

DYNAMICS OF CARDIOVASCULAR DISEASES AMONG KHARKIV RESIDENTS DURING THE WAR IN 2022 AND 2023

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<https://doi.org/10.35339/ic.2025.12.2.prb>

ABSTRACT

Background. The full-scale invasion in Ukraine has become a serious challenge for the healthcare system, in particular for the diagnosis, treatment and prevention of cardiovascular diseases.

Aim. To investigate the peculiarities of the prevalence of cardiovascular disease in Kharkiv residents during wartime, in 2022 and 2023.

Materials and Methods. The study used medical-statistical and comparative methods. Data from the Center for Medical Statistics of the Public Health Center of the Ministry of Health of Ukraine on cardiovascular pathology were analyzed. The comparison was based on absolute rates of morbidity due to the lack of reliable data on the number of the existing population during the war.

Results and Conclusions. The number of registered cases of hypertension increased from 192,919 to 211,214 cases from 2022 and 2023, which corresponds to an absolute increase of 18,295 cases (9.5%). Angina pectoris demonstrated an increase in the number of reported cases from 46,844 in 2022 to 54,850 in 2023, which is an increase of 8,006 cases (17.1%). The analysis of the prevalence of acute myocardial infarction also showed a negative trend. In 2022, 977 cases were registered, while in 2023 there were already 1,176 cases, which is an increase of 199 cases (20.4%). The prevalence of strokes also shows an upward trend – in 2022; 1,630 cases were reported, and in 2023; 1,857 cases were reported, an increase of 227 cases (13.9%). We attribute the increase in the number of cases of cardiovascular diseases to the influence of stress factors, changes in lifestyle, worsening access to medical care, worsening socio-economic living conditions of the population in war-affected regions, insufficient physical activity, sleep disorders (apnea). In addition, an important factor could be the restriction of preventive measures and medical examinations due to wartime conditions, which led to untimely detection and treatment of pathologies in the early stages.

Keywords: *martial law, hypertension, angina pectoris, acute myocardial infarction, strokes.*

Introduction

The full-scale invasion in Ukraine has become a serious challenge for the healthcare system, in particular for the diagnosis, treatment and prevention of CardioVascular Diseases (CVD) [1]. Increased stress levels, impaired access to healthcare, forced displacement of the population, and the negative impact of environmental factors such

as noise and chemical pollution create conditions for increased morbidity and mortality from CVD [2]. In such circumstances, analyzing the prevalence of cardiovascular disease in the population of Ukraine is extremely important for the development of effective prevention and treatment measures that take into account current challenges [3; 4].

Martial law has significantly affected the quality of life, stress levels, and access to medical care, which has led to an increase in cardiovascular disease. Prolonged exposure to constant danger, air raids, physical and emotional exhaustion significantly increases the risk of developing hypertension, coronary heart disease and other cardiovascular diseases [5].

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Aim. To investigate the peculiarities of the prevalence of cardiovascular disease in Kharkiv residents during wartime, in 2022 and 2023.

Materials and Methods

The study used medical-statistical and comparative methods. Data from the Center for Medical Statistics of the Public Health Center of the Ministry of Health of Ukraine on cardiovascular pathology [6] were analyzed. The comparison was based on absolute rates of morbidity due to the lack of reliable data on the number of the resident population during the war.

Microsoft Excel 2019 (Microsoft, USA) was used for data processing.

Results and Discussion

Kharkiv is one of the largest cities in Ukraine, the administrative center of the Kharkiv region, as well as an important industrial, scientific, and cultural center. As of 2021, Kharkiv had a population of approximately 1.4 million people. However, due to the military conflict, the city's population has undergone significant changes.

According to the Kharkiv City Council, in the first half of 2022, there was a [20–30]% decrease in the population. Part of the population left the city due to the fighting and danger, while others left for other regions of Ukraine or abroad in search of safety. At the same time, the city hosted Internally Displaced Persons (IDPs), which also affected the demographic picture. According to official data, in 2022, more than 150 thousand people from different regions of Ukraine moved to Kharkiv, which temporarily increased the city's population [7].

Analyzing the structure of the prevalence and incidence of cardiovascular diseases among different age groups in Kharkiv in 2022 and 2023, several important aspects should be noted. Firstly, among the adult population (18 years and older), there is a noticeable increase in the number of registered diseases, which increased from 57,684 in 2022 to 78,370 in 2023 (*Table 1*).

This increase can be interpreted as a consequence of several factors, such as the deterioration of adult health, in particular in conditions of stress,

unstable economic situation and war, which can worsen the condition of the cardiovascular system.

