

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.  
For more information visit [www.intechopen.com](http://www.intechopen.com)



---

## Arthritis/Rheumatoid Arthritis

---

Zeynep Bahadır Ağce, Esmâ Özkan and Barkın Köse

Additional information is available at the end of the chapter

<http://dx.doi.org/10.5772/intechopen.68477>

---

### Abstract

Rheumatoid arthritis is a progressive, chronic, and degenerative disease that adversely affects the quality of life of individuals. Depending on the individual's symptoms of rheumatoid arthritis, basic and instrumental daily life activities are restricted, and participation of life is adversely affected. Occupational therapy interventions for rheumatoid arthritis rehabilitation include self-management programs (e.g., arthritis self-management program, bone up on arthritis, self-management arthritis treatment physical activity), splinting techniques for rheumatoid arthritis, and vocational rehabilitation. In this chapter, updated information about these approaches is brought together and presented to the reader.

**Keywords:** coping with rheumatoid arthritis, health education, joint protection, energy conservation, occupational therapy, rheumatoid arthritis

---

### 1. Introduction

Arthritis is a very common health problem which is cause activity of daily living (ADL)-related and instrumental activity of daily living (IADL)-related functional disability, restriction of work and social participation, and fulfilling their life roles [1–6]. Arthritis is characterized by inflammation, autoimmune cell activation, and tissue destruction in the joints [7–9]. The patients typically complain about joint pain, stiffness, generalized fatigue, and reduced quality of life [2, 9–12]. Symptoms are seen in exacerbations and remissions [9]. Arthritis has many different types, such as rheumatoid arthritis (RA), psoriatic arthritis, systemic lupus erythematosus, ankylosing spondylitis, reactive arthritis, and juvenile idiopathic arthritis [8].

---

This chapter focuses on the rheumatoid arthritis and influences person's life. Rheumatoid arthritis (RA) prevalence ranges from 0.3 to 1% of the adult population, and female-to-male prevalence ratio was 4:1 [10, 13, 14]. It is related to low- and middle-income countries [10, 15, 16].

Rheumatoid arthritis affects people's life balance and their ability to perform work, leisure, self-care, and rest and sleep decreased [17–19]. In addition, they lose values of activity for their life so feel anxious and depressed and influence their health related quality of life [20–22].

Occupational therapist works with not only pain or symptoms management in rheumatoid arthritis but also the prevention of functional limitations and adaptation to lifestyle changes improve emotional state and social participation to maintain independence in daily living activities [11, 19, 23]. Occupational therapy (OT) interventions especially focus on improving occupational performance which is negatively affected by rheumatoid arthritis. For this reason, occupational therapists use some approaches for improving occupational performance such as using behavioral change approach, energy conservation approach, relax renovation and pain control, fatigue management, maintain independence, adaptive device, and home adaptations in rheumatoid arthritis [9, 24].

## 2. Prevalence and incidence

Arthritis includes approximately over 150 diseases and syndromes, and arthritis is the common problem and reason of substantial pain, limitation of activity, work, and social participation [2, 25, 26]. Rheumatoid arthritis is the most common variety among arthritis types [27]. Rheumatoid arthritis is typically diagnosed in adults between the ages 30 and 50, though it can develop at any age [28]. It is related to low- and middle-income countries, and one study showed high education level is influenced by positive feel pain and functional capacity [15, 25, 29]. At least 50% of the patients who live in developed countries have lost their ability to work in 10 years [25]. Family history is an important risk to occurrence of RA, the risk rate of twins increased approximately three to five [27]. The incidence of rheumatoid arthritis is thought to be influenced by geographical conditions, the prevalence of rheumatoid arthritis according to studies conducted in various nations is: in Turkey 0.57%, in Italy 0.48%, in France 0.29%, in Lithuania 0.50%, in Serbia 0.35%, in Argentina 0.329%, in Sweden 0.41%, in the USA 0.5–1.0% of general population [14, 30–33]. According to the 2010 classification criteria, countries' incidence rates are different from each other, for instance, the rate in Catalonia 0.20/1000 person/years, in Argentina 18.5/100,000 person/years, in Sweden 41/100,000 person/years, in Italy 68/100,000 person/years, in the UK 79/10,000 person/years, and in the USA 41/100,000 person/years [14, 30–32, 34].

