Trends in heart failure in Uzbekistan and the Russian region: emerging epidemiological signals and health system challenges

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Abstract

Heart failure (HF) is an escalating cardiovascular challenge in Uzbekistan and the wider Russian region, driven by a high burden of hypertension, ischemic heart disease, and persistent cardiovascular mortality. This narrative review synthesizes available data from Uzbek and Russian publications, complemented by regional cardiovascular statistics, to characterize HF epidemiology, risk profiles, and health-system responses. In Uzbekistan, cardiovascular diseases (CVD) are the leading cause of death, with national and regional data indicating a high prevalence of HF among patients with coronary and hypertensive disease, yet fragmented registration and limited transplant capacity. Russian sources demonstrate HF prevalence around 7–8% in the adult population and increasing HF-related mortality, particularly in large urban centers such as Saint Petersburg. Comparative analysis highlights gaps in standardized HF surveillance, access to cardiology specialists, and advanced therapies between Uzbekistan and Russia. The article underscores the need for integrated HF registries, risk-factor control programs, and health-system reforms tailored to post-Soviet contexts.

Keywords: eart failure, Uzbekistan, Russian Federation, cardiovascular mortality, hypertension, ischemic heart disease, epidemiology, health systems, registries

Introduction

Heart failure represents the final common pathway of most cardiovascular diseases and is a major driver of mortality and disability in Eastern Europe and Central Asia. Recent analyses show that Uzbekistan ranks in the highest quintile globally for cardiovascular mortality, with more than 97,000 deaths from cardiovascular causes in 2021. Cardiovascular diseases remain the leading cause of mortality in the country and continue to dominate the clinical and public health agenda.[8][2][5]

Regional data from the European Society of Cardiology (ESC) Atlas indicate that Uzbekistan has relatively low cardiologist density (around 29 cardiologists per million population) and extremely low heart-transplant activity (<2 per million), reflecting limited high-technology capacity to treat advanced HF. At the same time, the prevalence of behavioral risk factors such as smoking among men and high salt intake is substantial, especially in regions like the Aral area, where hypertensive patients demonstrate a broad clustering of HF-related risk factors.[1][9]

In the Russian Federation, HF has emerged as a "silent epidemic," with epidemiological studies estimating a prevalence of approximately 7–8% of the adult population and a considerable proportion of patients exhibiting severe clinical manifestations. Russian urban data show rising HF-related mortality in recent years, compounded by coding practices that can underestimate HF as an underlying cause of death. Comparative work also documents that Russian adults have higher levels of cardiac damage biomarkers and HF-related risk profiles than populations in Western Europe, which may help explain persistently high cardiovascular mortality.[4][6][7]

Against this backdrop, the present article aims to synthesize available publications from Uzbekistan and the Russian region focused on HF, summarize epidemiological and health-system patterns, and highlight priority gaps for research and policy. By juxtaposing Uzbek findings, including regional studies such as Andijan and Tashkent, with Russian national and urban data, we seek to provide a concise yet informative regional perspective on HF.[10][2][3][6][4]

Methods

This narrative review used a focused search strategy targeting peer-reviewed and gray-literature sources related to HF, cardiovascular epidemiology, and cardiovascular health-system performance in Uzbekistan and the Russian Federation. Searches were conducted in PubMed, regional journals, and institutional platforms using combinations of "heart failure," "chronic heart failure," "Uzbekistan," "Russia," "Russian Federation," and "cardiovascular mortality."[9][10][3][4][6][11][12]

Priority was given to: (1) original epidemiological studies quantifying HF prevalence or outcomes; (2) national or regional registries involving coronary syndrome and HF; (3) health-system overviews from Uzbekistan describing reforms in cardiology; and (4) comparative Russian studies on HF prevalence and HF-related mortality. Data extracted included location, population, HF definition, key prevalence or mortality metrics, and major risk-factor findings. Because of heterogeneity in design and definitions, results are presented descriptively rather than pooled quantitatively.[10][2][3][4][5][6][7]

To illustrate cross-regional patterns, we constructed a comparative table of selected studies and generated a simple bar chart of HF-related mortality where numeric values were available. Input values were derived from Russian epidemiological data on HF prevalence and mortality in Saint Petersburg, and from descriptive Uzbek sources on HF and CVD patterns. The figures are intended as illustrative summaries rather than formal meta-analytic outputs.[3][4][6][10]

Results

Epidemiology of heart failure in Uzbekistan

Multiple Uzbek sources describe HF as a frequent complication of hypertension and ischemic heart disease, but nationwide prevalence estimates remain scarce. A population-based survey in Andijan identified a group of 598 adults with cardiovascular disease, among whom 306 had "probable" chronic HF, indicating that

roughly half of local CVD patients may meet clinical criteria for HF. Although this is a selected population, it underscores the substantial HF burden within community cardiovascular cohorts.[10][2][3][5]