In general, the increase in the prevalence of cardiovascular diseases among all age groups is a serious sign that requires a comprehensive approach to addressing the problem, including through improved preventive measures, improved medical technologies, and improved public health, both among adults and children.

An analysis of the prevalence of cardiovascular diseases among the population of Kharkiv during martial law showed a significant increase in the number of cases in 2023 compared to 2022 (*Fig. 1, Fig. 2*).

In particular, the number of registered cases of hypertension increased from 192,919 cases in 2022 to 211,214 in 2023, which corresponds to an absolute increase of 18,295 cases (9.5%). The prevalence rate increased by 1,305.33 cases per 100,000 people, which indicates a negative trend in the dynamics of morbidity. A similar situation is observed among newly registered cases of hypertension: the number of new cases in 2023 increased by 3,433 cases (25.4%), which may indicate a deterioration in the health status of the population or improved diagnosis (*Fig. 3, Fig. 4*).

Ischemic heart disease also showed an upward trend. The total number of cases increased from 157,803 in 2022 to 181,563 in 2023, which corresponds to an increase of 23,760 cases (15.0%). The prevalence rate increased by 1,695.26 cases per 100,000 population. The number of newly registered cases of ischemic heart disease also increased by 2,139 cases (21.6%), which may indicate an increase in the level of diagnosis or a deterioration in the health status of the population, particularly in CVD.

Angina pectoris demonstrated an increase in the number of reported cases from 46,844 in 2022 to 54,850 in 2023, which is an increase of 8,006 cases (17.1%). The prevalence of angina pectoris per 100,000 population increased by 571.22 cases. The number of new cases of the disease increased by 623 cases (20.7%), indicating an increase in the detection of this disease.

Table 1. Structure, prevalence and incidence of cardiovascular diseases among different age groups in Kharkiv in 2022 and 2023

	Registered diseases		Prevalence per 100,000 population	
	2022	2023	2022	2023
Adults (18 years and older)	57,684	78,370	2,667.92	3,624.66
Children (0–17 years old)	17,509	17,910	4,157.03	4,252.24

