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# ASSESSMENT OF FUNCTIONAL ACTIVITY REDUCTION – AS A CRITERION FOR DETERMINING DISABILITY IN PATIENTS WITH RHEUMATOID ARTHRITIS

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## ABSTRACT

**The aim:** To analyze the assessment of the decrease in working capacity degree in patients with rheumatoid arthritis in accordance with modern diagnostic disease criteria and social approaches to disability definition in the world (the decline degree of vital activity).

**Materials and methods:** We analyzed the dynamics of primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016-2020. We analyzed the data of medical and social cases of 433 patients with RA (referral for medical and social examination, Form 088/o). We studied the degree of reduction of their efficiency. Statistical processing was performed using descriptive and variational statistics methods. The results were calculated on a personal computer using the licensed programs STATISTICA 6.1 (StatsoftInc., Serial № AGAR909E415822FA).

**Results:** It is shown that in Ukraine in 2016-2020 the primary disability had a tendency to increase. The article defines the approaches to medical and social examination of patients with rheumatoid arthritis to determine the ability to work and signs of disability. The article emphasizes the importance of a thorough study of medical data, data on the functional state of the affected joints using functional tests, determining the state of the patient's social activity according to the assessments of questionnaires based on the principles of evidence-based medicine.

**Conclusions:** The problem of RA is a relevant in the world and in Ukraine. The dynamics of primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016-2020 shows a growth trend: from 5.8 to 7.1 per 10 thousand population. Carrying out medical and social examination of RA patients to determine the state of working capacity and signs of disability requires careful study of medical data, data on the functional state of the affected joints with functional tests and determining the state of social activity of the patient according to questionnaires. In patients with RA, the most important data for determining violations of vital signs and the presence of functional disability are: disease activity, its course, the presence of lesions of internal organs and the completeness and quality of treatment methods recommended from the standpoint of evidence-based medicine.

**KEY WORDS:** rheumatoid arthritis, disability, joint functional state, functional activity

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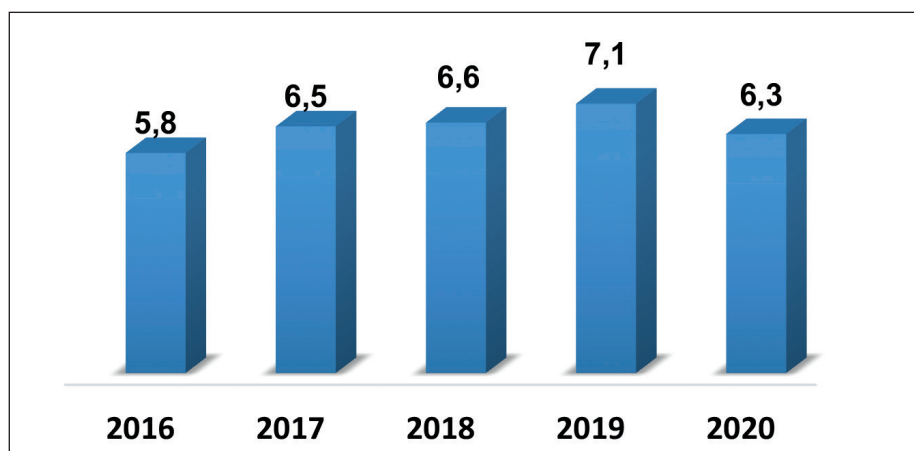
## INTRODUCTION

Disability is a social phenomenon that no society can avoid. According to the WHO, the number of people with disabilities today is about 1 billion, which is 15.6% of the world's population [1]. At the same time, the "Report on the Global Burden of Illness" of the International Labor Organization (ILO) provides an even high number of people with disabilities – 19.4% of the world's population. It is important to emphasize that from 110 to 190 million adults have significant dysfunction [2]. The ILO reports that almost 400 million people with disabilities are working-age, but 80% of them are not working. The main contribution to the functional disability indicators are diseases of the musculoskeletal system and rheumatoid arthritis (RA).

Rheumatoid arthritis is a chronic inflammatory disease with unknown etiology and complicated multifactorial pathogenesis, a diverse clinical course and an unpredictable prognosis [3]. The disease is characterized by progressive destruction of synovial joints with degradation of cartilage

and bone, damage to ligaments and tendons, decreased functional activity of the joints. The disease course is a high activity, insufficient medical and social rehabilitation lead to steadily progressing functional disorders and reduced quality of life, which leads to the formation of disability over time.