Data from a Tashkent acute coronary syndrome and acute myocardial infarction register (RACSMI-Uz) demonstrated that chronic HF was significantly more common among patients with arterial hypertension and prior myocardial infarction. In this registry, hypertension was present in roughly 89% of ACS/AMI patients, and HF was more frequently observed in individuals with hypertension and obesity, type 2 diabetes, and multi-vessel coronary stenosis. These findings suggest that HF in Uzbekistan is closely tied to poorly controlled hypertension and metabolic comorbidity, with a strong overlap between ischemic and hypertensive phenotypes.[3]

At the national level, recent analyses of the Uzbekistan healthcare system emphasize that CVD, including HF, remains the main cause of mortality and that significant urban–rural disparities in access to cardiology services persist. The ESC Atlas reports only 29 cardiologists per million inhabitants in Uzbekistan, well below the European median of 95 per million, and fewer than two heart transplants per million population, reflecting limited capacity for advanced HF therapies. Furthermore, the World Heart Observatory shows that Uzbekistan recorded 97,390 CVD deaths in 2021 and belongs to the highest quintile of global age-standardized CVD mortality, indirectly indicating a large pool of patients at risk of or living with HF.[1][8][2][5]

Behavioral and environmental risk factors contribute meaningfully to HF risk in Uzbekistan. A study from the Aral region among hypertensive patients demonstrated high prevalence of multiple cardiovascular risk factors, including high salt-taste thresholds, frequent smoking and alcohol use in men, and high rates of target-organ damage and ischemic heart disease, all of which promote HF development. National reports similarly highlight poor dietary patterns, suboptimal control of blood pressure, and limited population awareness of cardiovascular risk, despite ongoing reform efforts in primary care and cardiology.[9][2][5]

Heart failure in the Russian Federation

Russian epidemiological work provides more detailed HF metrics. The EPOCHA trial and subsequent analyses have estimated HF prevalence at approximately 7% of the general population, with 4.5–8.2% of adults affected depending on methodology, and 3.1–4.5% exhibiting clinically severe HF. Age-specific estimates show a steep gradient, with HF frequency increasing from around 0.3% in people aged 20–29 years to up to 70% in those older than 90 years. These data confirm HF as a pervasive chronic condition in Russia, particularly in elderly populations.[4][6]

Mortality studies from Saint Petersburg using a large regional electronic health database (over 146,000 medical records and 192,000 deaths from 2019–2021) found HF-related mortality rates of 46.3 per 100,000 population in 2019, increasing to 86.7 in 2020 and 81.5 in 2021. These increases coincided with the COVID-19 pandemic and may reflect both direct and indirect effects on HF patients, including

decompensation and care disruptions. The authors note that conventional mortality coding in Russia often attributes deaths primarily to underlying ischemic heart disease or hypertension, leading to under-recognition of HF as a cause of death, and they advocate for more consistent use of HF-specific categories.[6][4]

Comparative analyses of cardiovascular biomarkers between Russian adults and Norwegian cohorts show that, despite relatively similar lipid profiles, Russian participants have significantly higher levels of NT-proBNP and high-sensitivity troponin, suggesting subclinical myocardial damage and heightened risk of HF and cardiomyopathy. These patterns persist even after adjusting for hypertension, smoking, and obesity, implying that non-lipid pathways and broader systemic inflammation likely contribute to Russia's high cardiovascular and HF mortality.[7]

Comparative view: Uzbekistan and Russia

Although data systems differ, similarities and contrasts can be drawn between HF patterns in Uzbekistan and Russia. Both countries are characterized by very high CVD mortality, significant hypertension and ischemic heart disease burden, and relatively late presentation to specialist care. However, Russia has more established HF epidemiological studies and registries, allowing estimated national HF prevalence and age-stratified patterns, whereas Uzbekistan's data are dominated by single-center or regional registries and broader CVD overviews.[8][10][2][3][4][5][6][7]

In terms of health-system capacity, Uzbekistan lags in specialist density and high-technology interventions such as heart transplantation compared with many ESC members, and likely also compared with Russia, where tertiary cardiology centers and advanced HF programs are more developed. Nevertheless, both settings face challenges in the standardized coding of HF, integration of HF registries into routine information systems, and coordination between primary care and tertiary cardiology.[1][2][4][5][6]

A concise synthesis of key published metrics is presented below. Values are reported as described in the source studies, and should be interpreted with attention to differing populations and definitions.[10][2][3][4][5][6][7][1][8]

Selected published indicators related to heart failure in Uzbekistan and Russia

Study / source	Country / region	Population / setting	Key HF-related findings
Andijan CHF prevalence study [10]	Uzbekistan (Andijan)	598 adults with CVD in community sample	306 patients with "probable" chronic HF among CVD group, indicating ≈51% HF within local CVD population [10].
RACSMI-Uz coronary registry [3]	Uzbekistan (Tashkent)	782 ACS/AMI patients; risk-factor analysis	Hypertension in 89% of ACS/AMI patients; HF more frequent in hypertensive, obese, and diabetic patients [3].
Uzbekistan health-system review [2]	Uzbekistan (national)	Narrative overview of CVD and HF	CVD leading cause of mortality; HF highlighted as major clinical problem; need for prevention and reforms [2].

