



THE EFFECT OF CLIMATE-GEOGRAPHICAL FACTORS ON RHEUMATOID ARTHRITIS ACTIVITY

Axmedov Kh.S., Abdurakhmanova N.M., Zaripov S.S., Turaev I.A.

Tashkent Medical Academy, Uzbekistan

Article history:

Received: November 11th 2022
Accepted: December 11th 2022
Published: January 20th 2023

Abstract:

This article presents the results of the effect of climatic and geographical environmental factors in Uzbekistan on the activity of rheumatoid arthritis. The study included 460 patients from four climatic regions such as northern, western, eastern and southern regions of Uzbekistan. The effect of climatic factors on the course of rheumatoid arthritis was revealed.

Keywords: rheumatoid arthritis, clinical manifestations, climatogeographic factors

In recent years, a discussion has begun on a possible relationship between the development and features of the subsequent course of RA and adverse environmental factors [5]. RA is a multifactorial disease in which the interaction of the genetic component and environmental factors determines not only the development of the disease, but also its pronounced clinical polymorphism [4,6]. The aggravation of diseases occurs under the simultaneous influence of climatic and geographical and genetics factors [1,2, 3].

The aim of this study was to evaluate the effect of climatic factors on articular syndrome in patients from different regions of Uzbekistan.

MATERIALS AND METHODS OF RESEARCH

The study included 460 patients with a reliable diagnosis of RA at the age of 50.6 ± 9.1 years, disease duration 9.9 ± 4.7 years: Zone I, northern region - Tashkent city - 144 patients; Zone II, western region - Khorezm region - 112 patients; III zone, eastern region - Namangan region - 104 patients; IV zone, southern region - Surkhandarya region - 100 patients.

Actual levels of climate and meteorological parameters were obtained from the Center for Hydrometeorological Service under the Cabinet of Ministers of the Republic of Uzbekistan (Uzhydromet). To analyze the climatic and geographical zones of Uzbekistan, the most significant climatic indicators have been identified. For this purpose, the assessment of climate comfort was used. Therefore, we calculated – Ki – index of weather variability; S is an indicator of weather severity; normal equivalent effective temperatures (NEET); Km is the climatic potential for self-purification of the atmosphere, and Kcp is the general assessment of climatic comfort. These data made it possible to assess zone I as a zone with a moderately comfortable climate; II zone - with an uncomfortable climate; Zone III - with a comfortable climate and Zone IV - to a less comfortable climate.

The results obtained were subjected to static processing using the computer program EXCEL and STATISTICA 6.0.

RESULTS. As the results of the analysis show, patients with RA have weather-sensitive reactions depending on climatic factors, and we have identified certain patterns when comparing the month and season of the year. Correlation analysis showed a significant role and effect of climatic factors on the course of RA and that the most significant indicators were the weather severity index ($r=0.55$), the frequency of wet and cloudy weather ($r=0.71$), the number of days with fluctuations in atmospheric pressure ($r=0.5$) and the duration of the discomfort period ($r=0.67$). It should be noted that the duration of hot and dry summers with high temperatures above 40°C ($r=-0.73$) with low humidity $f < 80\%$ ($r=-0.8$), as well as the intensity of solar radiation ($r=-0.77$) favorably affected the course of RA.

As can be seen from Fig. 1, in a zone with an uncomfortable climate, i.e. in the II zone against the background of a long duration of the period with cloudy weather ($Ob \geq 5b$, $r=0.71$; $p < 0.05$) with $Ki=55\%-65\%$ ($r=0.63$; $p < 0.05$), and also with S values of 3.00-3.2 ($r=0.77$; $p < 0.05$), there is an increase in the frequency of patients visiting a doctor and indications for hospitalization ($r=0.79$; $p < 0.05$). At the same time, there is a negative correlation ($r=-0.71$; $p < 0.05$) with the indicators of patients with long-term remission.

At the same time, in a region with comfortable climatic conditions (Fig. 1), i.e. in zone III, with an increase in Cav, there is a decrease in the cases of patients' need for inpatient treatment ($r=-0.65$; $p < 0.05$) and the number of patients seeking treatment for problems ($r=-0.73$; $p < 0.05$). At the same time, with the duration of the period with cloudy weather Ki less than 40%, the duration of the remission period in patients with RA, as can be seen from Fig. 2, living in this zone increases ($r=0.8$; $p < 0.05$).