## 3. Pathology

Rheumatoid arthritis is a chronic progressive disease that affects joints and systems [35]. Due to the presence of autoantibodies [seropositivity] in rheumatoid arthritis, which is an autoimmune disease, many symptoms have occurred, such as joints and bone destruction

and mortality [27, 36, 37]. Although the pathophysiology of rheumatoid arthritis is not clearly explained, it is known that genetic and environmental factors affect the development of the illness [27, 35, 37]. Environmental effects such as recurrent exposure to exogenous, endogenous, commensal viral, bacterial, silica, alcohol, or smoking are factors that support the development of rheumatoid arthritis [27, 35, 38]. T cells, B cells, and pro-inflammatory cytokines have a key role in the development of the disease [35, 39]. The presence of HLA-DRB1, particularly HLA-DRB1, is associated with disease progression by affecting peptides [27]. Genetic factors affecting the development of rheumatoid arthritis have been associated with anti-citrullinated protein antibody (ACPA) positive [40]. When ACPA is positive, the risk of developing rheumatoid arthritis is increased [37]. The presence of ACPA was detected 10 years before the diagnosis of rheumatoid arthritis, and it indicated that there is an increase in ACPA, such as serum cytokine concentrations, especially before the onset of joint involvement [27]. In a study conducted on twins, it was reported that the stochastic factors, lifestyle and environmental effects, may be more effective than genetic factors in ACPA positivity. It is stated that there is a significant relationship between ACPA positivity and smoking in the study of smokers who have the DRB1 allele gene [41]. When rheumatoid arthritis is treated effectively, there is a decrease in RF and ACPA [27].

#### 4. Diagnosis and special tests

Diagnostic tests play an important role in the diagnosis of RA, but diagnosis is based on clinical findings [28]. For the diagnosis of rheumatoid arthritis, especially autoantibodies, such as RF and anti-citrullinated protein antibody (ACPA) (tested as anti-cyclic citrullinated peptide (anti-CCP)), have been used for many years [42]. RF is frequently used in the diagnosis and follow-up of rheumatoid arthritis but is not a distinctive diagnostic parameter because it is also detected in other rheumatic diseases [28, 43]. Rheumatoid arthritis causes destruction in joints and causes disability, so early diagnosis is very important [43, 44]. Anti-cyclic citrullinated peptide/protein (anti-CCP) is especially used for early diagnosis [44]. The most widely used and most reliable test, anti-ccp2, was accepted as the gold standard in ACPAs in 2010 [42]. But ACPA is not positive for every rheumatoid arthritis patient [43]. Individuals with ACPA positive are 90% estimated to be diagnosed with rheumatoid arthritis within 3 years, while 30% of those with ACPA positive [45]. As a result of a joint study by American College of Rheumatology (ACR) and European League Against Rheumatism (EULAR) for rheumatoid arthritis diagnostic criteria, ACPA has been included in the current 2010 rheumatoid arthritis diagnostic criteria (Table 1) [42].

#### 5. Living with rheumatoid arthritis

In rheumatoid arthritis, loss of function is seen in daily life due to symptoms such as degeneration, pain, swelling in joints, morning impairment, and fatigue based on joint inflammation [46]. In addition, especially effects on hand joints of rheumatoid arthritis also influence independence by causing problems in the individual's daily life activities [47, 48]. Gradually,

	Score
Target population (who should be tested?): patients who	
1. Have at least 1 joint with definite clinical synovitis (swelling)	
2. With the synovitis not better explained by another disease	
Classification criteria for RA (score-based algorithm: add score of categories a–d;	
A score of $\geq 6/10$ is needed for classification of a patient as having definite RA)	
<b>A. Joint involvement</b>	
1 large joint	0
2–10 large joints	1
1–3 small joints (with or without involvement of large joints)	2
4–10 small joints (with or without involvement of large joints)	3
>10 joints (at least one small joint)	5
<b>B. Serology (at least one test result is needed for classification)</b>	
Negative RF and negative ACPA	0
Low-positive RF or low-positive ACPA	2
High-positive RF or high-positive ACPA	3
<b>C. Acute-phase reactants (at least one test result is needed for classification)</b>	
Normal CRP and normal ESR	0
Abnormal CRP or abnormal ESR	1
<b>D. Duration of symptoms</b>	
<6 weeks	0
$\geq 6$ weeks	1

