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The Degree of Association of Risk Factors in A Population With High Blood Pressure and Various Levels of Cardiovascular Risk

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ABSTRACT

The presence of 22 behavioral risk factors elevates the detection of high blood pressure by over 9.5 times. Complications such as left ventricular hypertrophy (85.3%), cerebrovascular diseases (90.9%), myocardial infarction (80.0%), heart failure (87.5%), symptomatic peripheral artery damage (66.7%), and diabetes mellitus (75.0%) significantly influence the prognosis of total cardiovascular risk alongside hypertension.

Keywords: *cardiovascular risk, high blood pressure, risk factors*

1. INTRODUCTION

Introduction: Despite extensive scientific research and practical efforts, hypertension continues to emerge as a profound global challenge, intertwining medical, social, environmental, and national dimensions [10, pp. 470-473; 13, pp. 47-54; 6, pp. 101-105]. The relentless march of societal progress, urbanization, and increased life expectancy has amplified the prevalence of aging populations worldwide, foreshadowing a threefold rise in the socioeconomic burdens linked to cardiovascular diseases and their complications. According to the WHO and INC VIII (2014), hypertension afflicts over 1 billion individuals globally, contributing to 7.1 million annual deaths. Notably, systolic blood pressure (SBP) exceeding 115 mm Hg is implicated in 62% of cardiovascular diseases and 49% of ischemic heart disease cases, solidifying its status as the leading risk factor for mortality. Between ages 40 and 80, the risk of death from ischemic heart disease and stroke escalates linearly with SBP above 115 mm Hg and diastolic blood pressure (DBP) above 75 mm Hg, doubling with each 20 mm Hg SBP or 10 mm Hg DBP increase. Alarmingly, global hypertension monitoring rates remain dismally low at 14%. In 2015 alone, over 1 billion people lived with hypertension, with 37 million new diagnoses annually [7, pp. 63-70; 9, pp. 6-18; 11, pp. 441-450].

Contemporary perspectives on the parameters and implications of hypertension have undergone significant revision. Current evidence underscores the systolic blood pressure (SBP) indicator as the primary metric for assessing hypertension severity, as it indirectly reflects the extent of vascular elasticity impairment and the severity of peripheral vascular resistance. This conclusion is firmly supported by global studies, affirming SBP as a pivotal and large-scale factor contributing to cardiovascular diseases [1, pp. 9-15; 2 pp. 35-38; 3, pp. 154-160]. Epidemiological research further reveals that SBP exhibits age-related variability, fluctuating in response to diverse factors, while diastolic blood pressure (DBP) typically increases until approximately age 50 [4, pp. 60-63; 5, pp. 32-37; 8, pp. 38-46; 12, pp. 3-124].

To validate these population-level observations, our study aims to conduct a comprehensive analysis, examining the interplay between key risk factors, prehypertension (BH), and varying stages of arterial hypertension (AG) development.

Objective: To determine the relationship between these factors and the overall risk of cardiovascular disease among the population of the Fergana Valley, Uzbekistan.

THE MATERIAL AND METHODS for our study was the diverse population of Andijan, consisting of men and women of different ages (603 people). Employing the method of random numbers, an epidemiological selection of 10% from this representative sample was meticulously conducted. The study integrated a multifaceted approach, utilizing clinical and biochemical analyses, advanced instrumental investigations, and comprehensive questionnaires to gather precise and insightful data.

2. RESULTS.

The association of risk factors with prehypertension and hypertension across cardiovascular risk levels is illustrated in Fig. 1.

The relationship between varying degrees of hypertension and cardiovascular disease risk groups revealed the following findings: the cohort with a low cardiovascular disease burden and first-degree hypertension was most strongly linked to factors such as episodic use of hypertensive drugs (EUOHD), predominantly physical labor (PRPHL), smoking, low educational status (LES), and unfavorable social status (UNSS), with associations to AC and non-native populations being 1.2 times weaker. Additionally, instances of low fruit and vegetable intake, predominant consumption of spicy and salty foods (PCSSF), and nasvay abuse (AON) were 1.6 times less frequent. Psychoemotional factors (PEF), low physical activity (LPHA), and inadequate medical control (LMC) were 1.7 times rarer, while overweight, HHS, excessive consumption of strong tea and coffee (AOSTC), fatty foods (PCOFF), and meat and flour dishes (PCMFD) were 1.8 times less prevalent. Predominantly mental work (PMW) was 2 times less common, and its frequency in the studied region (CN) was 2.8 times lower. Finally, poor housing and living conditions (PHLC) were at least 7.5 times less associated.

