# Dynamics of quality of life indicators during personalized rehabilitation of patients with rheumatoid arthritis with arterial hypertension

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**Absrtact:** Rheumatoid arthritis (RA) is a systemic immune-mediated chronic inflammatory disease that not only affects the musculoskeletal region, but is also characterized by a high risk of developing comorbid conditions, which, in turn, are closely associated with a more active and severe course of RA and pronounced functional disorders. The purpose of the study: to study the dynamics of quality of life indicators in patients with rheumatoid arthritis with arterial hypertension during the personalized rehabilitation program at the post-hospital stage. Material and methods of research: At the first stage of the study (retrospective cross-sectional design), the medical histories of 51 patients with RA who sought inpatient care at 1-clinics of SAMMU in the period from 2019 to 2021 were analyzed, with HRQoL results recorded. Research results and their discussion: According to the results of data processing of 51 RA patients (mean age 53.7±9.9 years; 39 women and 12 men), 38.2% of the examined individuals had a concomitant diagnosis of hypertension. The activity of the disease was medium or high in 46.5% of cases. Patients had on average 2 risk factors for CVD, and one of them was present in at least 89.8% of cases. The combined average HRQoL score was calculated for the physical (PF, RP, BP and GH) and mental (VT, SF, RE and MH) components of SF-36 in RA patients. The algorithm for calculating average scores included a negative weighting of all elements of the SF-36 subscales, partially leveling the difficulties of interpreting the final scores of summary scores as values of a higher order. Conclusion: Rheumatoid arthritis has an effect on HRQoL, measured on the SF-36 scale, and RA patients with comorbid pathology - arterial hypertension - show the worst health-related quality of life profile. In patients with RA and hypertension, it is advisable to periodically assess the dynamics of HRQoL indicators, assuming as a key therapeutic goal the limitation of side effects of both the underlying disease and concomitant pathology. With the combined use of various methods of rehabilitation therapy, their influence is most significant both in the physical and mental spheres of life of RA patients with hypertension at the post-hospital stage of medical rehabilitation.

**Keywords:** rheumatoid arthritis, hypertrophy of the left ventricle, symptomatic hypertension

## INTRODUCTION

Rheumatoid arthritis (RA) is a systemic immune-mediated chronic inflammatory disease that not only affects the musculoskeletal region, but is also characterized by a high risk of developing comorbid conditions, which, in turn, are closely associated with a more active and severe course of RA and pronounced functional disorders.

One of the most common extra-articular manifestations of RA is cardiovascular diseases (CVD). According to Y. Garip et al. (2016), concomitant diseases were registered in 67% of RA patients, and peptic ulcer disease (31%), osteoporosis (21%), depression (15%), hypertension (14%) and diabetes mellitus (13%) were most often diagnosed. The most common concomitant pathology in patients with early RA (diagnosis <1 year) in study V. Stouten (2021) arterial hypertension (AH) was registered (22%), and the comorbidity index (RDCI) with RDCI 1, 2 or ≥3 was noted in 17%, 19% and 8% of RA patients, respectively, and patients with concomitant diseases had lower chances of achieving remission (OR=0.724) and a higher risk of hospitalization (OR=3.725).

It should be noted that the increased risk of developing CVD in RA cannot be fully explained only by traditional risk factors. For example, left ventricular hypertrophy (LVH) is a sign of CVD in patients with RA, with the highest predisposition to LVH in women. According to A. Giollo et al. (2021), women with RA had the strongest association with LVH regardless of the presence of CVD risk factors (OR=6.56) or characteristics specific to RA (OR=5.14).

Currently, arterial hypertension, the general prevalence of which is about 30-45% among the adult population, is recognized as the main risk factor for CVD. In previous studies, attention was drawn to the fact that patients with chronic pain, including those with RA, as well as patients with hypertension, have a lower quality of life associated with health (Health-related quality of life, HRQoL), and to improve the health of this group First of all, non-drug treatment is recommended to reduce blood pressure (BP).

