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Gender and Regional Features of Arterial Hypertension and Ischemic Heart Disease

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Abstract The article presents the results of a comprehensive clinical and laboratory study of 120 patients treated at the Bukhara Regional Cardiology Dispensary. The patients were divided into two groups: with arterial hypertension (Group I) and with ischemic heart disease that developed against the background of arterial hypertension (Group II). The work analyzed sex, place of residence and distribution of body mass index among patients. Significant differences between the groups were revealed, indicating a progressive worsening of cardiovascular disorders with a combination of arterial hypertension and ischemic heart disease. The results obtained can serve as a basis for further studies of the pathogenesis and prognosis of cardiovascular diseases.

Keywords Arterial hypertension, Ischemic heart disease, Gender characteristics, Body mass index, Place of residence

1. Introduction

Cardiovascular diseases (CVD) remain the leading causes of global mortality, annually claiming the lives of more than 18 million people [1,2]. Arterial hypertension (AH) and coronary heart disease (CHD) are the main factors determining the development of critical vascular complications. According to global statistics [3], AH affects over 1.2 billion people, and CHD has been diagnosed in more than 126 million. The combination of these pathologies is especially common in people over 60 years of age, reaching 45–50%, which is associated with the progressive impact of such factors as excess body weight, lipid metabolism disorders, and chronic inflammation [3,4,9].

Current approaches to the treatment and prevention of CVD do not fully solve the problem of effective hypertension management: in 35–40% of patients, blood pressure remains above target values, which significantly increases the risk of developing coronary heart disease and other cardiovascular events. Uncontrolled hypertension is associated with an increase in mortality from CVD, reaching 15–20% per decade [5,8]. The transition from isolated hypertension to a combination with coronary heart disease is due to complex processes, including vascular remodeling, microcirculatory disorders, and systemic metabolic shifts, but the detailed mechanisms of this process remain poorly understood [6,7].

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In this regard, there is a need for studies that will reveal the influence of gender, regional and anthropometric characteristics on the development and course of hypertension and coronary heart disease. Such data can become the basis for improving the methods of early prediction and prevention, which emphasizes the importance of this study.

Purpose of the study. to study gender and regional characteristics of arterial hypertension and coronary heart disease.

2. Materials and Methods

To conduct the study, a comprehensive clinical and laboratory examination of 120 patients who were undergoing inpatient and outpatient treatment at the Bukhara Regional Cardiology Dispensary was conducted. All study participants were carefully selected taking into account the inclusion and exclusion criteria to ensure maximum reliability of the data obtained and exclude the influence of concomitant pathologies. Patients were divided into two main clinical groups depending on the established diagnosis:

Group I included 60 patients suffering from hypertension. These patients were diagnosed with primary hypertension, without obvious signs of coronary heart disease, which allowed us to focus on the characteristics of the hypertensive process.

Group II consisted of 60 patients with an established diagnosis of coronary heart disease that developed against the background of hypertension. These patients represented a more complex clinical category, since the combination of two diseases significantly worsens the course and prognosis

of cardiovascular disorders.

The control group consisted of 20 conditionally healthy individuals with no history of chronic cardiovascular diseases, which was confirmed by clinical examination and additional instrumental diagnostic methods.

3. Results and Discussion

Recent studies have shown that there is a certain difference between men and women in the frequency and severity of coronary heart disease in patients with hypertension. These differences are due to a combination of genetic, hormonal, immunological and vascular factors that can affect the course of the disease and the likelihood of its complications. Despite the active study of this topic, the mechanisms underlying gender differences in the pathogenesis of coronary heart disease remain complex and require additional research for their full understanding.

According to clinical observations, men more often suffer from early development of coronary heart disease, which is associated with a greater tendency to dyslipidemia, insulin resistance and aggressive forms of atherosclerosis. At the same time, in women, coronary heart disease often manifests itself at a later age, but is often accompanied by atypical symptoms, which can complicate the timely diagnosis of the disease. Hormonal factors play an important role: estrogens have a protective effect on the vascular system, reducing inflammatory processes and preventing endothelial dysfunction, while in the postmenopausal period, the level of estrogens decreases, which leads to an increased risk of cardiovascular diseases in women.

Table 1. Gender characteristics in the studied patients

Floor	Group I (n=60)		Group II (n=60)		p-value
	Abs.	%	Abs.	%	
Man	23	38.3	31	51.7	1.0
Woman	37	61.7	29	48.3	

Group I included predominantly women - 37 people (61.7%), while the proportion of men was 23 people (38.3%). Group II was dominated by men - 31 people (51.7%), while there were 29 women (48.3%).

Statistical analysis performed using the χ^2-square criterion showed that the differences in gender distribution between groups I and II did not reach the level of statistical significance (χ^2=2.134, p=0.144). This indicates that the patient's gender does not have a significant effect on the probability of having coronary heart disease among patients with hypertension in this study. Taking into account the obtained results (p=0.144), it was decided not to conduct further stratification and analysis of data by gender.

Place of residence can influence the course of hypertension and the risk of developing coronary heart disease due to differences in living conditions, access to medical care, level of physical activity, nutrition, and environmental factors. Urban and rural environments impose different patterns on patients' lifestyles, which can contribute to either early detection and treatment of cardiovascular diseases or their progression due to insufficient control of risk factors.