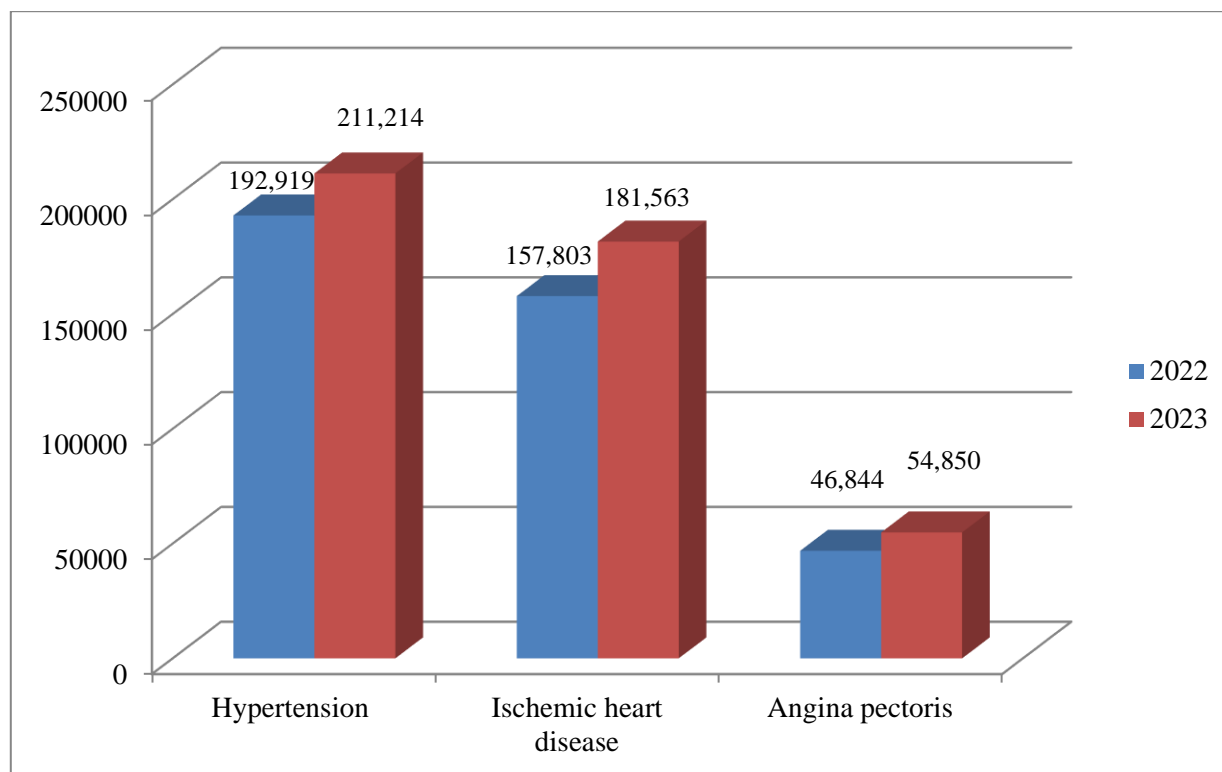


Fig. 1. Prevalence of hypertension, ischemic heart disease, and angina pectoris in Kharkiv during the war period, 2022 and 2023, among the general population.

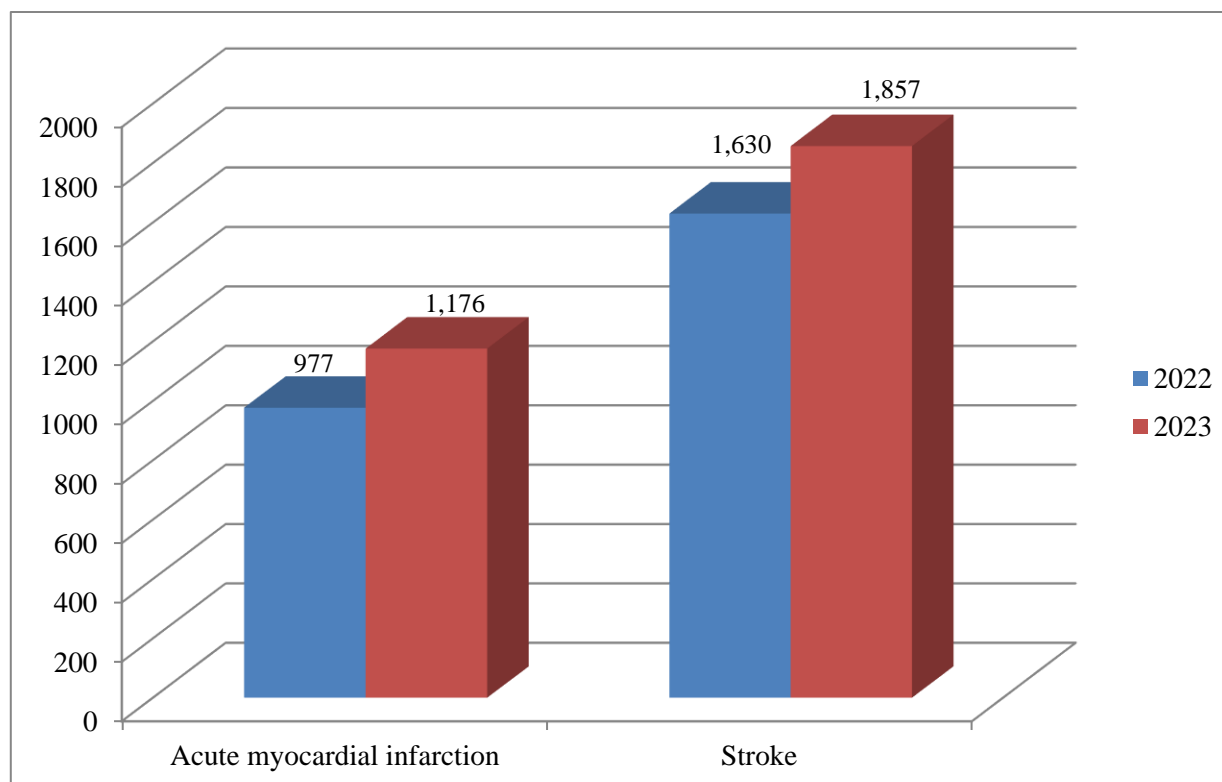


Fig. 2. Dynamics of the prevalence of acute myocardial infarction and stroke in Kharkiv during the war period, 2022 and 2023, among the total population.

