOGY

Following approval from the Institutional Review Board of Rashid Latif Khan University Medical College (RLKUMC), a case–control study was conducted between August and October 2025 to investigate psychosocial determinants of hypertension in a peri-urban community of Lahore. Hypertension was designated as the primary outcome variable, while a range of psychosocial attributes were examined as potential explanatory factors.

The sample size was estimated using the World Health Organization (WHO) formula for population proportion, considering an 18% national prevalence of hypertension, a 95% confidence level, and a 5% margin of error. The formula $n = (Z^2 \times p \times (1 - p)) / E^2$ (where Z is the Z-score, p is the prevalence, and E is the margin of error) yielded a required sample of approximately 200 participants.

Only adult male subjects were eligible for inclusion. Participants were assigned into two equally sized groups. Group 1 comprised hypertensive adults meeting the study criteria: males aged ≥18 years with systolic blood pressure ≥140 mmHg and diastolic blood pressure ≥90 mmHg, documented on three separate readings, and without significant comorbid medical or surgical conditions. Group 2 included normotensive adult males with no prior history of hypertension. Each group contained 100 participants. Control subjects were selected through systematic random sampling from the target population, and written informed consent was obtained from all participants before enrollment.

Data on psychosocial factors were collected using structured, pretested, close-ended questionnaires administered ensuring adherence in accordance with ethical and sociocultural standards.

RESULTS

Binary logistic regression revealed significant associations of hypertension with aggression(OR 5.155,CI 1.228-21.646), stress(OR4.485,CI 1.344-14.970), anxiety(OR8.288,2.185-31.434) ,smoking(OR9.813,CI2.378-40.497), depression(OR6.081,CI1.697-21.786), financial burden(OR 5.297,CI 1.699-16.510), social isolation(OR 3.577,CI 1.138-11.248), lack of exercise(OR 6.040,CI 1.711-21.329), poor sleep(OR 4.626,CI 1.167-18.377) ,unhealthy dietary habits(OR 4.506,CI1.384-14.655), hostility(OR 6.758-CI 1.899-24.041), lack of support(OR 4.340-CI 1.302-14.463), feeling insecured(OR 17.425,CI 1.630), missing congregational prayers(OR 3.616,CI 1.045-12.514) and reciting Quran without understanding (OR 5.599-CI 1.765-17.758).See Table 1

Table 1.Psychosocial determinants of Hypertension in Lahore Peri-urban Community

Psychosocial Factors	Exp(B)	95% C.I.for EXP(B)	
		Lower	Upper
aggression	5.155	1.228	21.646
stress	4.485	1.344	14.970

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anxiety	8.288	2.185	31.434
smoking	9.813	2.378	40.497
depression	6.081	1.697	21.786
financial stress	5.297	1.699	16.510
social isolation	3.577	1.138	11.248
lack of exercise	6.040	1.711	21.329
poor sleep	4.626	1.167	18.337
unhealthy dietary habits	4.506	1.384	14.665
hostility	6.758	1.899	24.041
lack of support	4.340	1.302	14.463
feeling insecured	17.425	1.630	186.322
vegetarian	0.142	0.024	0.825
frustration	0.366	0.085	1.583
late night sleeping	2.368	0.764	7.339
nocogregation	3.616	1.045	12.514
any loss	0.601	0.183	1.977
Quran without understanding	5.599	1.765	17.758
low self esteem	0.692	0.235	2.042
media negativity	0.537	0.161	1.790
poor health care	1.134	0.393	3.273
physical stress	1.297	0.411	4.094
self-medication	1.469	0.373	5.779
alcohol intake	2.169	0.601	7.833

However frustration, habit of late night sleeping, any loss, low self esteem, media negativity, poor health care, physical stress, self medication and alcohol intake were not significantly associated with hypertension in this model. Moreover, persons fond of vegetables only previously considered as unhealthy habits proved to be protective(OR 0.142,CI 0.024-0.825). The factors which were found significantly associated with hypertension in the past studies but not in our study were limited healthcare access and environmental stress. Similarly lack of congregational prayers and recitation of holy Quran without translation found significant in our study were not found in the literature. See Table 1

