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The Assessment of the Influence of Risk Factors on Arterial Hypertension

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Abstract

General Background: Arterial hypertension (AH) remains one of the most prevalent non-communicable diseases globally and a leading contributor to cardiovascular morbidity and mortality. Specific Background: Despite extensive research on individual determinants, little is known about the combined impact of behavioral, biological, and lifestyle factors in rural populations within specific sociocultural settings such as Uzbekistan. Knowledge Gap: Existing studies have largely focused on isolated risk factors, overlooking their synergistic effects and limited data from Central Asian populations undergoing rapid lifestyle transitions. Aims: This study aimed to assess the influence of major risk factors—including obesity, smoking, physical inactivity, and salt consumption—on the prevalence of arterial hypertension among adults in rural Uzbekistan. Results: A cross-sectional survey involving 6,644 adults revealed that 57.8% had at least one major risk factor. Obesity, overweight, genetic predisposition, and smoking were significant predictors with relative risks of 10, 8.3, 2.2, and 1.92, respectively. Hypertension prevalence was up to 4.5–5 times higher in overweight individuals. Novelty: The study provides the first comprehensive analysis of multiple concurrent risk factors for hypertension within a Central Asian context. Implications: These findings underscore the urgent need for community-based interventions focusing on weight control, physical activity, dietary modification, and smoking cessation to reduce hypertension prevalence and improve cardiovascular outcomes.

Highlight :

- The study identifies obesity and overweight as the main determinants of arterial hypertension.
- It stresses lifestyle modification such as reducing smoking and increasing physical activity.
- The findings emphasize prevention and health education, especially in rural communities.

Keywords : Arterial Hypertension, Risk Factors, Obesity, Smoking, Blood Pressure

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Introduction

Arterial hypertension (AH) is among the most popular chronic non-communicable diseases, as it is a disease that afflicts about a third of adult population in the world. It is a significant cause of cardiovascular morbidity and mortality, as it causes millions of premature deaths annually. Hypertension is not only a clinical disease but it is also a significant public health problem which is a mirror of the socioeconomic and behavioral trends. The World Health Organization indicates that the world health burden of hypertension is constantly rising, especially in the developing world where preventative health and health awareness is still low [1].

In the recent years studies have pointed out that hypertension is a multifactorial disease which is affected by both modifiable and non-modifiable risk factors. Physical inactivity, smoking, unhealthy diet, and excessive intake of salt are lifestyle habits identified to cause significant increment in blood pressure. In the meantime, genetic predisposition, age, and sex are the biological factors. The interplay of these determinants may only increase the vascular stress, deteriorate the metabolic processes and hasten the development of cardiovascular diseases. Different theories have been used to elucidate the role of individual habits and environmental circumstances in determining the risk of hypertension, including the biopsychosocial and the ecological theory of health behavior [2].

Although the research is quite extensive, there is still a significant gap in knowledge towards the joint impact of these risk factors in particular sociocultural and geographic settings. Most current studies have concentrated on individual variables (e.g. obesity or smoking) without looking at their combined or synergistic impacts. In addition, there is dearth of empirical data among the populations of Central Asia where the rapid lifestyle changes and changes in the diets may be the unique factors in epidemiology of hypertension. The proposed study will fill this gap by comparing the relative and absolute risk of arterial hypertension according to the main behavioral and biological factors among the Uzbekistan adult population [3].

On the analytical design, the study utilizes a cross-sectional research design with clinical measurements and structured interviews in a representative rural population. Blood pressure measures, anthropometric measures, and lifestyle measures were measured to understand the relationship between risk factors and hypertension. Relative risk analysis and logistic regression were statistical tools that were employed to determine significant predictors of elevated blood pressure. Combining both epidemiological and behavioral data makes it possible to have an in-depth insight into the interactions between lifestyle, environment and heredity in the pathogenesis of hypertension [4].

It is expected that the findings will prove that modifiable factors especially obesity, lack of physical activity, and excess intake of sodium are the most predictive factors of hypertension, and then genetic predisposition and smoking. These findings should provide significant implications on how preventive health policies and localized interventions on a community level are designed. The investigation of determinants of particular behaviors adds to the evidence-based approaches to minimizing the prevalence of hypertension, enhancing cardiovascular outcomes, and the health resilience of the population at the level of the low and middle-income countries [5].