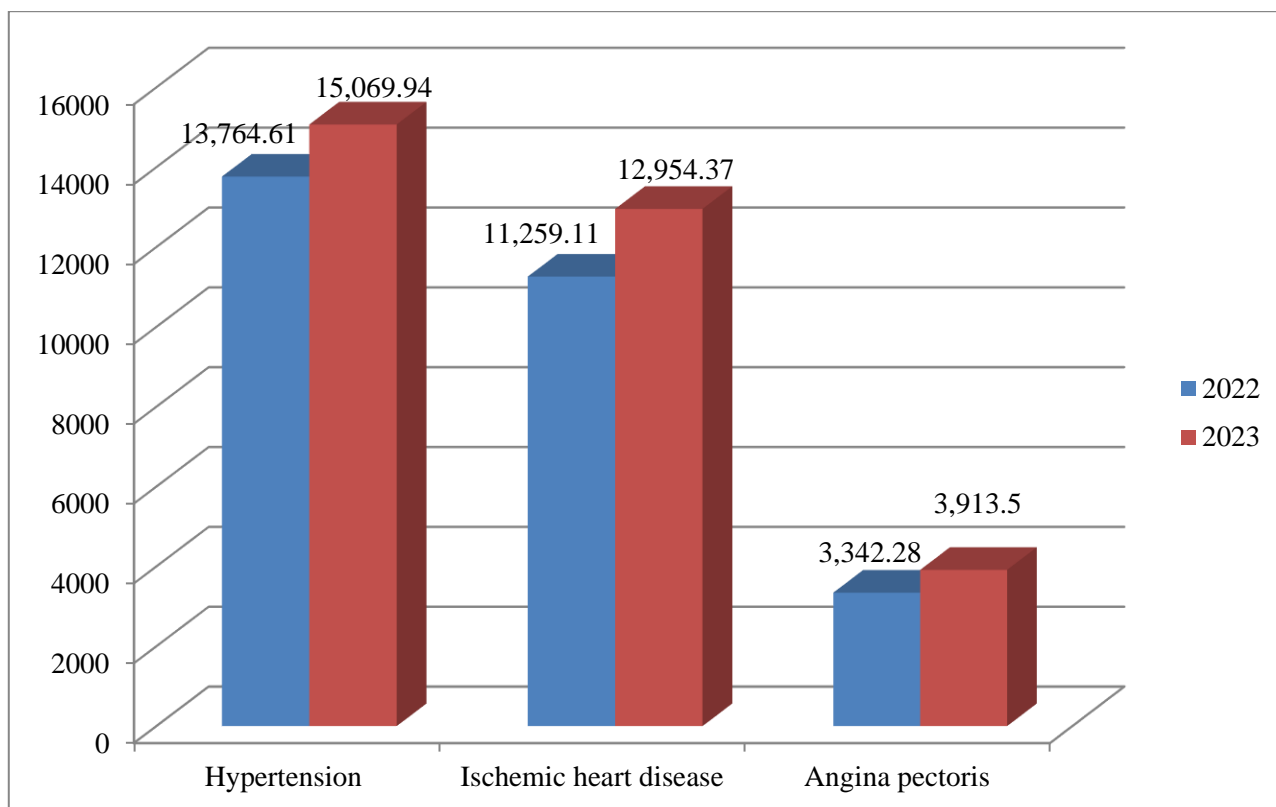


Fig. 3. Dynamics of the incidence of hypertension, ischemic heart disease and angina pectoris per 100,000 population in Kharkiv during the war period, 2022 and 2023, among the total population.