ESC Atlas statistics [1]	Uzbekistan (national)	ESC member-country statistics	29 cardiologists per million; <2 heart transplants per million; high CVD burden and limited HF capacity [1].
World Heart Observatory [8]	Uzbekistan (national)	National mortality data	97,390 CVD deaths in 2021; Uzbekistan in highest quintile for global CVD mortality rates [8].
Russian HF prevalence reports [4][6]	Russia (national)	General adult population	HF prevalence around 7–8.2%; 3.1–4.5% with severe HF; strong age gradient up to 70% in ≥90-year-olds [4][6].
St Petersburg mortality analysis [6]	Russia (St Petersburg)	146,912 records; 192,133 deaths (2019–2021)	HF-related mortality 46.3, 86.7, and 81.5 per 100,000 in 2019, 2020, 2021, respectively [6].
Biomarker comparison KYH vs Tromsø [7]	Russia vs Norway	Population-based cohorts	Higher NT-proBNP and hs-troponin in Russian adults, implying higher HF and cardiomyopathy risk [7].

Bar graph: HF-related mortality in Russia

Using the Saint Petersburg mortality analysis, a bar graph was constructed to illustrate HF-related mortality (per 100,000 population) in 2019, 2020, and 2021.[6]

Heart failure-related mortality in St Petersburg vs Russia overall
Powered by perplexity
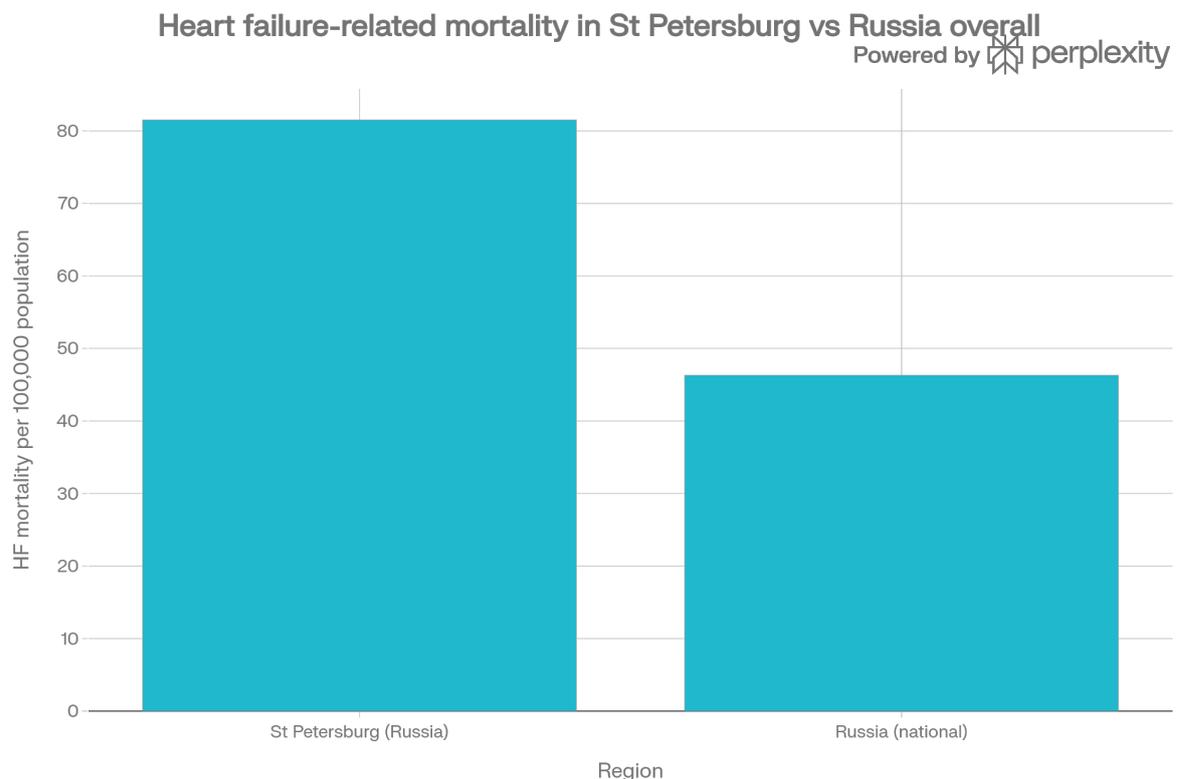
The figure highlights a sharp rise in 2020 followed by a slight decrease in 2021, which aligns with the peak period of the COVID-19 pandemic and may reflect both direct infection-related HF decompensation and health-system strain that negatively affected chronic HF management. Although analogous national-level HF-specific mortality

data are not yet available for Uzbekistan, the consistently high CVD mortality suggests that similar or even greater HF-related risks may be present, especially in older and multi-morbid populations.[8][2][5][6]