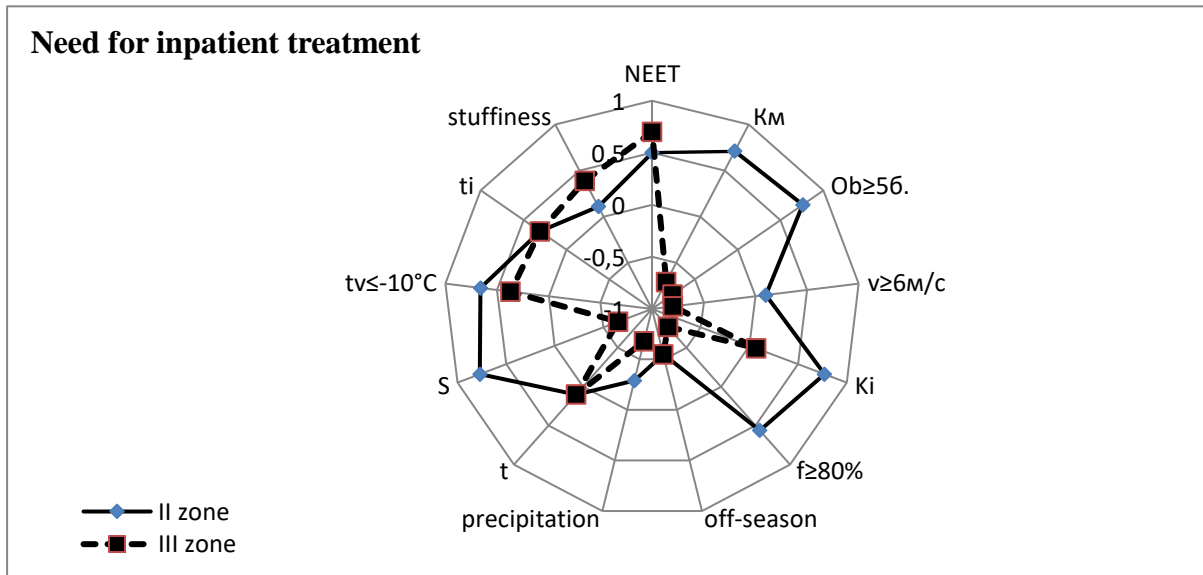


Fig.1. The effect of climatic factors on the frequency of need for hospitalization in patients with RA (r).

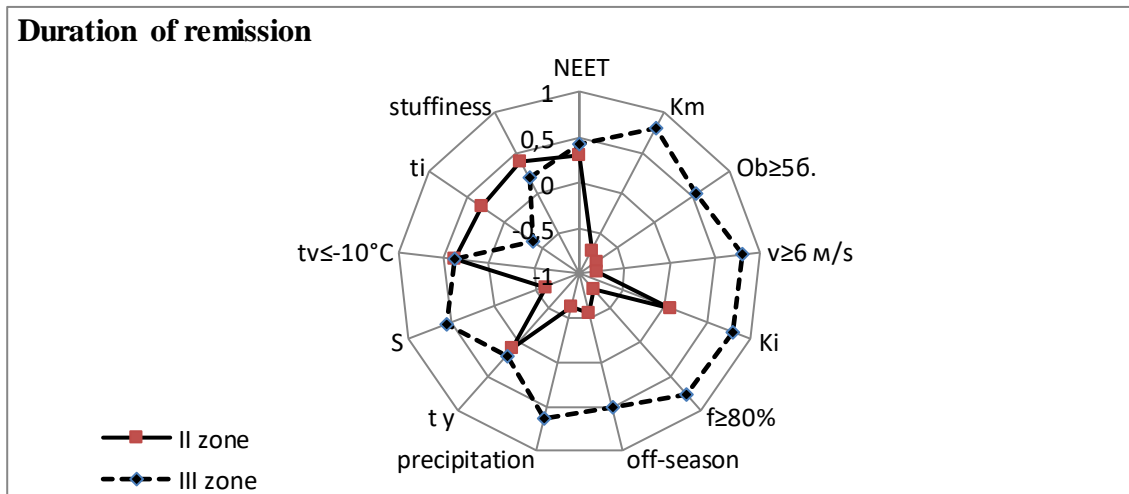


Fig.2. The effect of climatic factors on the duration of remission in RA patients (r).

When analyzing the influence of climatic factors on RA activity, it turned out, as can be seen from Fig. 3, that with a decrease in Kav,

the DAS28 indicators increase, as evidenced by negative correlations between these indicators ($r=-0.8$; $p<0.05$).