Inflammatory and degenerative diseases of the joints and spine, including RA are in 4<sup>th</sup> place in prevalence after diseases of the circulatory, respiratory and digestive systems. Today, more than 4% of the world's population suffers from RA [4]. In the USA, 54.4 million adults (22.7%) annually go to the doctor with complaints in connection with rheumatoid arthritis, gout, fibromyalgia or lupus. It is estimated that by 2040, 78 million (26%) American adults will be diagnosed with RA [5]. According to the scientists, there are 5 million people suffer from RA in Europe. The disease ranks 7<sup>th</sup> among the most common diseases in Europe, it degrades the life quality of more than 2.9 million people. There are 0.8% of the UK population suffers from



**Fig. 1.** The primary disability caused by musculoskeletal system and connective tissue diseases (the main disease – rheumatoid arthritis) in Ukraine in 2016-2020

RA [6]. According to the National Health Interview Survey (NHIS, 2015), arthritis and other rheumatic diseases are the leading cause of disability among the adult population in the United States; one in 25 working-age adults face with difficulties arising from arthritis; 1 in 4 patients with RA has work restrictions. In total, this is 23.7 million people or about 44% of adults in USA [7].

Due to the high prevalence of RA, disability rates are also rising. Thus, in the world RA accounts for about 10% of disability and more than 30% of cases of temporary disability. According to the American College of Rheumatology (ACR) in recent years, the prevalence of persistent disability among RA patients with 10-years disease duration is 40-50%. At the same time, the annual increase in disability is 10%, and complete termination of work (severe disability) – 6% over the past three years [8]. In the United Kingdom, disability among patients with RA and a history of 10 years is approximately 60% of cases. In 2019, researchers at the Mayo Clinic published data from the Rochester Epidemiological Project, which found that the prevalence of functional disability in patients with RA was twice as high as in those with other disabling diseases. Conversely, patients with RA had a 15% higher prevalence of functional disability than patients without RA in most age groups [9]. The national spending of the United States on RA in 2013 amounted to 304 billion dollars, the share of medical expenses - 140 billion dollars. At the same time, the loss of wages from RA amounted to 164 billion dollars [10].

Today, the problem of determining the assessment of the functional state of a patient with RA remains complex and relevant, because it is the basis for addressing issues of persistent disability and identifying signs of disability. Family doctors face in everyday practice with some difficulty, to conduct medical and social assessment of these patients.

## THE AIM

Aim of the study was to analyze the assessment of the decrease in working capacity degree in patients with rheumatoid arthritis in accordance with modern diagnostic disease criteria and social approaches to disability definition in the world (the decline degree of vital activity by WHO).

## MATERIALS AND METHODS

We analyzed the dynamics of primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016-2020. We analyzed the data of medical and social cases of 433 patients with RA (referral for medical and social examination, Form 088/o). We studied the degree of reduction of their efficiency. Statistical processing was performed using descriptive and variational statistics methods. The results were calculated on a personal computer using the licensed programs STATISTICA 6.1 (Statsoft Inc., Serial № AGAR909E415822FA).

## RESULTS

The analysis of the data allowed us to determine that the primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016 was 13359 in absolute numbers, which was 5.8 per 10 thousand population; in 2017 – 14673 and 6.5 per 10 thousand population; in 2018 - 14666 and 6.5 per 10 thousand population; in 2019 - 15750 and 7.1 per 10 thousand population; in 2020 - 13950 and 6.3 per 10 thousand population, respectively.

The dynamics of the primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016-2020 is presented on Fig.1.

Given the extreme urgency of the formation of signs of disability in RA, medical and social examination should be based on a comprehensive assessment of the human body based on the analysis of clinical, functional, social, occupational, psychological data of a person based on clear modern diagnostic criteria and criteria for reducing functional and social activity.

In our study 62% of disability cases were due to disease consequences – the end stage renal disease. It is important to emphasize that 20% of disability cases was due to high activity, which may indicate not only a refractory course, but rather inadequate treatment.

One of the main medical criteria for disability and evaluation of treatment effectiveness is the activity of RA. As a basic method of activity gradation, it is recommended to

use the integrated indicator RA – DAS28 index (Disease Activity Score) based on the study of 28 joints: proximal interphalangeal, metacarpophalangeal, radial, carpal, elbow, shoulder, knees. It also takes into account the subjective analysis of the patient's history on a 100-millimeter visual analog scale, on which the patient marks a point that corresponds to the severity of pain and general condition.