**Table 1.** The 2010 American College of Rheumatology/European League against rheumatism classification criteria for rheumatoid arthritis [42].

changes in the health of individuals lead to limitations in their ability to participate in everyday life, such as individual roles, work, school, self-care, leisure time activities, home work, and family functioning, so the quality of life of an individual is reduced [6, 32, 48–51]. The daily life of women on rheumatoid arthritis is more affected than men because of the complex roles such as motherhood, spouse, and nursing [52, 53]. It is a very difficult process to live with a chronic disease like rheumatoid arthritis [54]. After the diagnosis, the individual learns to live with rheumatoid arthritis in three stages, namely “becoming aware,” “learning to live with,” and finally “mastery.” The first stage involves the initiation of medical treatment

for the twinges problem. In the second stage, as physical life and emotional manifestations emerge, there is living with the experience of coping with multiple physical and emotional symptoms in daily life. Finally, it increases the quality of life of individuals by learning how to set goals and expectations, how to use energy, how to maintain the relationship between family and society, and how to manage the medical routine with doctors [53]. Individuals' disease experience is different from others, and individual responses are influenced by the individual's spiritual characteristics, his/her view of the disease, biological, social, and environmental factors [49, 53, 55]. The person not only that burden from clinical symptoms, but also the physical weakness effected her/his life, so it is important that the individual maintains his/her independence in social and recreational areas [46, 53]. For this reason, although the individual has effective treatment, the level of pain, fatigue, and functionality may be low [55]. Individuals may lose physical well-being, independence, privacy, autonomy, control of cynicism, restriction of social roles, loss of opportunity to plan for the future, and decrease in family and friends relations [54]. Maintaining independence in the lives of individuals with rheumatoid arthritis is important for quality of life and well-being [48].

## 6. Occupational therapy evaluation

In progress of time, rheumatoid arthritis leads to a decline in well-being and quality of life, depending on the individual's functional capacity and decreased mobility, decreased productivity, and difficulties in daily life performance [6, 51, 56, 57]. For this reason, it is very important to implement the evaluation with an interdisciplinary approach [58]. As stated in the "International Classification of Functioning, Disability And Health" (ICF), the body structure and functions of the individual, as well as the level of activity and life participation and the personal and environmental factors affecting it, must be approached with a holistic perspective [59]. Rheumatoid arthritis focuses on evaluating the individual's disease management, compliance, self-efficacy, comprehension, and range of motion; due to pain and fatigue effect, the individual's functional ability to be restricted and participation in social life is affected [11, 59, 60]. Symptoms of individuals with rheumatoid arthritis may be fluctuating, so how the individual occupational performance affected by symptoms such as morning stiffness, pain and fatigue, and how to deal with it and the use of assistive devices should be evaluated [26]. In addition, how rheumatoid arthritis affects the individual's life and treatment goals and expectations should also be assessed [60].

### 6.1. Client history

In the past medical history of the individual, age, gender, date of diagnosis, medication and adherence, current clinical symptoms, second complications, deformities due to rheumatoid arthritis, and previous treatments should be questioned. In the assessment, personal factors such as the individual's point of view of the illness, his/her values, his/her knowledge of the illness, self-efficacy, problem-solving skills, spiritual activities, his/her feelings should be taken into consideration. In addition, the individual's personal, environmental, and social experiences, current activity level, activities restricted by rheumatoid arthritis, difficulties in work, leisure activities, family, and friends relations should be questioned [6, 9, 17, 46, 49, 55].



## 6.2. Occupational profile

Occupation is defined as everything that a person does in his life, such as physical, mental, social, and rest occupations, and occupations for productivity, leisure, and self-care [61]. Everybody's priority and meaningful occupations are different from others. For this reason, it is important to determine the occupation and occupational profile of the individuals who are affected by the clinical symptoms of rheumatoid arthritis [9, 53]. The individual's ability to cope with stress, where he lived or worked, family and socio cultural expectations, community resources, and transport opportunities affect his occupational performance [9, 62]. In-depth interviews with open-ended questions provide information on individual roles, meaningful activities, occupational activity level, priorities, occupational profile, activity-rest balance, individual's stress perception, social stress, relationship with health professionals, comorbidity, and physical fitness [6, 55]. Another effective method for determining the occupational profile of an individual is the typical day assessment. Typical day assessments can provide important information about how a person lives a day, such as habits and routines, sleeping, diet, exercise habits, and activity rest periods [6, 55].

