DYNAMICS OF THE PREVALENCE OF ISCHEMIC HEART DISEASE AMONG WOMEN IN THE REPUBLIC OF UZBEKISTAN

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Abstract. *Ischemic heart disease (IHD) remains a leading cause of morbidity and mortality globally, with distinct gender-specific characteristics. In Uzbekistan, comprehensive epidemiological data on IHD prevalence among the female population remain limited. This study aims to analyze the regional dynamics and age-specific structure of IHD prevalence among women in the Republic of Uzbekistan over the 2022–2024 period. A retrospective epidemiological study was conducted using official medical statistics data from all administrative regions of Uzbekistan. The analysis encompassed absolute and relative indicators of IHD prevalence among the female population, stratified by four age groups (<49, 50–58, 59–68, and ≥69 years) and by region for 2022–2024. Extensive indicators, temporal dynamics, and comparative interregional differences were calculated. Statistical significance was set at $p<0.05$. Over the three-year period, the total number of registered IHD cases among women increased from 133,325 to 181,998, representing a growth rate of 36.5% ($p<0.05$). Cardiovascular diseases consistently dominated the overall morbidity structure, accounting for 78.3% in 2022 and 79.7% in 2023y. Marked regional heterogeneity was observed: the Tashkent region consistently demonstrated the highest prevalence (increasing from 25.2% to 29.4% of national cases), followed by the Namangan (144.8% growth in 2023) and Kashkadarya regions. Age-stratified analysis revealed a progressive increase in IHD burden with advancing age, with the highest absolute numbers concentrated in the ≥69 years cohort (11,717 cases in 2022; 13,548 in 2024). The 50–58 age group, corresponding to early postmenopause, exhibited a 14.8% increase in 2023, supporting the hypothesis of hormonal influence on cardiovascular risk. This study demonstrates a significant increase in IHD prevalence among women in Uzbekistan, with pronounced regional and age-related disparities. The findings underscore the urgent need for gender-oriented preventive strategies, enhanced screening programs targeting perimenopausal and postmenopausal women, and region-specific resource allocation. Further research should focus on elucidating the socioeconomic, behavioural, and environmental determinants contributing to the observed epidemiological patterns.*

Keywords: *cardiovascular diseases, circulatory system, chronic infections, mortality rates.*

Introduction

Cardiovascular diseases (CVD) have been among the leading causes of mortality and disability worldwide for many decades, representing one of the most pressing problems in modern healthcare [1,14]. According to the World Health Organization, diseases of the circulatory system

are the leading cause of death worldwide, resulting in more than 17 million deaths annually [1]. Among the wide variety of cardiovascular pathologies, ischemic heart disease (IHD) occupies a special place, contributing significantly to premature mortality and disability rates. Despite the tremendous progress made in recent decades in the field of diagnostics, pharmacotherapy, and the introduction of high-tech treatment methods, the absolute number of people suffering from IHD continues to grow steadily [7, 12]. This seemingly paradoxical trend is largely due to the aging of the population, as well as the high prevalence of key risk factors such as hypertension, lipid metabolism disorders, obesity, and physical inactivity [5,8]. Other risk factors include comorbidities that accelerate atherosclerosis, such as chronic kidney disease, inflammatory diseases, autoimmune diseases, connective tissue diseases, and chronic infections. Another risk factor is common psychosocial disorders, such as anxiety and depression, which are associated with a 22% increase in the risk of developing IHD [10].

The gender and age characteristics of the prevalence of the disease deserve special attention. According to numerous studies, the incidence and mortality rates from ischemic heart disease are traditionally higher among men, and therefore IHD has been perceived as a pathology that predominantly affects the male population. However, in older age groups, there is a significant increase in the prevalence of the disease among women, which requires a more in-depth study of the gender aspects of the pathogenesis and clinical course of IHD. Indeed, in younger age groups, the incidence among men is significantly higher. Epidemiological studies in recent years have convincingly demonstrated that with the onset of menopause and the loss of the protective effect of estrogen, the risk of developing and progressing atherosclerosis in women increases rapidly, practically comparable to that in men in older age groups [2]. Moreover, the clinical course of IHD in women has its own characteristics: atypical forms of pain syndrome are more common, the likelihood of developing microvascular dysfunction (so-called ischemia with intact coronary arteries) is higher, and outcomes after acute coronary events are often worse than in men [12].