Assessment of the health-related quality of life in RA is becoming increasingly common both in research and in clinical practice, with the most widely used questionnaire SF-36 defining HRQoL as the degree to which physical health affects a person's functional abilities and perceived well-being in the mental, social and physical aspects of life. The domestic recommendations on the treatment of RA, as well as the latest recommendations of NICE (National Institute for Health and Care Excellence), indicate that patients with RA should be regularly evaluated for the impact of their disease on HRQoL and provided with appropriate treatment.

The purpose of the study: to study the dynamics of quality of life indicators in patients with rheumatoid arthritis with arterial hypertension during the personalized rehabilitation program at the post-hospital stage.

MATERIAL AND METHODS OF RESEARCH

At the first stage of the study (retrospective cross-sectional design), the medical histories of 51 patients with RA who sought inpatient care at 1-clinics of SAMMU in the period from 2019 to 2021 were analyzed, with HRQoL results recorded.

The second stage of the study (prospective design) included 19 patients with a reliable diagnosis of RA (ACR/EULAR, 2010) in combination with arterial hypertension who underwent inpatient therapy in the rheumatology department1 of the SAMMU clinic. The presence of hypertension was confirmed at the level of systolic blood pressure (SAD) ≥140 mmHg and/or diastolic (DAD) ≥90 mmHg, as well as if the patient had previously taken antihypertensive drugs. The sequential recruitment of participants was carried out for 2.5 years (from 10.2020 to 04.2022). Criteria for inclusion in the study: signed informed consent, age ≥18 and ≤69 years inclusive, duration of RA >2 years, presence of clinical signs of concomitant hypertension, hypotensive therapy for more than 6 months (at the time of the study). Exclusion criteria: symptomatic hypertension; a history of liver and kidney diseases, myocardial infarction, stroke, severe chronic heart failure.

Based on the results of scientometric analysis and our own previous studies, a three-component program of post-hospital rehabilitation (PPR) was compiled and applied for the treatment of patients with the selected pathology. When conducting low-frequency magnetotherapy (NMT), an 8-channel hardware and software complex "Multimag" was used according to the method of treating diseases of the musculoskeletal system (code of the treatment regime PROG01C.MMET and/or PROG01E.MMET). To teach patients relaxation skills during BOS therapy, the "Reakor" complex was used.

All patients who participated in the II stage of the study (n=19) were divided into two groups comparable in gender, age, duration and activity of RA: group I (n=10) - complex treatment with the use of PPD; group II (n=9) - complex treatment without the use of PPD.

All patients with RA (at the initial and final stages) were measured heart rate, clinical blood pressure (according to the Korotkov method) and filled out a questionnaire of quality of life (QL) - Short Form 36-item Health Status Questionnaire SF-36, including 36 questions (with a score of 0 to 100 answers) and 8 analytical scales. After the doctor explained the SF-36 questionnaire, each participant of the study independently answered all the questions contained in it. Follow-up [median (interquartile range), 2.8 months (2.2-3.1)] was carried out within the framework of the PRP.

Statistical analysis was carried out using the software package "STATISTICA 10.0 for Windows" (StatSoft Inc., USA). The calculation of adequate power (0.80) to assess the differences in the current design was performed using the G*Power3 analysis program. The data are presented as averages ± standard deviation (for variables with a normal distribution) or as a percentage. The data were reviewed for the entire sample and presented in groups. Spearman's correlation analysis (r) is used to assess the influence of variables and sample characteristics on HRQoL indicators, the t-criterion and one-sided analysis of variance (ANOVA) are used to analyze differences between groups of independent variables. Statistical significance was established at the level of $p<0.05$.

RESEARCH RESULTS AND THEIR DISCUSSION

According to the results of data processing of 51 RA patients (mean age 53.7±9.9 years; 39 women and 12 men), 38.2% of the examined individuals had a concomitant diagnosis of hypertension.