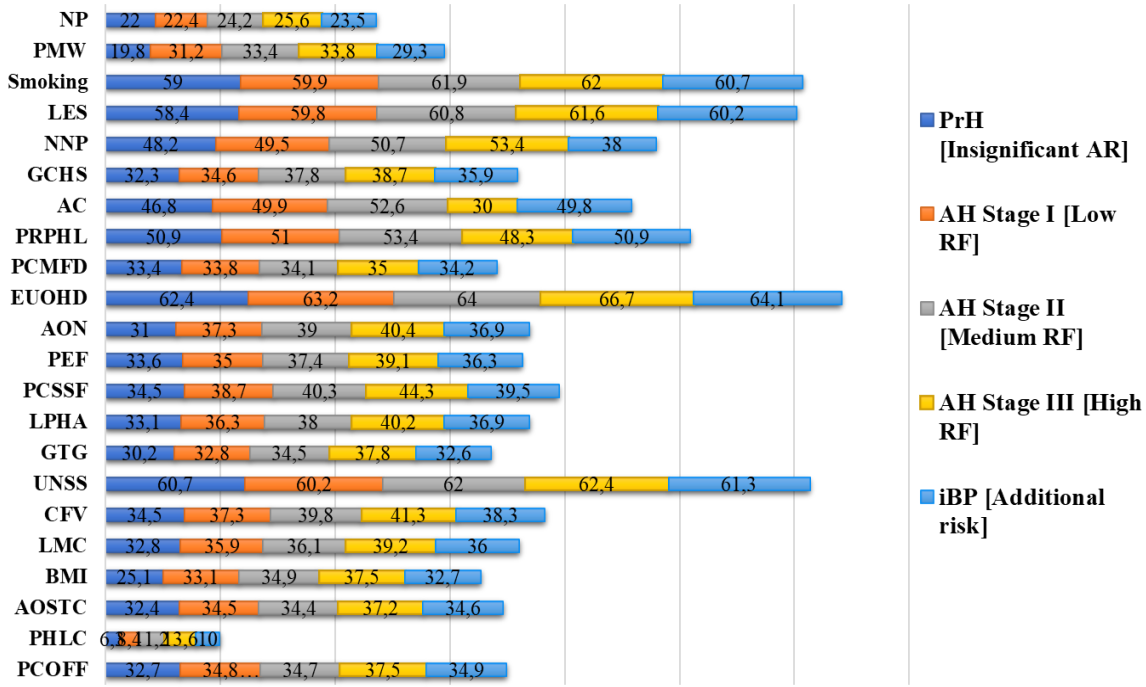

Fig. 1 Comparative characteristics of the relationship between primary risk factors in the population with PH and AG across varying levels of total cardiovascular continuum (CVC) risk.

The findings reveal that the strongest association between the development of PH and the insignificant additional risk (IAR) of CVC progression in the Fergana Valley is linked to unfavorable social status (UNSS), episodic use of hypertensive drugs (EUOHD), smoking, and low educational status (LES). These factors exhibit a 1.2-fold weaker correlation with predominantly physical labor (PRPHL) and non-native populations (NNP), a 1.3-fold weaker correlation with alcohol consumption (AC), and a 1.8-fold weaker correlation with low fruit and vegetable intake (CFV), predominant consumption of spicy and salty foods (PCSSF), psychoemotional factors (PEF), predominant consumption of meat and flour dishes (PCMFD), and low physical activity (LPHA). A 2-fold weaker association is observed with excessive strong tea and coffee

consumption (AOSTC), poor medical oversight (LMC), hypercholesterolemia (HCH), and nasvay abuse (AON). Hypertriglyceridemia (HTG) shows a 1.2-fold weaker link, while body mass index (BMI) and indigenous populations demonstrate 2.5- and 2.8-fold weaker associations, respectively. Predominantly mental work (PMW) and poor housing and living conditions (PHLC) exhibit the weakest correlations, at 3.2- and 9.9-fold (P <0.001), respectively. The impact of arterial hypertension severity on cardiovascular risk, contextualized by these factors, is detailed in Figure 2.