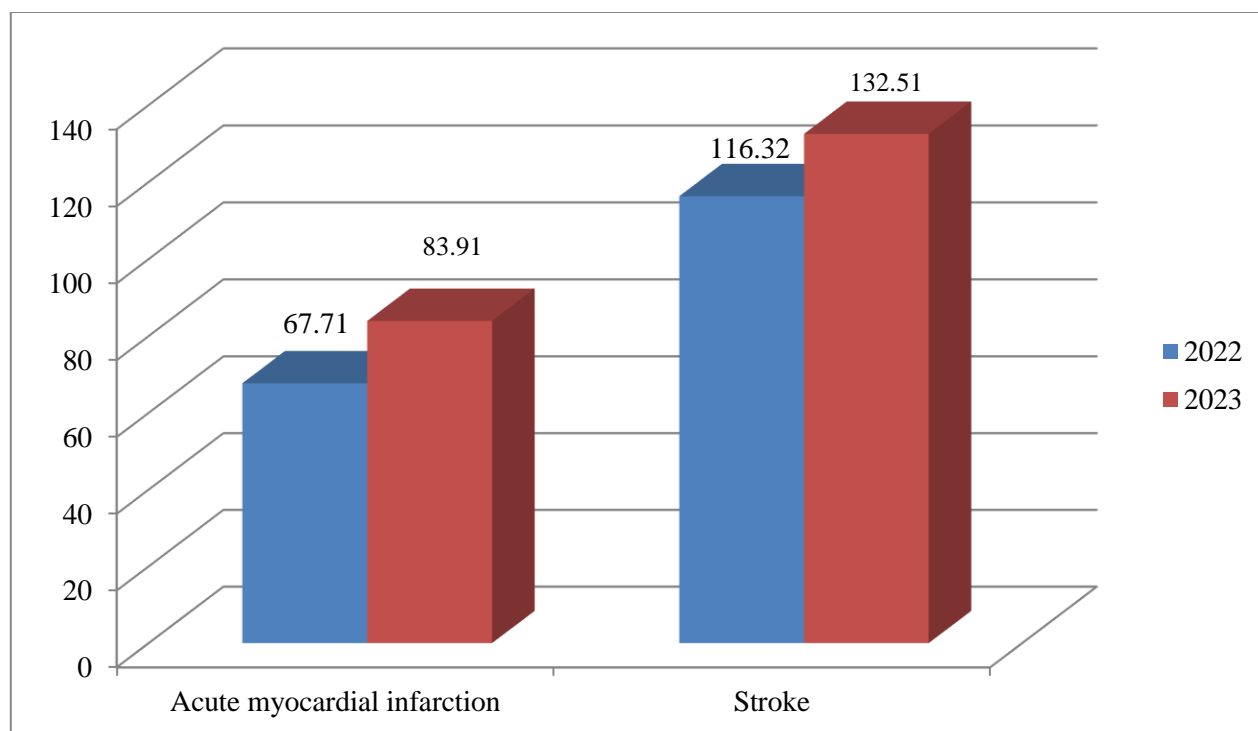


Fig. 4. Dynamics of the incidence of acute myocardial infarction and stroke per 100,000 population in Kharkiv during the war period, 2022 and 2023, among the total population.

The analysis of the prevalence of acute myocardial infarction also showed a negative trend. In 2022; 977 cases were registered, while in 2023 there were already 1,176 cases, which is an increase of 199 cases (20.4%). The prevalence per 100,000 population increased by 14.2 cases. Similarly, the number of newly registered cases of acute myocardial infarction increased by 20.4%, indicating an increase in pressure on the health care system.

The prevalence of strokes also shows an upward trend. 1,630 cases were reported in 2022, and 1,857 cases – in 2023 (an increase of 227 cases (13.9%)). The prevalence per 100,000 population increased by 16.2 cases, which is a significant indicator. The number of newly registered cases of stroke also increased significantly, indicating a deterioration in the overall health of the population of Kharkiv.

Stress caused by the war is one of the main reasons for the deterioration of health in people with pre-existing cardiovascular disease. Elevated levels of cortisol and other stress hormones can impair blood circulation, increase heart rate, cause vascular spasms, and contribute to the development of hypertension. This, in turn, can lead to heart attacks or strokes in people at high risk. In addition, mental stress and constant exposure to danger can lead to the development or exacerbation of cardiovascular diseases such as coronary heart disease, hypertension, and heart failure [8].

People living in Kharkiv may also experience an increased prevalence of symptoms such as shortness of breath, chest pain, and tachycardia, as well as more frequent complications due to stress and poor access to healthcare. Unstable supplies

of medicines and medical resources also affect patients' ability to receive proper treatment. For many people, it is difficult to get the medicines they need or undergo routine medical examinations, which leads to cardiovascular diseases not being diagnosed or treated in a timely manner [9].

Conclusions

Thus, the data obtained indicate a significant increase in the number of cases of cardiovascular diseases in Kharkiv during martial law. This may be due to the impact of stress factors, lifestyle changes, worsening access to medical care, worsening socio-economic living conditions of the population in war-affected regions, insufficient physical activity, sleep disorders (apnea). In addition, an important factor could be the restriction of preventive measures and medical examinations due to wartime conditions, which led to untimely detection and treatment of pathologies in the early stages.

DECLARATIONS:

Disclosure Statement

The authors have no potential conflicts of interest to disclosure, including specific financial interests, relationships, and/or affiliations relevant to the subject matter or materials included.

Statement of Ethics

The authors have no ethical conflicts to disclosure.

Data Transparency

The data can be requested from the authors.

Funding Sources

There are no external sources of funding.

Consent for publication

All authors give their consent to publication.

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Received: 29 Jan 2025

Accepted: 01 Apr 2025

Published: 01 Apr 2025

Cite in Vancouver style as: Pryima N, Bezditko T. Dynamics of cardiovascular diseases among Kharkiv residents during the war in 2022 and 2023. *Inter Collegas*. 2025;12(2):6p. In press.
<https://doi.org/10.35339/ic.2025.12.2.prb>

Archived: <https://doi.org/10.5281/zenodo>.

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