DISCUSSION

This case–control study examined a broad range of psychosocial determinants of hypertension among adult males in a peri-urban setting of Lahore. The findings reveal that hypertension is strongly associated with multiple psychological, behavioral, and social stressors, highlighting the complex and multifactorial nature of blood pressure regulation. Numerous variables—including aggression, stress, anxiety, smoking, depression, financial stress, social isolation, poor sleep, unhealthy dietary habits, hostility, lack of social support, and loneliness—were found to significantly increase the odds of hypertension. These results align with a growing body of global evidence demonstrating that psychosocial adversity significantly contributes to cardiovascular morbidity.(1-7)

One of the strongest predictors in this study was feeling insecure, which showed an exceptionally high odds ratio. Although the wide confidence interval suggests reduced precision, the direction and magnitude of the association indicate that chronic insecurity may be a potent psychological stressor capable of persistently activating neuroendocrine pathways, such as the hypothalamic–pituitary–adrenal (HPA) axis and sympathetic nervous system, leading to sustained elevations in blood pressure. Similarly, anxiety

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and hostility—both markers of heightened autonomic arousal—were also associated with markedly increased odds of hypertension.

Behavioral factors such as smoking, lack of exercise, and unhealthy dietary habits were also significant predictors. Smoking demonstrated nearly a tenfold increase in the odds of hypertension, underscoring its well-established role as a modifiable cardiovascular risk factor. Lack of physical activity and poor dietary patterns, both common in urban and peri-urban Pakistani populations, further compound the psychosocial burden. These results corroborate the widely accepted biopsychosocial model of hypertension, where behavioral and psychological factors operate synergistically to accelerate cardiovascular risk.(8-15)

Social determinants also played a critical role. Social isolation, loneliness, and lack of support were all independently associated with higher odds of hypertension. Historically, congregational prayers and the recitation of the Holy Qur'an were integral and routine practices within Muslim communities. Over time, however, participation in these communal religious activities has progressively declined. An increasing number of individuals now prefer performing prayers at home rather than attending mosques, which has consequently reduced opportunities for social interaction.(16-18)

Previously, structured religious courses and group discussions offered community members guidance on adopting healthier and more balanced lifestyles. These activities contributed to reductions in stress, insecurity, and anxiety, thereby lowering the risk of conditions such as hypertension. Likewise, the recitation of the Holy Qur'an with translation and interpretation served as an important protective factor against a wide spectrum of psychosocial challenges.(19-20)

The observed decline in these communal and spiritual practices may therefore be contributing to rising physical, mental, and psychosocial health concerns within the community(21)

The factors which were found significantly associated with hypertension in the past studies but not in our study were limited healthcare access and environmental stress. Similarly lack of congregational prayers and recitation of holy Quran without understanding found significant in our study were not found in the literature

These findings highlight the relevance of social cohesion and interpersonal relationships in cardiovascular health. In collectivist cultures such as Pakistan's, social support networks traditionally serve as buffers against psychological stress. Erosion of these networks—due to urbanization, migration, or economic hardship—may leave individuals more vulnerable to stress-related physiological dysregulation. Financial stress, another significant predictor, reflects broader socioeconomic insecurities that influence health through both behavioral pathways (e.g., poor diet, reduced healthcare access) and psychophysiological mechanisms (e.g., chronic stress activation).(22)

Interestingly, the study found that the habit of eating vegetables only which was previously considered not good for health was a protective factor. This suggests that vegetables may play a beneficial role by improving body regulation and promoting a state of psychological calm. Further research is required to determine whether the protective association is attributable to biochemical profile or something else.

Several variables—including frustration, late-night sleeping, low self-esteem, media negativity, and poor healthcare experience—did not show statistically significant associations. This may reflect genuine lack of effect or insufficient statistical power for these specific characteristics. Additionally, alcohol intake was nonsignificant, likely due to low prevalence in the population studied.(24)

Overall, this study reinforces the concept that psychosocial factors are integral components of hypertension risk. The findings have important implications for prevention and management. Interventions should extend beyond pharmacological therapy and routine clinical counseling, addressing stress management, mental health screening, lifestyle modification, social support enhancement, and community-based health promotion. Integrating psychosocial assessment into primary care—particularly in

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resource-constrained peri-urban environments—may substantially improve hypertension control rates.