The results of modern epidemiological studies indicate significant regional differences in the prevalence of coronary heart disease. The most unfavorable epidemiological indicators are recorded in Eastern Europe, Central Asia, and South Asia, where there is a relatively high incidence and mortality rate associated with this pathology [7]. The prevalence of major risk factors remains high in these regions, and there are certain limitations in the availability of specialized medical care. According to experts, these circumstances have a significant impact on the formation of unfavorable epidemiological indicators [8].

At the same time, a number of countries in Western Europe and North America have seen a steady decline in mortality from ischemic heart disease over the past decade. This trend is largely due to the successful implementation of primary and secondary prevention programs, early detection of risk factors, and improvements in the treatment of patients with coronary artery disease [7]. In this regard, studying the gender, age, and regional characteristics of IHD prevalence is particularly relevant. Understanding how the burden of disease is distributed among women of different age groups and depending on their place of residence is a prerequisite for planning effective preventive measures, optimizing the work of cardiology services, and rationally allocating healthcare resources. Of particular interest is the analysis of the situation in Central Asian countries, including Uzbekistan, where epidemiological data on the female population is often fragmentary, and the influence of socio-economic and ethnocultural factors on cardiovascular risk has not been sufficiently studied [7,8].

Research objective

The aim of this study was to investigate regional characteristics of the prevalence of ischemic heart disease among women and to analyze the dynamics and structure of its frequency in different age groups in the Republic of Uzbekistan for the period 2022–2024yy.

Materials and methods. A retrospective epidemiological study was conducted based on the analysis of medical statistics data. The object of the study was the incidence of cardiovascular diseases among the population of the Republic of Uzbekistan. The study used summary data on the incidence and prevalence of ischemic heart disease among the female population for the period from 2022 to 2024. The information was stratified by region and four key age groups: under 49, 50-58, 59-68 years, and 69 years and older. For each age group and each region, the absolute number of registered cases (n) and the region's share in the overall incidence structure for the republic for the corresponding year (%) were calculated. The analysis was conducted over a three-year period to identify the main trends. Data processing included the calculation of extensive indicators (distribution of morbidity by region), analysis of the dynamics of absolute and relative indicators, and comparative analysis of age groups. Differences were considered statistically significant at a significance level of $p<0.05$. The results were interpreted from the perspective of current understanding of cardiovascular epidemiology and risk factors.

Results. Analysis of statistical data revealed that diseases of the circulatory system occupy a leading position in the structure of the overall morbidity of the population of the Republic of Uzbekistan (Table 1).

Table 1. Overall morbidity from cardiovascular diseases in the Republic of Uzbekistan (2022–2023).

Name of disease	2022y		2023y	
	n	%	n	%
Circulatory system diseases	2 050 809	78,3%	2 160 983	79,7%
Ischemic heart disease	418 850	16,0%	472 581	17,4%
Post-infarction cardiosclerosis	106 533	4,1%	52 744	1,9%
Heart aneurysm	9 754	0,4%	3 673	0,1%
Ischemic cardiomyopathy	23 105	0,9%	13 744	0,5%
Other	9 261	0,4%	9 066	0,3%
Total	2 618 312	100%	2 712 791	100%

In 2023, compared to 2022, there was an increase in the total number of cardiovascular diseases by 94,479 cases, which corresponds to a growth rate of 3.6% ($p<0.05$) (Table 1).

Table 2. Dynamics in cardiovascular diseases among women in the Republic of Uzbekistan (2022–2023).

Name of disease	2022y		2023y	
	n	%	n	%
Circulatory system diseases	671 987	82,2%	741 452	81,3%
Ischemic heart disease	133 325	16,3%	162 800	17,9%
Post-infarction cardiosclerosis	4 094	0,5%	4 470	0,5%
Heart aneurysm	1 125	0,1%	2	0,0%
Ischemic cardiomyopathy	6 379	0,8%	2 114	0,2%

Other	428	0,1%	941	0,1%
Total	817 338	100%	911 779	100%

The total number of cases of cardiovascular disease among women increased by 11.6% ($p < 0.05$). The most pronounced increase was observed for ischemic heart disease (Table 2).