The analysis showed that there were no significant differences in the distribution of patients by place of residence between the study groups. The majority of participants in both Group I — 48 people (80.0%) and Group II — 43 people (71.7%) lived in rural areas, while urban residents accounted for 12 people (20.0%) in Group I and 17 people (28.3%) in Group II (χ^2=1.111 p=0.292).

Table 2. Analysis of patients' place of residence

Place of residence	Group I (n=60)		Group II (n=60)		p-value
	Abs.	%	Abs.	%	
City	12	20.0	17	28.3	χ^2=1.111 p=0.292
Village	48	80.0	43	71.7	

The obtained data indicate a predominance of rural residents among patients with arterial hypertension and ischemic heart disease, which is consistent with the results of studies conducted in Gornaya Shoria. In particular, a study led by Mulerova T.A. et al. (2017) showed that rural residents have a higher prevalence of risk factors such as arterial hypertension and obesity compared to urban residents.

In addition, a study conducted by Zagidullin S.Z. et al. (2021) demonstrated that the epidemiology of coronary heart disease and associated risk factors varies significantly depending on the region of residence, which confirms the need to take into account the place of residence when assessing the risk of cardiovascular diseases.

Thus, in our study, living in a rural area can be considered as one of the potential risk factors for the development of arterial hypertension and its progression to coronary heart disease.

Obesity and overweight are recognized risk factors for the development of cardiovascular diseases, including hypertension and coronary heart disease, due to their impact on metabolic disorders, systemic inflammation and the progression of the atherosclerotic process.

According to Stamler et al. (2019), each increase in body mass index (BMI) by 5 kg/m² is associated with a 30% increase in the risk of cardiovascular events (RR 1.3; 95% CI: 1.2–1.4), which is associated with increased insulin resistance and proinflammatory status. Wilson et al. (2012) in the Framingham Study found that BMI above 25 kg/m² correlates with an increase in the incidence of coronary heart disease in patients with hypertension (OR 1.5; 95% CI: 1.2–1.9), while Ridker et al. (2015) emphasize the role of obesity in increasing C-reactive protein levels, enhancing atherosclerosis.

In our study, we analyzed the distribution of BMI to assess the anthropometric characteristics of the cohorts (Table 3). In Group I, the average BMI was 28.2±4.1 kg/m², indicating a predominance of overweight and grade I obesity. In Group II, the average BMI was slightly lower, 26.9±4.3 kg/m², with a higher proportion of patients in the normal weight category.

Table 3. Analysis of BMI distribution in patients (kg/m^2)

Category	Group I (n=60)		Group II (n=60)		p-value
	Abs.	%	Abs.	%	
Less than 18.5 (underweight)					
18.5 - 24.9 (normal)	6	10.0	18	30.0	χ^2=7.50, p=0.006
25-30 (overweight)	30	50.0	24	40.0	χ^2=1.25, p=0.263
30-35 (obesity stage I)	20	33.3	14	23.3	χ^2=1.53, p=0.216
35-39.9 (obesity stage II)	3	5.0	4	6.67	χ^2=0.15, p=0.699
More than 40.0 (obesity stage III)	1	1.67			χ^2=1.01, p=0.315

The distribution of BMI demonstrates differences between the groups reaching a significant level (χ^2=9.524, p=0.049). In group I, patients with normal BMI accounted for 10.0% (n=6), while in group II their proportion was 3 times higher — 30.0% (n=18). The overweight category prevailed in group I — 50.0% (n=30) versus 40.0% (n=24) in group II, and stage I obesity was more common in group I — 33.3% (n=20) versus 23.3% (n=14) in group II. Stage II obesity was comparable: 5.0% (n=3) and 6.67% (n=4), and stage III obesity was recorded only in group I — 1.67% (n=1).

Comparative analysis revealed a tendency towards a decrease in the average BMI in group II in the presence of coronary heart disease, which may be associated with a change in metabolic status, weight loss against the background of coronary heart disease progression, or drug correction. These results are partially consistent with the literature (Stamler et al., 2019), where obesity increases the risk of coronary heart disease with an increase in BMI, but a lower BMI in group II indicates the influence of concomitant factors.

4. Conclusions

1. In patients with isolated hypertension, a significant predominance of women was noted - 61.7%, while among patients with a combination of hypertension and coronary heart disease, the proportion of men was 51.7%. Women were more common in group I (37 out of 60), while men predominated in group II (31 out of 60), but these differences did not reach statistical significance (p=0.144).
2. Rural residents predominated among patients with isolated hypertension - 80.0%, while in patients with hypertension and coronary heart disease their proportion was 71.7%. The urban population was more common in group II - 28.3% compared to 20.0% in group I, although the differences did not reach significance (p = 0.292).
3. Excess body weight was more often recorded in patients with isolated hypertension - 50.0%, while among patients with a combination of hypertension and coronary heart disease this figure was 40.0%. The proportion of individuals with normal BMI in group II was higher - 30.0% versus 10.0% in group I, which reflects statistically significant differences in the distribution of BMI (p=0.049).

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