Methods

This paper was done to assess how the major risk factors contribute to the occurrence of arterial hypertension among adults living in rural setting. The sample size was 6,644 (aged 20 years and above) representing 1,685 families of the Bukhara region of Uzbekistan, which was estimated as a population of 6,644 individuals. The sources of data were standardized clinical measurements and structured household survey. After five minutes of rest, blood pressure was determined by a calibrated sphygmomanometer at a right arm position, two measurements were made and the average values were taken. The participants were defined as hypertensive when the systolic blood pressure of the participants was 140 mmHg and above and/or the diastolic blood pressure was 90 mmHg and above, or when the participants were under antihypertensive therapy [6].

Anthropometric data on height and weight were taken in order to determine the body mass index (BMI) which was then categorized based on the WHO standards (normal, 25 kg/m, overweight, 25 30 kg/m, and obese, 30 kg/m). Interviews were also used to measure behavioral and lifestyle variables (smoking habits, the degree of physical activity, and the salt intake). The data gathered was analyzed to obtain the prevalence of risk factors, and their relationship with hypertension. It involved statistical analysis that involved calculation of absolute and relative risks and the significance testing of the results with the help of standard epidemiological tools. The research was conducted considering the principles of ethical research practice, participant confidentiality and informed consent were guaranteed to the participants before the data was collected [7].

Results and Discussion

The current research paper examined information about 6,644 adult individuals to evaluate the correlation among behavioral, biological, and lifestyle risk factors and the prevalence of arterial hypertension. Out of the surveyed population, it was found that 3,840 (57.8%) of the population had at least one risk factor that could be identified with misdiagnosis of hypertension. The general prevalence of high blood pressure was 14.7 with much higher prevalence rates among the individuals of age group 40 years and above. The results also indicated that the prevalence of hypertension was significant in women, and the risk level of women was 1.9 times greater in comparison to men [8].

Body mass index (BMI) was found as one of the key contributors to arterial hypertension. Table 1 indicates that the percentage of hypertension increased with the increasing BMI: 16.3% of participants who were normal weight (BMI < 25 kg/m), 72.6% of overweight people (BMI 25 30 kg/m) and 81.3% of obese people (BMI 31 35kg/m). A strong positive relationship was found between BMI and high blood pressure as supported by statistical analysis ($p < 0.001$). The comparative risk of high blood pressure in the population having excess weight was found to be 4.5 to 5 times more than those with normal body weight, which must serve as an important reason to emphasize the importance of excess weight as a risk factor that can be modified [9].

Shows the categorization of the study participants based on the body mass index (BMI) and occurrence of arterial hypertension. The results indicate that excess body weight and high blood pressure have a positive correlation. The percentage of hypertensive respondents was only 16.3 among those with normal BMI (25 kg/m) and skyrocketed to 72.6 among those who were overweight (BMI 25 30 kg/m) and 81.3 among those

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who were obese (BMI 31 35 kg/m). On the other hand, the proportion of study subjects who were not hypertensive declined with an increase in BMI. The statistical analysis showed that the relationship between the BMI and incidence of arterial hypertension was highly significant ($p < 0.001$), which proves that excess body weight is a strong and independent risk factor of hypertension among the study population. These findings indicate that weight management through lifestyle interventions should be part of programs that prevent hypertension (Table-1).

Table 1. Distribution of Respondents by Body Mass Index (BMI) and the Presence of Arterial Hypertension

Body Mass Index (BMI)	Total (n)	With Arterial Hypertension	Without Arterial Hypertension	p-value
	n	%	n	%
< 25	3,236	84.3	528	16.3 ± 0.6
25–30	497	12.9	361	72.6 ± 2.0
31–35	107	2.8	87	81.3 ± 3.8
Total	3,840	100	976	25.4 ± 0.7

Such behavioral factors as smoking, physical inactivity, and salt overconsumption were also found to have a significant association with hypertension. Smoking was given as a report by 11.2% of the participants who were majorly men and was associated with almost twice the risk of hypertension (RR 1.92). Though smoking does not directly increase blood pressure, it increases the rate of vascular damage, as well as increasing the overall cardiovascular load. Physical inactivity was common among 13.9 percent of respondents but mainly within older women and was linked to increased prevalence rates of elevated blood pressure. Likewise, overconsumption of salt was observed in 8.7 percent of the sample, which represents a dietary habit that has probably led to hypertension in rural areas [10].

