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FEATURES OF DAILY AND SEASONAL DYNAMICS OF CARDIAC ARRHYTHMIA ATTACKS IN THE CONTEXT OF NEURO-MENTAL OVERLOAD DURING MILITARY AGGRESSION

Abstract.
The article analyzes 1998 cases of acute cardiac arrhythmias registered in 2023–2024. It is proven that the highest frequency of attacks is observed in women, as well as in age groups over 60 years old. The dominance of extrasystole, atrial fibrillation and impulse conduction disorders is established. It is shown that Monday is the busiest day of the week in terms of the number of attacks, and the winter-autumn period is the season of increased arrhythmia activity. The influence of stress and neuropsychiatric stress associated with Russia's military aggression, which contributes to an increase in the frequency of attacks, is taken into account. The results emphasize the need for targeted preventive measures in certain periods to reduce the risk of attacks and optimize the work of emergency medical care.

Keywords: *cardiac arrhythmias, frequency of cardiac arrhythmia attacks, daily and seasonal dynamics, neuropsychiatric overstrain, stress, emergency medical care, prevention of arrhythmias.*

Introduction. For effective long-term and current planning and organization of the work of the emergency medical care and disaster medicine center, which provides specialized emergency care to patients at the pre-hospital stage, it is necessary to carefully record the intensity of incoming calls. An important aspect is to analyze the relationship between the number of calls and factors such as gender and age of patients, seasons, months, days of the week and hours of the day. The data obtained allow identifying the busiest periods of work of emergency medical care teams, which allows for more rational planning of resources and determining the needs of the population in specialized teams of the appropriate profile.

In addition, the level of calls is significantly affected by the organization and quality of work of outpatient clinics in the city, since timely and high-quality provision of primary health care can reduce the burden on the emergency medical service [3, 7, 12]. Analysis of such factors is key to increasing the efficiency of the emergency medical care system, which ultimately improves patient treatment outcomes and reduces mortality in the population [5, 9].

One of the key factors influencing the frequency of cardiac arrhythmias is stress and neuropsychiatric stress. In the context of Russia's prolonged military aggression against Ukraine, a significant part of the population is exposed to constant psychological pressure, which increases the risk of cardiac complications. Chronic stress activates the sympathoadrenal system and leads to an imbalance in the autonomic regulation of cardiac activity, which contributes to the appearance of heart rhythm disturbances [1, 3].

Psycho-emotional stress associated with military operations can not only provoke new cases of arrhythmias, but also worsen the course of existing disorders. During 2023–2024, an increase in the number of arrhythmia attacks was recorded, which correlates with the exacerbation of military events and the increase in the level of anxiety among the population [2, 5].

Given this, when assessing risk factors for cardiac arrhythmias, not only somatic but also psychosocial aspects should be taken into account, which significantly affect the clinical course of the disease. The implementation of comprehensive measures to reduce stress load can significantly improve the results of treatment and prevention of cardiac arrhythmias [4].

Presenting the main material.

To study the problem, a comprehensive analysis of clinical data and factors influencing the occurrence of cardiac arrhythmias in patients was conducted.

The purpose of the article: studying the daily and seasonal dynamics of cardiac arrhythmia attacks, taking into account the influence of neuropsychiatric overload and stress factors in the context of military aggression.

Materials and methods: The study materials were obtained based on documents of the Municipal Non-Profit Enterprise “Chernivtsi Regional Center for Emergency Medical Care and Disaster Medicine” of the Chernivtsi Regional Council, in particular, on the basis of the emergency (ambulance) medical team departure cards (form No. 110/o) for 2023–2024, which related to cases of cardiac rhythm and conduction disorders. During the provision of emergency medical care, all patients underwent an electrocardiographic examination in 12 standard leads, with recording of

information about the time and place of arrhythmia occurrence. In addition, anamnesis data was taken into account, which included information about living conditions, the impact of military events, socio-economic status and factors that caused chronic psycho-emotional stress. Subsequently, according to the departure cards, patients were classified by gender, age groups and forms of cardiac rhythm disorders.

In the period 2023–2024, 1998 cases of emergency medical care for acute attacks of cardiac arrhythmias were recorded. Of all cases, 1031 (54.3%) involved women, while 867 (45.7%) involved men. The predominance of women is partly explained by the higher number of women in the urban population (by more than 8.5%), as well as the higher mortality rate among men over the age of 60.

Distribution by age category

Analysis of the age structure showed the following:

- 18–29 years old— 67 people (3.4%);
- 30–39 years old— 134 people (6.7%);
- 40–49 years old— 310 people (15.5%);
- 50–59 years old— 412 people (20.6%);
- 60–69 years old— 549 people (27.5%);
- 70 years and older— 572 people (28.6%).

Distribution by forms of rhythm disturbances

According to the clinical forms of heart rhythm disorders, the structure of cases was as follows:

The structure of appeals by clinical forms of arrhythmias and conduction disorders was distributed as follows:

- Extrasystole— 676 cases (33.8%).
- Atrial fibrillation and flutter— 457 cases (22.9%).
- Impaired impulse conduction— 395 cases (19.8%).
- Paroxysmal tachycardia— 299 cases (15.0%).
- Other forms (in particular, parasystole, Wolff–Parkinson–White syndrome (WPW), sick sinus syndrome, etc.) — 209 cases (10.5%).