Regional dynamics of the incidence of ischemic heart disease among women. Analysis of regional statistical data revealed significant differences in the prevalence of ischemic heart disease among the female population of the Republic of Uzbekistan (Table 3).

Table 3. Dynamics of the incidence of ischemic heart disease among women by region of the Republic of Uzbekistan (2022–2024).

Regions	2022y		2023y		2024y	
	n	%	n	%	n	%
Andijan	7 038	5,3%	5 338	3,3%	8 421	4,6%
Jizzakh	4 316	3,2%	8 427	5,2%	7 952	4,4%
Sirdarya	3 200	2,4%	3 645	2,2%	3 956	2,2%
Samarkand	12 103	9,1%	12 649	7,8%	13 240	7,3%
Kashkadarya	14 564	10,9%	20 156	12,4%	19 850	10,9%
Surkhandarya	11 754	8,8%	11 419	7,0%	12 564	6,9%
Navoi	3 269	2,5%	3 064	1,9%	3 684	2,0%
Bukhara	5 228	3,9%	5 713	3,5%	5 896	3,2%
Namangan	8 595	6,4%	21 048	12,9%	18 942	10,4%
Fergana	18 701	14,0%	8 396	5,2%	16 745	9,2%
Khorazm	2 129	1,6%	5 542	3,4%	6 781	3,7%
Tashkent	33 571	25,2%	48 396	29,7%	53 481	29,4%
Rep. of Karakalpakistan	8 857	6,6%	9 007	5,5%	10 486	5,8%

An analysis of trends showed that the total number of cases of ischemic heart disease among women increased from 133,325 cases in 2022 to 181,998 cases in 2024. The overall growth rate was 36.5%. The highest incidence rate was observed in the Tashkent region, where the proportion of registered cases of IHD among women increased from 25.2% to 29.4% (Table 3).

A significant increase in incidence was also observed in the Namangan region, where the number of cases more than doubled in 2023. The growth rate was 144.8%, which is one of the highest among the regions. Relatively low rates were recorded in the Sirdarya and Navoi regions, where the incidence rate remains at around 2–2.5%. Statistical analysis showed that the differences between regions are significant ($p < 0.05$) (Table 3).

The analysis revealed significant differences in the distribution of coronary heart disease depending on both the age of women and their region of residence. The total number of registered cases of IHD among women in Uzbekistan over three years shows a wave-like pattern with an overall upward trend in older age groups.

The prevalence of IHD in the youngest of the analyzed groups—among women of reproductive and young age (aged 49 and younger)—shows a decrease in the absolute number of registered cases from 1,434 in 2022 to 945 in 2024y. This may be due to both a true decrease in incidence and the peculiarities of diagnosis in this group, where IHD is relatively rare. The highest number of cases over all three years is consistently recorded in the Surkhandarya region (22.6% in 2022, 23.4% in 2023, 17.6% in 2024) and the Tashkent region (17.1% and 15.9% and 16.1%, respectively), indicating possible regional risk factors.

Table 4. Ischemic heart disease in women aged 49 and younger by region.

Regions	2022y		2023y		2024y	
	n	%	n	%	n	%
Andijan	178	12,4%	126	11,1%	111	11,7%
Bukhara	37	2,6%	30	2,7%	28	3,0%
Jizzakh	34	2,4%	35	3,1%	19	2,0%
Kashkadarya	156	10,9%	92	8,1%	103	10,9%
Navoi	27	1,9%	19	1,7%	24	2,5%
Namangan	51	3,6%	86	7,6%	78	8,3%
Samarkand	146	10,2%	75	6,6%	122	12,9%
Surkhandarya	324	22,6%	265	23,4%	166	17,6%
Sirdarya	30	2,1%	38	3,4%	22	2,3%
Tashkent	245	17,1%	180	15,9%	152	16,1%
Fergana	64	4,5%	89	7,9%	64	6,8%
Khorazm	90	6,3%	51	4,5%	32	3,4%
Rep. of Karakalpakistan	52	3,6%	45	4,0%	24	2,5%

The prevalence of IHD in the 50-58 age group, which roughly corresponds to the early postmenopausal period, shows a different picture. The total number of cases increased from 1,998 in 2022 to 2,294 in 2023, after which it decreased slightly to 2,171 in 2024. The sharp increase in the proportion and absolute number of cases in the Republic of Karakalpakistan in 2023 (219 cases, 9.5%) compared to 2022 (62 cases, 3.1%), which may indicate improved detection or a surge in incidence that requires separate study.