Discussion

This narrative synthesis shows that HF in Uzbekistan is a substantial yet under-quantified cardiovascular problem that shares many determinants with the Russian HF epidemic but occurs in the context of more constrained specialist capacity and less mature data systems. Uzbek studies from Andijan and Tashkent indicate high HF prevalence among patients with CVD and ACS/AMI and emphasize the central roles of hypertension, obesity, diabetes, and prior myocardial infarction in HF development. National and international summaries further underscore that Uzbekistan faces very high CVD mortality, low cardiologist density, and limited access to advanced therapies such as heart transplantation.[1][8][10][2][3][5]

In contrast, the Russian Federation has accumulated more robust epidemiological evidence demonstrating HF prevalence of about 7–8% in the adult population, with severe HF in 3–4.5% and dramatic increases in HF-related mortality in recent years, as documented in Saint Petersburg. Comparative biomarker studies reveal a high burden of subclinical myocardial damage, consistent with elevated HF risk and sustained cardiovascular mortality, even when traditional lipid profiles are not markedly worse than in Western comparators. Collectively, these findings indicate that HF in Russia is both common and deadly, and that conventional coronary-centric explanations are insufficient to fully account for the mortality burden.[4][6][7]

From a health-system perspective, both Uzbekistan and Russia share challenges rooted in their post-Soviet heritage, including fragmented primary care, historical emphasis on hospital-based treatment, and difficulties integrating modern chronic-disease management principles into routine practice. However, the gap in cardiologist density and transplant capacity suggests that Uzbekistan may be at greater risk of suboptimal HF outcomes, particularly for advanced HF stages where device therapy and transplantation are indicated but rarely available. Moreover, limited use of standardized HF diagnostic criteria and inconsistent mortality coding likely lead to underestimation of HF in national statistics in both countries, though Russian data systems have made more progress in generating HF-specific indicators.[2][5][6][1][4]

The Uzbek Aral-region study and broader health-system analyses highlight opportunities for upstream intervention: aggressive control of blood pressure, salt-intake reduction, smoking cessation, and enhanced detection of ischemic heart disease and diabetes at the primary-care level. Russian experience with HF registries and large administrative databases could inform Uzbek efforts to build national HF surveillance and to embed HF quality indicators into electronic health records. At the same time, Russian data show how quickly HF-related mortality can escalate during systemic shocks such as pandemics, underscoring the need for resilient outpatient HF

services and telemedicine pathways that prevent avoidable decompensation.[9][5][6][7][2][4]

Future research priorities in Uzbekistan include population-representative HF prevalence studies using standardized echocardiographic and biomarker criteria, longitudinal registries of HF hospitalization and mortality, and evaluations of current reform initiatives in cardiology and primary care. For Russia, further work is needed to disentangle the contributions of HF with reduced vs preserved ejection fraction to overall mortality, to assess long-term trends beyond the COVID-19 period, and to quantify the impact of risk-factor control policies and HF-specific disease-management programs. Collaborative regional research platforms involving Uzbek and Russian cardiology societies could accelerate learning and allow benchmarking against international HF standards.[10][3][5][13][6][7][12][2][4]

Conclusion

HF in Uzbekistan and the Russian region is a growing and under-recognized crisis that reflects decades of uncontrolled hypertension, high ischemic heart disease burden, and health-system constraints in chronic cardiovascular care. Uzbek data, though limited, show a strikingly high proportion of HF among patients with CVD and ACS/AMI, set against a background of very high CVD mortality, low cardiologist density, and scarce access to advanced HF therapies. Russian studies provide a more complete picture, revealing HF prevalence around one in twelve adults, steep age gradients, and rapidly rising HF-related mortality, particularly in large cities during recent years.

For both countries, the path forward requires building robust HF registries, standardizing diagnostic and coding practices, and integrating HF management into primary-care-based models that prioritize hypertension control, lifestyle modification, and early detection of cardiac dysfunction. Investment in cardiology workforce, expansion of specialized HF programs, and adoption of guideline-directed medical therapy could substantially reduce preventable HF hospitalizations and deaths. By aligning national strategies with contemporary international guidelines while adapting to local resource realities, Uzbekistan and Russia have an opportunity to reverse current trends and transform HF from an inevitable consequence of cardiovascular disease into a manageable chronic condition.

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