## 6.3. Occupational performance

Occupational therapists work to improve the occupational performance of individuals who are affected by the person, environment and occupations from themselves [59]. Occupational performance can be evaluated by interviewing and observing the Canadian Occupational Performance Measure (COPM) [6, 63]. COPM is revealed by the occupational performance and satisfaction of the individual in self-care, leisure, and productivity activities [26, 64–66]. Individual self-efficacy, stress, sleep posture, use of assistive technology, and exercise habits should be considered because they may affect symptoms of rheumatoid arthritis [26]. In addition, the person-centered approach should be used to understand the individual experiences in daily life due to rheumatoid arthritis [17, 63]. Activity requirements such as work-house ergonomic conditions, tools and equipment should be assessed while assessing the factors that limit the individual's activities [6, 26]. It should not be forgotten that during the evaluation of the activity, the symptoms that the individual struggles with may change day by day or day to day [23]. For instance, which activity increased the fatigue or pain, or when it is more intense, the way the individual follows in the fight with it should be evaluated [67–70].

## 6.4. Evaluation of body structure

Rheumatoid arthritis is characterized by swelling in the joints, tenderness on palpation, morning stiffness, decreased range of motion, and weakening in the muscles due to them [71–73]. Therefore, the presence of posture, atrophy, swelling, scar tissue, skin changes, and deformity should be observed with the inspection [74, 75]. The increased inflammation symptom can be detected such as tenderness and swelling of the joint with palpation in rheumatoid arthritis [9, 76]. Goniometer is used to determine whether there are any limitations by evaluating passive and active ranges of motion [75]. Hand joints are particularly affected by rheumatoid arthritis, so manual muscle testing can be used to assess muscle strength; in addition, power grip, pinch grip, and tripod grip strength can be evaluated for both hands using Jamar Dynamometer [77].

The use of manual muscle testing is indicated in the general muscle strength instead of the isokinetic devices because they may provoke inflammation [9]. Surrounding measurement or water immersion methods can be used to assess swelling around the joint [77].

## 7. Patient education

Development of early and progressive treatment for rheumatoid arthritis (RA) made interventions to occupational therapy, physiotherapy, and patient education be done earlier [78].

The multidisciplinary teamwork consisting of rheumatologists, occupational therapists, physiotherapists, surgeons, and other contributing professionals is rather important for obtaining positive results in RA. Occupational therapy is defined as a treatment method that aims to treat and compensate the limited functions of the patients. Occupational therapy helps patients manage their daily life activities and improves their self-care skills [79].

In rheumatoid arthritis, personalized treatment programs consisting of arthritis education (individual or group), ADL education, joint protection, fatigue management and exercise (especially for the hands and arms), splinting (for the wrist/hand, foot, and neck), assisting devices, work and free time counsel, sexual advice, pain relaxation, and stress management and self-management education as required are developed by occupational therapists [3].

OT involves both therapeutic and educational interventions and aims to increase the performance of daily life duties, to facilitate successful organization of the lifestyle, and to prevent function loss. Therapists also aim to improve psychological organization of living with arthritis by helping individuals have the sense of controlling the symptoms more by means of using self-management methods and developing self-efficiencies of the individuals [79–81].

For individuals with RA, a preventive approach is adopted in order to maintain optimum participation to normal activities, to minimize dysfunction, to protect and help improve health by means of providing knowledge about the disease and facilitating positive behavior regarding effective learning strategies in improving self-management skills [81].

Patient education can be defined as planned, organized learning experiences that are developed in order to enable and support individuals to organize their health and well-being and to manage living with their condition. Education of the patient is proposed as an inseparable part of the management in RA because the individual gets prepared for self-management activities with patient education [82, 83].