The findings are in line with the world evidence that clearly shows the compound effect of genetic predisposition, poor lifestyle and the environment in developing hypertension. The biopsychosocial model and behavioral epidemiology theory are the theoretical models that can be used to understand how the social determinants and the individual behaviors interact to have an effect on the physiological endpoints such as blood pressure regulation [11].

Nevertheless, in spite of these insights, there are still many gaps in knowledge regarding the synergistic nature of the combination of various risk factors under particular sociocultural conditions in a particular sociocultural context like Uzbekistan [12].

Practically speaking, the present study supports the need to establish extensive community-based programs that can address the preventable risk factors. These strategies must involve health education in terms of nutrition and physical activity, smoking cessation, and frequent screening [13].

At the hypothetical level, longitudinal or interventional designs should be tested in future in order to trace the causal pathways with biochemical and genetic markers to be used as a more comprehensive way to understand the individual susceptibility. Furthermore, the analytical research that incorporates the sociobehavioral variables including stress, socioeconomic status, and health literacy may offer a more comprehensive insight into the risk of hypertension [14].

Evaluation of obtained results regarding risk factors enabled us to create a four-field table and establish the connection between risk factors and the arterial hypertension probability (Table 2).

Table-2. Risk factors and their effect on the prevalence of arterial hypertension, human.

Risk Factor	Outcome Present, abs	Outcome Absent, abs	Total
Present	912 (a)	2928 (b)	3840
Absent	64 (c)	2740 (d)	2804
Total	976	5668	6644

To conclude, the current results verify that overweight, obesity, and poor lifestyle habits are the major predisposing factors of hypertension among the population under study. To reduce the growing burden of hypertension and, therefore, enhance the population health outcomes in Uzbekistan and other regions, such determinants will need to be addressed by employing specific prevention policies and conducting more theoretical and empirical research [15].

Conclusion

The current paper shows that (non)modifiable risk factors are strongly related to arterial hypertension in the population under study with 57.8% of the surveyed participants having at least one risk factor of significance. Among them, obesity, overweight, genetic predisposition and smoking stood out as the most influential with relative risks of 10, 8.3, 2.2 and 1.92 respectively. Interestingly, the individuals with high body mass indices had 4.5 5-fold more prevalence of hypertension than those with normal weight and a presence of risk factors elevated the chances of developing hypertension more than tenfold. Such results highlight the vital role of primary diagnosis, continuous observation, and specific treatment, such as weight control, smoking, and physical activity promotion, to counteract the development of hypertension and its progression. Moreover, the paper notes the necessity of targeted prevention especially in women and rural areas where the risk factors were overrepresented. Long-term studies on intervention and effect of lifestyle changes on occurrence of hypertension and the interplay between genetic and environmental factors in various population groups to come up with more specific evidence-based preventive strategies should be undertaken in the future.