The activity of the disease was medium or high in 46.5% of cases. Patients had on average 2 risk factors for CVD, and one of them was present in at least 89.8% of cases. The combined average HRQoL score was calculated for the physical (PF, RP, BP and GH) and mental (VT, SF, RE and MH) components of SF-36 in RA patients. The algorithm for calculating average scores included a negative weighting of all elements of the SF-36 subscales, partially leveling the difficulties of interpreting the final scores of summary scores as values of a higher order.

It was previously noted that RA has a greater impact on physical HRQoL than on mental well-being. We found a significant violation of the QOL of RA patients with hypertension in the physical sphere (36.2±7.8 vs. 38.7±6.4, p=0.006) and a slight decrease in the mental component of HRQoL (43.7±8.2 vs. 45.4±5.8, p=0.055).

At the II stage of the study, when processing the initial data on the study of QOL in RA patients with hypertension (n=94), it was found that patients aged 50-69 years had higher indicators on the SF-36 "Viability" (VT) and "Psychological Health" (MH) scales than RA patients aged 30-49 years (p=0.032 and p=0.041, respectively); in women, after age adjustment, the indicators of "Physical functioning" (PF), "Somatic pain" (BP) and "Social functioning" (SF) were lower than in men (p=0.044, p=0.037 and p=0.04 accordingly); a more pronounced increase in blood pressure was more closely related to the physical health of patients (PF: r= -0.38, p=0.019 and BP: r= -0.33, p=0.041) than with other subscales of SF-36.

After carrying out rehabilitation measures, QOL in RA patients with hypertension improved: in group I, a significant improvement was revealed on six SF-36 scales (PF, RP, VT, SF, RE, MH), in group II - only on three indicators (PF, SF, MH).

Group I showed higher scores in physical function (PF, p=0.011; RP, p=0.045), general health (GH, p=0.036), vitality (VT, p=0.02), social functioning (SF, p=0.046) and mental health (MH, p=0.039) compared with the participants from group II. The positive dynamics (to varying degrees) of almost all HRQoL indicators in group I can be explained by the cumulative effect of the presented components of the selected PPD, the impact of which was purposefully planned on both the physical and mental components of health. Physical exercises contribute to the treatment of not only RA, but also hypertension, improving cardiorespiratory fitness, reducing blood pressure values, strengthening overall health. Moderate aerobic exercise (walking) has proven to be an economical and effective method of training to improve overall well-being (physical and mental components of HRQoL). The direct physical effect of the use of NMT, exerted by the magnetic field on the structures of the affected joints (leveling the symptoms of edema, pain, synovitis), has a positive effect on the physical health of patients with RA (the physical component of HRQoL). Conducting BOS therapy using relaxation training techniques for the treatment of stress disorders, to which patients with chronic pain and high blood pressure are particularly susceptible, initiates the mobilization of hidden reserves of the body and promotes behavior modification, improvement of well-being and mood, and also has a positive effect on the parameters of QOL (mental component HRQoL).

Considering that HRQoL can be used as one of the main "non-surrogate" criteria when studying the effectiveness of various treatment programs, the noted positive dynamics of the overwhelming number of SF-36 indicators during the proposed CPR for RA patients with hypertension can become a starting point for further development of personalized medical rehabilitation programs for RA patients with combined pathology. But we should not forget that, since SF-36 is a subjective questionnaire, it is sometimes difficult to accurately assess all its results in patients with multiple comorbid conditions. Despite the fact that close attention has been paid to the search for the relationship between hypertension and HRQoL over the past decades, the impact of high blood pressure and patients' awareness of hypertension on the quality of life in long-term RA requires further study.

CONCLUSION

Rheumatoid arthritis has an effect on HRQoL, measured on the SF-36 scale, and RA patients with comorbid pathology - arterial hypertension - show the worst health-related quality of life profile. In patients with RA and hypertension, it is advisable to periodically assess the dynamics of HRQoL indicators, assuming as a key therapeutic goal the limitation of side effects of both the underlying disease and concomitant pathology. With the combined use of various methods of rehabilitation therapy, their influence is most significant both in the physical and mental spheres of life of RA patients with hypertension at the post-hospital stage of medical rehabilitation.

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