The DAS28 index is calculated using a computer program and is defined as:

- 0 = remission (DAS28 <2.6);
- 1 = low activity (DAS28 2.6-3.2);
- 2 = average activity (DAS28 3.2-5.1);
- 3 = high activity (DAS28 > 5.1) [ 8, 20].

It is important that according to the EULAR recommendations, a patient with active RA (high, moderate activity) should be examined every 1-3 months, with low activity or remission – once for 6-12 months.

It is clear that exacerbation of diseases negatively affects human working capacity. Therefore, when determining the disability of patients with RA and assessing their ability to work, it is necessary to assess and indicate in the diagnosis the frequency of exacerbations, which is defined as: small - 1 time in 1-2 years; average - 1-2 times a year; high frequency - 2-5 times a year; and their duration (short-term - 3-4 weeks; average duration - 5-8 weeks; long-term > 8 weeks). The direct fact of confirmation of RA exacerbation in a working patient can be only a certificate of incapacity for work issued to the patient in the hospital, on an outpatient basis, as well as in day hospitals.

An important criterion for reduced working capacity is the joint dysfunction degree. Criteria of the first degree of hand joints dysfunction are: the amplitude of movements for the joints of the wrist in the range of 110-170°, dynamometry - 17.4-31 kg (normal 21-56 kg). When assessing the dysfunction of the joints of the foot takes into account radiological data with individual isolated foci of destruction of the heads of the metatarsal bones or the corresponding phalanges. Such joint damage is clinically manifested by a moderate violation of the supporting function of the foot. There were no individuals with I degree dysfunction of the hands and feet joints in the study group.

Criteria of the II degree of dysfunction of the wrist joints are: the amplitude of movements of the finger joints in the range of 55-30°, dynamometry - 10-23 kg. There may be a significant deformation of the finger joints with their deviation in the ulnar direction - the deviation of the fingers towards the ulna due to subluxations in the metacarpophalangeal joints, Z similar deformation of the thumb in the form of a boutonniere - flexion in the metacarpophalangeal joints and flexion in distal interphalangeal joints, as well as deforming arthrosis of the interphalangeal joints. This degree of wrist joints dysfunction was found in 18%, these subjects had certain contraindications to work. For example: hairdresser, typist, etc. These were patients who had main work with fine motor skills of the fingers.

Criteria of III degree are amplitude of movements within 15°, decrease in indicators of dynamometry within 0-10 kg, deformation of fingers on type of a loop - flexural

contracture in the first interphalangeal joint and overstretching in the second interphalangeal joint, ankylosis in functional position (II-V fingers by 45%, flexion in the interphalangeal joints by 60-90%, the first finger in opposition to the third finger with a slight flexion of the end phalanx). The criterion of IV degree is fixed joints in a functionally unfavorable (tightened) position (including Jacques' arthropathy). Therefore, functional tests should be performed to determine joint dysfunction.

In practice, the Sollerman test is often used to determine a patient's functional class. The patient is offered 20 tasks (insert the key into the keyhole, turn it 90°; collect coins from a flat surface, put them in a wallet hanging on the wall; unzip the zipper; cut plasticine with a knife and fork; put a glove on the other hand, etc.). By estimating the time a patient spends on a task and calculating the sum of the points on the Sollerman scale, it is possible to determine the class to which the patient belongs.

Thus, summarizing the scientific data on medical and social examination of patients with RA, the classification of functional classes (FC) is:

- FC I: the person is fully capable of performing ordinary daily tasks;

- FC II: mobility is moderately limited: when the lower extremities are affected, the tolerance of heavy physical exertion is reduced, there is a reduction in walking distance (up to 3-4 km near the home) and the pace of movement (90 steps/min). Self-service is moderately limited; at defeat of wrist joints – an exception of works with moderate and considerable physical activity. Under conditions of adaptation of a working surface and application of additional technical means reduction of dependence on third parties can be reached. Everyday affairs are moderately limited due to work with moderate physical activity, transfer of responsibilities to family members. There must be restrictions on the specialty. Work is possible under conditions of exclusion of heavy physical activities, long walking, works with the set pace. A person can work with a moderate load (moving loads up to 3-5 kg, at a free pace, with a reduction in the working day, week, and workload);

- FC III: mobility is limited due to the exclusion of heavy and moderate physical activity, reduction of walking distance (near housing - ≤0.5 km) and pace of movement (70 steps/min; or 2-3 km/h) within one's own housing or close neighborhood. Self-service is significantly limited due to the inability to perform work with moderate physical activity. There is a need for regular (several times a month) help from others (purchase of products, cleaning, washing dishes). The performance of daily tasks is significantly limited due to work with moderate physical activity, the transfer of part of the responsibilities to family members. There is a refusal of active recreation. Ability to work is possible under conditions of light physical activity and intellectual work;

- FC IV: mobility is severely limited by one's own home or close neighborhood. Movement is possible only with the use of crutches, orthoses or prostheses, outside the home - on a wheelchair. Self-care is severely limited, there



is a need for constant third-party care or assistance (food and sanitation). The ability to work is significantly reduced, the inability to perform heavy work other than intellectual work or work at home.