Table 5. Distribution of IHD among women aged 50–58 by region (2022–2024).

Regions	2022y		2023y		2024y	
	n	%	n	%	n	%
Andijan	221	11,1%	229	10,0%	309	14,2%
Bukhara	76	3,8%	75	3,3%	64	2,9%
Jizzakh	53	2,7%	67	2,9%	76	3,5%
Kashkadarya	220	11,0%	234	10,2%	227	10,5%
Navoi	37	1,9%	52	2,3%	77	3,5%
Namangan	160	8,0%	189	8,2%	195	9,0%
Samarkand	286	14,3%	268	11,7%	253	11,7%
Surkhandarya	323	16,2%	374	16,3%	270	12,4%
Sirdarya	58	2,9%	63	2,7%	66	3,0%
Tashkent	316	15,8%	288	12,6%	329	15,2%
Fergana	105	5,3%	136	5,9%	120	5,5%
Khorazm	81	4,1%	100	4,4%	74	3,4%

Rep. of Karakalpakistan	62	3,1%	219	9,5%	111	5,1%

In the group of women aged 59-68 (late postmenopause), the absolute number of cases remains the highest among all groups (except for the oldest), peaking in 2023 (5,421 cases). In this category, Samarkand and Tashkent regions show consistently high rates. In the Surkhandarya region, which led in 2022-2023, there was a noticeable decrease in both the absolute number and the proportion of cases (from 13.6% to 8.9%) in 2024, which may be due to the saturation effect of medical examinations or migration processes.

Table 6. Distribution of IHD among women aged 59–68 by region.

Regions	2022y		2023y		2024y	
	n	%	n	%	n	%
Andijan	365	8,1%	593	10,9%	601	12,8%
Bukhara	162	3,6%	169	3,1%	155	3,3%
Jizzakh	103	2,3%	221	4,1%	165	3,5%
Kashkadarya	386	8,6%	443	8,2%	460	9,8%
Navoi	156	3,5%	168	3,1%	168	3,6%
Namangan	381	8,5%	455	8,4%	388	8,2%
Samarkand	720	16,0%	575	10,6%	592	12,6%
Surkhandarya	570	12,7%	735	13,6%	420	8,9%
Sirdarya	212	4,7%	319	5,9%	135	2,9%
Tashkent	863	19,2%	990	18,3%	1044	22,2%
Fergana	266	5,9%	360	6,6%	299	6,3%
Khorazm	156	3,5%	173	3,2%	139	2,9%
Rep. of Karakalpakistan	154	3,4%	220	4,1%	147	3,1%

As expected, the oldest age group (69+) bears the greatest burden of IHD. Here, there has been a steady increase in the absolute number of cases from 11,717 in 2022 to 13,548 in 2024, which fully correlates with the processes of demographic aging and the accumulation of risk factors. The Tashkent region consistently ranks first in terms of the number of female patients, with its share steadily increasing (from 23.9% to 27.7%), which probably reflects both higher life expectancy and better access to diagnostics in the capital region.

Table 7. Prevalence of IHD in women aged 69 and older by region (2022–2024).

Regions	2022y		2023y		2024y	
	n	%	n	%	n	%
Andijan	1307	11,2%	1548	11,5%	1585	11,7%
Bukhara	485	4,1%	554	4,1%	601	4,4%
Jizzakh	266	2,3%	400	3,0%	357	2,6%
Kashkadarya	1138	9,7%	1255	9,3%	1228	9,1%
Navoi	325	2,8%	389	2,9%	436	3,2%

Namangan	1062	9,1%	1103	8,2%	1112	8,2%
Samarkand	1278	10,9%	1259	9,3%	1260	9,3%
Surkhandarya	1120	9,6%	1469	10,9%	1021	7,5%
Sirdarya	359	3,1%	358	2,6%	271	2,0%
Tashkent	2802	23,9%	3492	25,8%	3748	27,7%
Fergana	615	5,2%	699	5,2%	868	6,4%
Khorazm	567	4,8%	527	3,9%	413	3,0%
Rep. of Karakalpakistan	393	3,4%	461	3,4%	648	4,8%