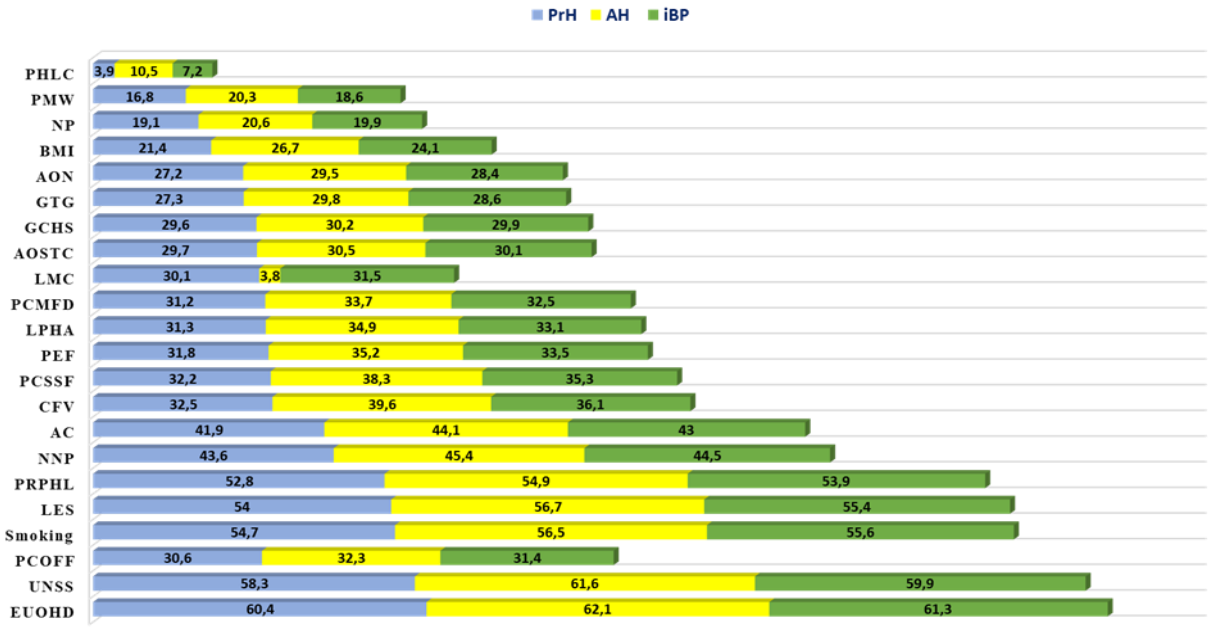

Figure 2. Relative probability of PH, AG, and HBP in relation to socio-medical and behavioral risk factors.

The development of stage I hypertension or the formation of a low additional risk (LAR) group within the cardiovascular continuum (CVC) is most strongly associated with EUOHD, smoking, LES, PRPHL, and NBSS. This association diminishes 1.6-fold with alcohol consumption and non-native residency, 1.7-fold with PCSSF, low vegetable and fruit intake, and AON, 1.8-fold with LPHA, LMC, and PEF, 1.9-fold with AOSTC, HCH, overweight, and PCMFD, 2-fold with PRUKT, 2.9-fold among the indigenous population, and least (7.9-fold) with PHLC.

For stage II hypertension and moderate additional risk, the strongest associations are observed with smoking, LES, EUOHD, UNSS, PRPHL, CA, and LMC. These weaken 1.6-fold with PCSSF, AON, CFV, LPHA, and HHS, 1.9-fold with LMC, overweight, AOSTC, GTG, and PMW, 3-fold among indigenous populations, and 5.8-fold with PHLC.

Stage III hypertension and high additional risk are most pronounced with UNSS, EUOHD, LES, and smoking, moderately with NNP and AC, 1.6-fold less with CFV, LPHA, PCSSF, AON, and PRPHL, 1.8-fold less with PCMFD and PMW, 2.6-fold less among indigenous populations, and 4.6-fold less with PHLC.

Among the surveyed population of Andijan city, cases of high blood pressure (HBP) exhibited the strongest associations with UNSS, EUOHD, PRPHL, LES, smoking, and AC. A moderately positive correlation was observed with CFV, PCSSF, and non-native populations, while weaker links were noted with AOSTC, overweight, LMC, GTG, PEF, AON, PCMFD, and HHS (2-fold lesser), PMW (2.2-fold lesser), the indigenous population (2.8-fold lesser), and PHLC (6.4-fold lesser). Notably, the prevalence of epidemiological risk factors for PH and AG was higher: LPHA (11.3%), GTG (14.9%), PEF (16.6%), LMC (18.1%), HHS (18.4%), CA (24.0%), overweight (42.7%), and smoking (43.9%), with men disproportionately affected (P<0.01). The presence of 22 behavioral risk factors increased PH and AG incidence by over 9.5 times (P<0.001). Associated cardiovascular conditions (ACC) included left ventricular hypertrophy (85.3%), cerebrovascular diseases (90.9%), myocardial infarction (80.0%), heart failure (87.5%), chronic heart failure (90.0%), symptomatic peripheral arterial disease (66.7%), CKD (81.7%), and diabetes mellitus (75.0%). These, alongside HBP, significantly influence cardiovascular risk. The high prevalence of HBP (43.4%), its risk factors, and ACC underscores the need for targeted prevention efforts and deeper study of local hypertension risk factors in the Fergana Valley. Comprehensive risk assessment enhances predictive accuracy and optimizes preventive strategies, minimizing overall cardiovascular risk.

3. CONCLUSION

We have proven that effective prevention of high blood pressure in the Fergana Valley requires continuous efforts to prevent the multifactorial impact on the lifestyle of the male and female population of the valley, to minimize the regional risk factors

for the development of hypertension and cardiovascular diseases. This applies both to improving the skills of the population in primary and secondary prevention, and to implementing educational programs aimed at promoting a healthy lifestyle among the population, taking into account the risk factors noted in our study. traditions and education.

Thus, the findings of our study underscore the imperative to implement existing programs for the prevention and treatment of blood pressure (BP) disorders, meticulously addressing 22 precisely delineated risk factors, with the aim of mitigating or eradicating them at the population level. It is essential for practical health services to amplify efforts focused on enhancing the educational awareness of the general populace, patients, and healthcare professionals regarding high blood pressure, its associated risk factors (RF), and atherosclerotic cardiovascular disease (ACC). Such initiatives are pivotal in reducing the heightened cardiovascular risk attributable to elevated blood pressure, fostering a more informed and proactive approach to public health.

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