## DISCUSSION

According to modern concepts, in case of determining a patient's disability, it is necessary to identify the presence and severity of life criteria violations, which cause full or partial restriction of the patient (disabled) to participate and be active in society, as well as be useful to themselves personally. The main criteria of human life are: the ability to self-care; ability to move; working ability (ability to work in their profession or in separately created conditions); ability to orientation; ability to control their behavior; ability to learn; ability to communicate [11]. Perhaps the most important criterion of life is a person's ability to work. This criterion of vital activity is a set of physical, psychophysiological and psychological capabilities that are formed as a result of physical, psychological and cultural development of the individual; depends on its level of general and special education. The development of work skills and abilities required in the professional sphere also significantly affects the assessment of the severity of the ability to work. Decreased ability to work limits the patient's personal finances, as well as negatively affects the economic condition of the state due to the loss of working hours of temporary and permanent disability.

The main basis for the formation of disability in patients with RA is the clinical course of the disease. In addition to systemic manifestations of the cardiovascular, urinary, nervous, respiratory systems, radiological stage, the most important in establishing the labor prognosis and the formation of functional disability is the joint syndrome. Current regulations on management of patients with RA are formulated in international document of the European League Against Rheumatism (EULAR) and ACR (2010) and supplemented by new postulates in 2019 [12]. The document presents the algorithm for RA diagnosis according to specific points: classification, clinical stage, activity, clinical and anatomical form, systemic manifestations, course character, frequency of exacerbations, instrumental characteristics (radiological stage), additional immunological characteristics - anticitrulline antibodies, joint abilities, functional class and complications.

According to the EULAR recommendations, the criteria of the American Board of Rheumatologists (ACR) are used today when deciding on the presence of signs of disability in RA patients, namely: ability to self-care (dressing, eating, self-care, etc.); ability to non-professional activities (sports, etc., taking into account gender and age opportunities); ability to professional activity (work, housekeeping - for domestic workers) [12]. Validated forms, questionnaires, functional indices help to assess these criteria of vital activity and to establish a certain degree of decrease in social activity of a patient with RA. In particular: the Health Assessment Questionnaire (HAQ), based on 5 aspects of

everyday life; Health Assessment Questionnaire Disability Index (HAQ-DI); a modified health assessment questionnaire (mHAQ) consisting of 8 questions; multidimensional HAQ (MDHAQ); routine evaluation of patient index data for RA (RAPID); disease activity index (RA) (RADAI); modified SCIM III scale for quantitative assessment of life-limiting parameters; World Health Organization Disability Assessment Scale (WHODAS2.0) using domains of the International Classification of Functioning (2017) [13].

Based on all above facts, it can be argued that it is necessary to establish a decrease in working capacity and evaluate and according to the classification of functional classes in patients with rheumatoid arthritis.

## CONCLUSIONS

1. The problem of RA is a relevant in the world and in Ukraine. The dynamics of primary disability caused by musculoskeletal system and connective tissue diseases (the main disease - RA) in Ukraine in 2016-2020 shows a growth trend: from 5.8 to 7.1 per 10 thousand population.
2. Carrying out medical and social examination of RA patients to determine the state of working capacity and signs of disability requires careful study of medical data, data on the functional state of the affected joints with functional tests and determining the state of social activity of the patient according to questionnaires. In patients with RA, the most important data for determining violations of vital signs and the presence of functional disability are: disease activity, its course, the presence of lesions of internal organs and the completeness and quality of treatment methods recommended from the standpoint of evidence-based medicine.
3. Functional disability is a condition that is caused, among other things, by the subjective experience of the patient, which he receives in connection with a disease. Determining the presence of disability signs in patients with RA is impossible without determining the functional state of affected joints, which can be done through functional tests (measuring the angles of active and passive joints flexion, dynamometry, Sollerman test).

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**Conflict of interest:**

*The Authors declare no conflict of interest.*

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