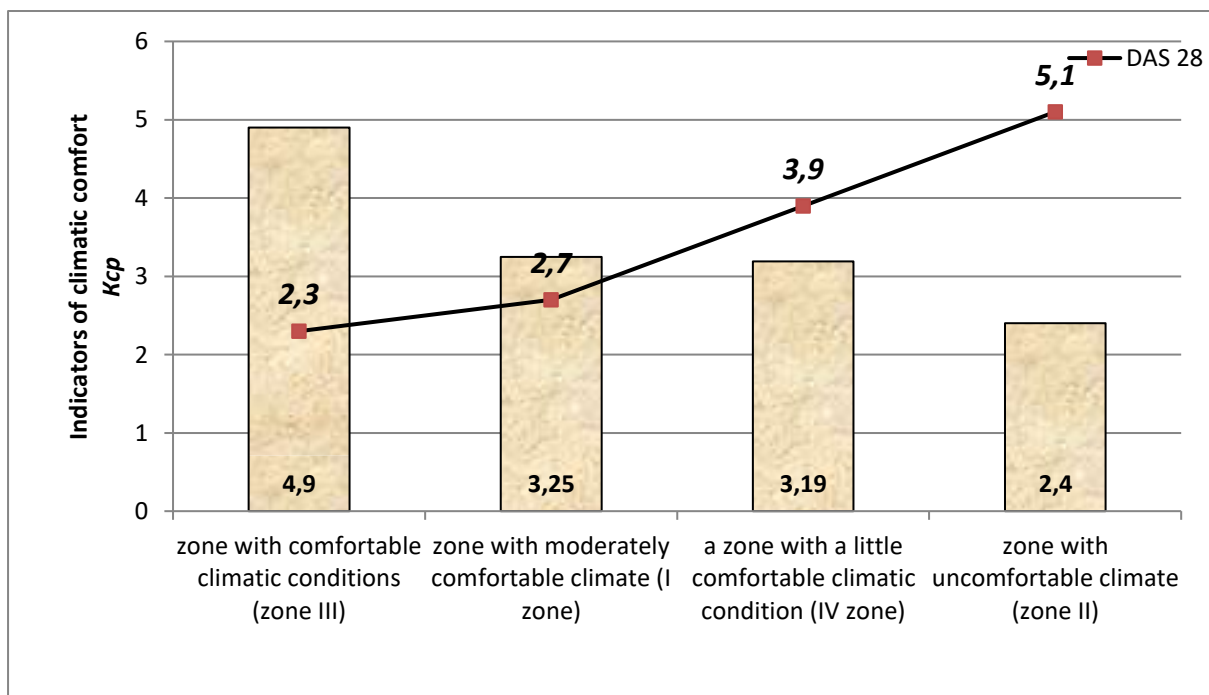


Fig.3. Dynamics of DAS 28 against the background of various indicators of Kcp.

It is noteworthy that at high temperatures above 40°C ($r=-0.73$) with low humidity $f<80\%$ ($r=-0.8$), as well as increased intensity of solar radiation ($r=-0.77$), activity indicators SDAI is undergoing change. Thus, with a decrease in air humidity and an increase in the intensity of solar radiation and an increase in temperature in the month of July, SDAI activity indicators decrease.

When analyzing the effect of sunshine time on the course of the disease, it turned out that no significant correlations between the indicators were found. At the same time, the complex of elements that is established during a period of high relative humidity in certain areas are unfavorable. Thus, a regular variation with clinical signs was found, indicating the intensity of the articular syndrome in patients with RA, since with an increase in the level of humidity in winter (zone II, $r=0.8$; $p<0.05$), the indexes of morning stiffness, NSP and NPV progress.

Thus, based on the above, it follows that climatic factors have a certain influence on the course of RA.

LITERATURE

1. Nargiza Abdurakhmanova, Khalmurad Akhmedov et al. Association analysis of three MDR1 (ABCB1) gene variants (C1236T, G2677T and C3435T) and their genotypes of the rheumatoid arthritis patients. European science review. Vol. 11-12, 2018. p 57-61.
2. Abdurakhmanova N., Akhmedov Kh. Association of MDR1 gene G2677T

polymorphism with methotrexate resistance in patients with Uzbek rheumatoid arthritis. Annals of the Rheumatic Diseases 78 (Suppl 2), 2019, 1468-1468

3. Akhmedov K. et al. Changes in the immune system with rheumatoid arthritis in the background of the influence of environmental factors of the external environment //International Journal of Advanced Science and Technology. – 2020. – Т. 29. – №. 5. – С. 1907-1917.
4. Келина Н.Ю., Безручко Н.В., Рубцов Г.К. Оценка воздействия химического загрязнения окружающей среды как фактора риска здоровья человека: аналитический обзор. – Вестник ТТПУ, 2010.№3 (93). С.156-161.
5. McInnes I.B. The pathogenesis of rheumatoid arthritis// I.B. McInnes, G.Schett// New Engl.J. Med. – 2012. – Vol. 365. – P. 2205–19.
6. Чашин В.П., Гудков А.Б. Попова О.Н. Характеристика основных факторов риска нарушений здоровья населения, проживающего на территориях активного природопользования в арктике. – Экология человека. 2014. С.3-10.