Discussion

The results of the study indicate a continuing increase in the prevalence of cardiovascular disease in the Republic of Uzbekistan. The data obtained are consistent with the results of international epidemiological studies indicating an increase in the scale of cardiovascular pathology in countries with developing economies [3,4,9]. One of the most significant findings of this study is the identified increase in the prevalence of coronary heart disease among women. During the period analyzed, the number of cases of IHD among women increased by 36.5%. This indicator reflects not only an increase in morbidity, but also a possible improvement in the diagnosis of this pathology.

The identified regional heterogeneity in the prevalence of coronary heart disease deserves special attention. The highest incidence rates are observed in the Tashkent region, which may be associated with a high degree of urbanization, higher population density, and the prevalence of risk factors. Urbanization is one of the key factors influencing the growth of cardiovascular diseases. Residents of large cities are more often exposed to adverse environmental factors, experience high levels of psycho-emotional stress, and lead less active lifestyles [6,14-16]. Significant differences in morbidity rates may also be due to differences in the availability of medical care and diagnostic capabilities of regional medical institutions.

The sharp increase in incidence in the Namangan region deserves special attention. This trend may be associated with both a real increase in the number of cases and improvements in the registration and detection of this pathology. At the same time, it should be noted that epidemiological studies of cardiovascular diseases among women have a number of specific features. In particular, the clinical picture of ischemic heart disease in women often differs from the typical manifestations of the disease in men. Women more often complain of nonspecific symptoms such as fatigue, shortness of breath, or chest discomfort, which can make early diagnosis of the disease difficult [7, 11-13].

In addition, women are more likely to have microvascular forms of coronary heart disease, which are more difficult to diagnose using standard examination methods. The results obtained in this analysis convincingly confirm global trends regarding the critical impact of age on the prevalence of IHD among women. There is a clear "turning point" after the age of 50, when mechanisms associated with menopausal hormonal changes are likely to be triggered, leading to a sharp increase in the number of detected cases [2, 3].

The consistently high rates observed in densely populated areas such as Tashkent, Samarkand, Andijan, and Surkhandarya among women under the age of 49 can be explained both by the larger absolute number of women and by the concentration of risk factors characteristic of

regions with developed industry and high population density. These include psycho-emotional stress, dietary characteristics with high consumption of fats and carbohydrates, and higher levels of environmental pollution, which is consistent with data on the impact of the environment on cardiovascular risk [5, 8].

The surge in incidence in the Republic of Karakalpakstan in 2023 in the middle age group (50-58 years) deserves special attention. This may be the result of organizational changes (e.g., mass screening) or a reflection of a real deterioration in the situation associated with socio-economic or environmental problems in the region. This fact requires additional, more in-depth research using data on the prevalence of risk factors in this particular region. It should also be noted that the decrease in the number of cases in some regions and groups in 2024 (e.g., in the 59-68 age group in the Surkhandarya region) should not be interpreted unequivocally as an improvement in the situation. This may be due to population migration, the transition of patients to the next age cohort, changes in accounting rules, or a temporary decrease in treatment demand.

Conclusion

The analysis of epidemiological data for the Republic of Uzbekistan for 2022-2024 allows us to draw the following conclusions:

1. Cardiovascular diseases continue to occupy a leading position in the structure of the overall morbidity of the population of the Republic of Uzbekistan. For the period 2022-2024, a steady trend towards an increase in the prevalence of ischemic heart disease among women has been identified. The overall growth rate was 36.5%, which indicates a significant increase in the prevalence of this pathology.

2. Regional variability has been identified: There are significant differences in the prevalence of IHD between regions. The highest rates are recorded in the Tashkent, Kashkadarya, and Namangan regions. The Tashkent, Samarkand, Andijan, and Surkhandarya regions lead in terms of the number of patients in all age groups, which requires the allocation of priority resources to these areas.

3. The high significance of age has been confirmed: The burden of ischemic heart disease among women increases regularly and significantly with age. The largest absolute number of patients is concentrated in the age group of 69 years and older, with a steady increase in the number of cases in this category, which dictates the need to develop geriatric cardiac care.