To study the patterns of distribution of cardiac arrhythmia attacks during the week, the average daily rates of their frequency for each day of the week in 2023 and 2024 were analyzed. This approach allows us to identify days with an increased risk of arrhythmias, as well as assess changes between two years, which may be associated with increased neuropsychiatric strain and stress factors. This is important for optimizing medical care and developing preventive measures.

Table №. 1.

Average daily rates of cardiac arrhythmia attacks by day of the week (2023-2024)

Day of the week	2023 (M ± m)	2024 year (M ± m)
Monday	3.8 ± 0.1	3.8 ± 0.1
Tuesday	2.8 ± 0.2	2.7 ± 0.1
Wednesday	2.6 ± 0.1	2.6 ± 0.1
Thursday	2.8 ± 0.2	2.8 ± 0.2
Friday	2.3 ± 0.2	2.8 ± 0.1
Saturday	2.2 ± 0.1	2.6 ± 0.1
Sunday	2.6 ± 0.1	2.8 ± 0.3

The study found clear differences in the average daily frequency of cardiac arrhythmia attacks depending on the day of the week. In particular, the highest rates were recorded on Monday in both years - 3.8 cases per day, which is approximately 1.5 times higher than the average values for other days. This pattern may be associated with the increased stress levels characteristic of the beginning of the working week.

Consistently lower values are observed on Tuesday, Wednesday and Thursday (2.6–2.8), with the indicators remaining practically unchanged throughout both years. This indicates a certain stability in the influence of environmental factors and the rhythm of life in the middle of the week.

Interestingly, the frequency of attacks on Fridays increased in 2024 to 2.8 (compared to 2.3 in 2023), which may indicate changes in behavioral or psychoemotional factors at the end of the week.

Analysis of weekends revealed an increase in the indicators in 2024: on Saturdays - to 2.6 (from 2.2 in 2023), on Sundays - to 2.8 (from 2.6). This suggests that arrhythmias do not decrease on weekends, probably due to a violation of the usual daily routine, changes in diet, alcohol consumption, or the presence of chronic psycho-emotional overload, which is not compensated during the rest period.

As a result, there is a trend towards a decrease in the differences between weekdays and weekends in 2024, which may indicate a general increase in the level of neuropsychiatric stress throughout the week.

In order to identify seasonal changes in the frequency of cardiac arrhythmia attacks, an analysis of relative monthly indicators, expressed as a percentage of the average daily annual frequency, was carried out for 2023 and 2024. The collected statistical data made it possible to outline periods of increased probability of arrhythmias, which is of important practical importance for improving the organization of medical care and implementing preventive measures.

Assessment of monthly changes allows us to trace the influence of a number of external and internal factors, including weather conditions, physiological biorhythms, level of physical activity, emotional state and lifestyle on the frequency of attacks. This approach contributes to a better understanding of the dynamics of the pathological process and allows us to plan medical care taking into account expected peaks of load.

Determining potentially dangerous periods during the year is an important condition for timely diagnosis, prevention, and reducing the risks of developing serious complications in patients with cardiac pathology.

Table №. 2.

Relative monthly rates of cardiac arrhythmia attacks (in % of the average daily annual frequency) for 2023 and 2024

Month	2023 (%)	2024 (%)
January	129.0	111.0
February	97.3	98.9
March	93.1	98.7
April	91.9	89.3
May	95.0	88.7
June	94.1	96.1
July	92.9	95.7
August	97.9	108.1
September	119.8	96.9
October	96.9	127.1
November	99.9	91.9
December	98.0	104.7

Analysis of the monthly dynamics of cardiac arrhythmia attacks in 2023 and 2024 allowed us to identify features of seasonal variability, which are important for planning medical interventions and preventive measures. During 2023, the highest frequency of arrhythmia attacks was observed in January (129%) and September (119.8%), which exceeded the average annual rates. These periods may be associated with sharp changes in external conditions, cold climate, workload after winter holidays, or the beginning of the active work and school season. At the beginning of 2024 — in January — the rate also remained elevated (111%), although it did not reach the values of the previous year.

During 2024, the most pronounced increase in the frequency of attacks was recorded in October (127.1%) and August (108.1%). This indicates a certain shift of the peaks of arrhythmia activity to late summer and autumn, probably due to the combined effect of changes in temperature, disruptions to the usual rhythm of life, emotional stress, or seasonal factors.

The spring months — March, April, and May — are characterized by a more stable course and lower rates (from 88% to 98%), which may reflect a relatively favorable period with less stress on the cardiovascular system.

Compared to 2023, some months in 2024—particularly August, October, and December—show a higher frequency of attacks. Such fluctuations may be the result of changes in the nature of risk factors, working conditions, lifestyles, or the level of medical surveillance.

Conclusion.

1. The results of the analysis of data for 2023–2024 showed an increase in the frequency of cardiac arrhythmia attacks at the beginning of the workweek, as well as in the winter and autumn months. The highest rates are on Monday, January, August, September and October, which may be associated with changes in weather conditions, physiological stress and the peculiarities of the organization of daily life.

2. The results obtained should be taken into account when planning preventive and therapeutic measures, developing seasonally oriented information campaigns, as well as when forming a surveillance system for patients with an increased risk of arrhythmias.

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