Future research should employ longitudinal designs to establish causal pathways and explore biological mediators linking psychosocial stress to hypertension. Moreover, culturally tailored behavioral and psychosocial interventions, including faith-based and community-centered programs, warrant further evaluation for their potential role in cardiovascular risk reduction.

LIMITATIONS

This study has several limitations that should be considered when interpreting the findings. First, the case–control design limits the ability to establish causal relationships between psychosocial factors and hypertension. Second, all psychosocial variables were assessed through self-reported questionnaires, which are subject to recall bias, social desirability bias, and subjective interpretation. Moreover, the lack of validated psychosocial scales may have affected the reliability and comparability of the measured constructs. Third, the study included only adult males from a peri-urban area of Lahore, which may limit the generalizability of the results to women, rural populations, or other socio-cultural contexts.

Residual confounding cannot be excluded, as unmeasured variables, such as genetic predisposition, unassessed lifestyle factors, or environmental exposures, may have influenced the observed associations. The inclusion of multiple psychosocial and behavioral variables also increases the risk of multiple testing inflation, potentially leading to type I errors. Considering that this study employed a case–control design and included a relatively small sample of 200 participants, the statistical power to detect associations in multivariable logistic regression may also be limited, particularly for variables with low prevalence or small effect sizes.

CONCLUSION

This study demonstrates that hypertension among adult males in a peri-urban setting is strongly associated with a wide spectrum of psychosocial factors. Variables such as anxiety, aggression, smoking, depression, financial stress, social isolation, lack of exercise, hostility, loneliness, and feelings of insecurity were significant predictors, highlighting the substantial impact of psychological and social stressors on cardiovascular health. The observed association with recitation of the Holy Qur'an without understanding suggests that culturally embedded spiritual practices may offer beneficial effects on emotional regulation and physiological stress responses, though causal relationships cannot be inferred.

Future longitudinal and interventional studies are warranted to clarify causal mechanisms and to design effective, community-tailored psychosocial interventions for hypertension prevention.

RECOMMENDATIONS

Based on the findings of this study, several recommendations emerge for clinical practice, public health policy, and future research:

1.Integrate Psychosocial Screening into Hypertension Care:
Routine assessment of anxiety, stress, depression, social isolation, and hostility should be incorporated into primary healthcare settings, particularly in peri-urban communities where psychosocial burden is high.

2.Develop Culturally Tailored Mental Health Interventions:
Community-based stress-management programs, counseling services, and behavioral therapy should be made accessible and culturally adapted. Spiritual practices such as Quran recitation with translation identified as potentially protective—may be incorporated into culturally sensitive wellness programs.

3.Strengthen Lifestyle Modification Initiatives:
Programs promoting smoking cessation, regular physical activity, and healthy dietary habits should be intensified, as these behavioral factors were significant contributors to hypertension.

4.Enhance Social Support Networks:
Interventions that encourage social engagement, peer support groups, and community cohesion may help buffer psychosocial stress and reduce hypertension risk.

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5.Address Socioeconomic Stressors: Policies aimed at reducing financial strain—through social protection mechanisms, employment support, and access to affordable healthcare—may mitigate the impact of socioeconomic stress on cardiovascular health.

6.Training of Healthcare Providers: Physicians, nurses, and community health workers should receive training to recognize psychosocial stressors and provide brief psychological interventions or refer patients appropriately.

7.Longitudinal and Interventional Research: Future studies should use cohort designs and randomized interventions to determine causal pathways and evaluate the effectiveness of psychosocial and lifestyle interventions in lowering blood pressure.

8.Holistic and Multidisciplinary Management: Combining medical treatment with psychological counseling, lifestyle coaching, and community engagement strategies may lead to more effective and sustainable hypertension control.

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