4. Indicators requiring further study have been identified: Statistical outliers (e.g., growth in Karakalpakistan in 2023) have been detected, indicating the need for in-depth local epidemiological investigations to identify their true causes.

5. The need for a gender-oriented approach is justified: The data obtained underscore the need to improve the cardiovascular disease prevention system aimed at early detection of risk factors, the development of specialized prevention programs targeting women, especially in the perimenopausal and postmenopausal periods, and the improvement of the effectiveness of medical care. It is important to improve screening and early diagnosis programs for cardiovascular diseases among women. Screening measures and programs for correcting risk factors (arterial hypertension, diabetes, obesity) should be intensified for women starting at age 50. Further research should also focus on studying the impact of socioeconomic and behavioral factors on the prevalence of cardiovascular disease among the female population.

Thus, the results of the study emphasize the relevance of further monitoring of the situation with IHD in the female population at the regional level for making effective management decisions in the field of health care.

REFERENCES

1. Boitsov S.A., Samorodskaya I.V. Epidemiology of cardiovascular diseases in the Russian Federation // Cardiology. – 2021. – Vol. 61, No. 2. – P. 5–12.
2. Chazov E.I., Oganov R.G. Guide to Cardiology. – Moscow: GEOTAR-Media, 2019. – 960 p.
3. Gaziano T.A., Gaziano J.M. Global burden of cardiovascular disease. published 2012. doi:10.1016/b978-1-4377-0398-6.00001-9.
4. Lloyd-Jones D.M., Adams R.J., Brown T.M., Carnethon M. and et al. Cardiovascular epidemiology. Circulation. 2010, 121 (7):e948-e954.
5. Oganov R.G., Maslennikova G.Ya. Prevention of cardiovascular diseases: modern approaches // Preventive Medicine. – 2020. – Vol. 23, No. 4. – P. 7–13.
6. Piepoli M.F., Hoes A.W., Agewall S., Albus C., Brotons C., Catapano A.L., et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2016;37(29):2315-2381.
7. Roth G. A., Mensah G. A., Johnson C. O., et al. Global burden of cardiovascular diseases and risk factors, 1990–2019: update from the Global Burden of Disease Study // Journal of the American College of Cardiology. – 2020. – Vol. 76, No. 25. – P. 2982–3021. https://doi.org/10.1016/j.jacc. 2020.11.010.
8. Shalnova S.A., Deev A.D. Risk factors for cardiovascular diseases in population studies // Cardiovascular Therapy and Prevention. – 2020. – Vol. 19, No. 5. – Pp. 34–41.
9. Shlyakhto E.V. Modern Cardiology. Moscow. 2016.
10. Smaardijk V.R., Lodder P., Kop W.J., van Gennep B., Maas AHEM. Mommersteeg PMC. Sex- and gender-stratified risks of psychological factors lor incident ischemic heart disease: systematic review and meta-analysis. Journal Am. Heart Assoc. 2019:8 (9): e 010859.
11. Smith S.C. Jr., Jackson R., Pearson T.A., Fuster V., Yusuf S., Faergeman O., et al. Principles for national and regional guidelines on cardiovascular disease prevention: a scientific statement from the World Heart and Stroke Forum. Circulation. 2004;109 (25):3112-3121.
12. Timmis A., Townsend N., Gale C., et al. European Society of Cardiology: Cardiovascular Disease Statistics 2021 // European Heart Journal.–2022.–Vol.43, No.8. – P. 716–799. https://doi.org/10.1093/eurheartj/ehab892.
13. Townsend N., Wilson L., Bhatnagar P. Cardiovascular disease in Europe: epidemiological update 2016. European Heart Journal (2016) 0, 1–14.
14. Virani S. S., Alonso A., Benjamin E. J., et al. Heart Disease and Stroke Statistics—2023 Update: A Report From the American Heart Association // Circulation.–2023.–Vol. 147, No.8.–P.e93–e621. https://doi.org/10.1161/CIR.0000000000001123.
15. World Health Organization. Cardiovascular diseases (CVDs). Geneva: WHO; 2023.
16. Yusuf S., Hawken S., Ounpuu S., Dans T. and et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet 2004 Sep;364 (9438):937-52.