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References

1. S. Grujicic, "Risk Factors for the Development of Arterial Hypertension," Medicinski Glasnik: Official Publication of the Medical Association of Zenica-Doboj Canton, Bosnia and Herzegovina, vol. 11, no. 2, pp. 254–260, 2014. Available: https://doi.org/10.17392/1490-14
2. C. Pinto and D. Martins, "Prevalence and Risk Factors of Arterial Hypertension: A Literature Review," J. Cardiovasc. Med. Ther., vol. 1, no. 2, pp. 45–52, 2017.
3. G. de Simone, R. B. Devereux, M. Chinali, M. J. Roman, L. G. Best, T. K. Welty, et al., "Risk Factors for Arterial Hypertension in Adults With Initial Optimal Blood Pressure: The Strong Heart Study," Hypertension, vol. 47, no. 2, pp. 162–167, 2006. Available: https://doi.org/10.1161/01.HYP.0000198430.48219.98
4. C. A. T. Radovanovic, L. A. D. Santos, M. D. D. B. Carvalho, and S. S. Marcon, "Arterial Hypertension and Other Risk Factors Associated With Cardiovascular Diseases Among Adults," Rev. Latino-Am. Enfermagem, vol. 22, no. 4, pp. 547–553, 2014. Available: https://doi.org/10.1590/0104-1169.3476.2450
5. M. Humbert, H. Nunes, O. Sitbon, F. Parent, P. Hervé, and G. Simonneau, "Risk Factors for Pulmonary Arterial Hypertension," Clin. Chest Med., vol. 22, no. 3, pp. 459–475, 2001. Available: [https://doi.org/10.1016/S0272-5231(05)70284-5](https://doi.org/10.1016/S0272-5231%2805%2970284-5)
6. J. V. Costa, A. R. V. D. Silva, I. H. D. Moura, R. B. N. D. Carvalho, L. E. Bernardes, and P. C. D. Almeida, "An Analysis of Risk Factors for Arterial Hypertension in Adolescent Students," Rev. Latino-Am. Enfermagem, vol. 20, no. 2, pp. 289–295, 2012. Available: https://doi.org/10.1590/S0104-11692012000200010
7. K. M. Alisherovna and Y. S. Tatlibayevich, "Assessment of Risk Factors for Arterial Hypertension in Pregnant Women," Cent. Asian J. Med. Nat. Sci., vol. 2, no. 3, pp. 214–217, 2021.
8. V. Poznyak, N. K. Sadykhov, A. G. Kartuesov, E. E. Borisov, A. A. Melnichenko, A. V. Grechko, and A. N. Orekhov, "Hypertension as a Risk Factor for Atherosclerosis: Cardiovascular Risk Assessment," Front. Cardiovasc. Med., vol. 9, 959285, 2022. Available: https://doi.org/10.3389/fcvm.2022.959285
9. M. C. Kuschnir and G. A. Mendonça, "Risk Factors Associated With Arterial Hypertension in Adolescents," J. Pediatr., vol. 83, no. 4, pp. 335–342, 2007. Available: https://doi.org/10.2223/JPED.1652
10. M. E. Safar, "Arterial Stiffness as a Risk Factor for Clinical Hypertension," Nat. Rev. Cardiol., vol. 15, no. 2, pp. 97–105, 2018. Available: https://doi.org/10.1038/nrcardio.2017.155
11. C. Moglia, A. Calvo, A. Canosa, D. Bertuzzo, P. Cugnasco, L. Solero, et al., "Influence of Arterial Hypertension, Type 2 Diabetes and Cardiovascular Risk Factors on ALS Outcome: A Population-Based Study," Amyotroph. Lateral Scler. Frontotemporal Degener., vol. 18, no. 7–8, pp. 590–597, 2017. Available: https://doi.org/10.1080/21678421.2017.1328628
12. S. Skrtic, A. Niklason, T. Leoo, and T. Hedner, "Risk Factor Identification and Assessment in Hypertension and Diabetes (RIAHD) Study," Blood Press., vol. 15, no. 6, pp. 367–374, 2006. Available: https://doi.org/10.1080/08037050601012170
13. M. Naresh, S. Viral, K. Sudham, C. Mahesh, G. Kalpesh, and Y. Sudha, "Assessment of Risk Factors of Hypertension: A Cross-Sectional Study," J. Evol. Med. Dent. Sci., vol. 1, no. 4, pp. 519–526, 2012. Available: https://doi.org/10.14260/jemds/111
14. T. Sobierajski, S. Surma, M. Romańczyk, K. Łabuzek, K. J. Filipiak, and S. Oparil, "What Is or What Is Not a Risk Factor for Arterial Hypertension? Not Hamlet, but Medical Students Answer That Question," Int. J. Environ. Res. Public Health, vol. 19, no. 13, 8206, 2022. Available: https://doi.org/10.3390/ijerph19138206
15. D. C. Malta, R. T. I. Bernal, E. G. Ribeiro, A. D. Moreira, M. S. Felisbino-Mendes, and J. G. Velásquez-Meléndez, "Arterial Hypertension and Associated Factors: National Health Survey, 2019," Rev. Saude Publica, vol. 56, 122, 2023. Available: https://doi.org/10.11606/s1518-8787.2023057004868

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