A comprehensive review of studies on patient education in patients with arthritis showed a positive change in more than one factor in 77–87% of studies [84]. Another comprehensive review examined the effectiveness of patient education interventions on health status (disease activity, patient global assessment, joint counts, pain, functional disability, and psychological well-being) in patients with RA. At the end of the study was found a small beneficial effect of patient education at first follow-up for psychological status, joint counts functional disability, depression, and patient global assessment [85]. A meta-analysis of psychoeducational interventions in arthritis showed that the intervention groups experienced 22% greater



advancement in depression score, 16% advancement in pain over control groups, and an 8% greater advancement in disability [86].

Patient education programs are developed based on psycho-behavioristic theories and holistic approaches in order for the patients to assume their self-care and to acquire problem-solving skills. The attitudes that reduced the risks regarding health were examined, and the fact that educational approaches aimed at individuals required behavioral change was emphasized by the World Health Organization [9]. In patient education programs, health belief model, social cognitive theory, and transtheoretical model are widely used [80, 87].

7.1. Models of health behavior

7.1.1. Health belief model

Health belief model is structured in order to clarify which beliefs are to be targeted in the communicational interventions that result in positive health behaviors. According to the health belief model, probability of a person changing his/her behavior in order to prevent the disease depends on the person’s realization of the facts that he/she can also catch the disease (perceived sensitivity), the consequences of the disease may be serious (perceived seriousness), cautious behavior will prevent the disease effectively (perceived benefit) and that the benefit of reducing the dangers/risks is greater than the damage of getting into the act. The basic structures and application proposals for the health belief model are briefly given in **Table 2** [88, 89].

Basic structures	Application proposals
Perceived sensitivity expresses the person’s belief regarding the possibility of catching the disease.	Define the population at risk and the level of risk.  Personalize the risks based on an individual’s characteristics or behavior.  Synchronize the perceived sensitivity of the individual with the real risk.
Perceived seriousness is defined as the belief about how serious a situation and its sequels are.	Indicate the consequences of the risks and conditions.
Perceived benefit expresses the belief regarding the effectiveness of a recommended action to reduce the risk or seriousness of a disease.	Clarify when, where, and how a person should behave, and what the expected positive effects of these behaviors will be.
Perceived barrier is defined as the belief about the moral and material cost of the proposed action.	Reduce the perceived barrier by giving assurance, correcting misinformation, giving courage, and helping.
Action hints indicate the strategies based upon increasing the state of readiness.	Provide information regarding how behavioral change could be made, increase awareness and use appropriate reminding systems.
Self-efficacy reflects the confidence of the individual in his/her skill of getting into action.	Provide education and guidance during the recommended action.  Set goals gradually.  Give verbal support.  Show sample for desired actions.  Reduce the anxiety.

**Table 2.** Basic structures of the health belief model and application proposals [89].

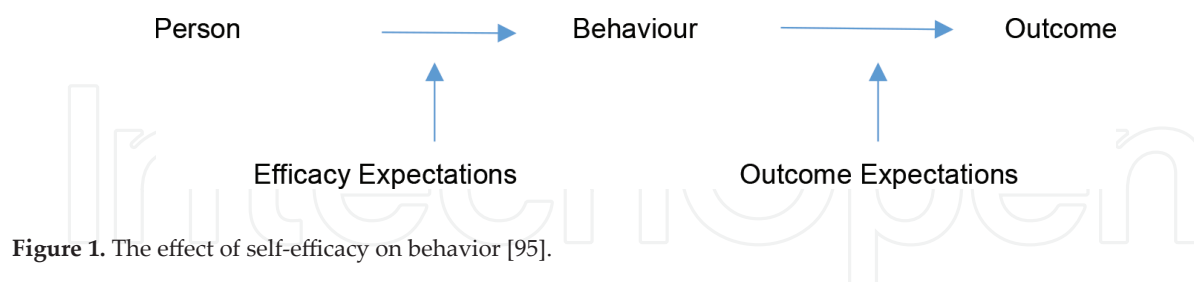
Other variable factors in the application of the health belief model (age, gender, ethnic background, personal characteristics, socioeconomic condition, and educational status) influence the individual's perception of sensitivity, seriousness, benefit, and prevention and thus his/her behaviors [90].

### 7.1.2. Social cognitive theory

Social cognitive theory adopted concepts from sociology and political sciences in order to understand the functions and capacity of a group. The theory also integrated concepts of humanistic psychology by means of analyzing the processes that formed the basis of self-will, self-sacrifice, and moral behavior. Moreover, it highlights the fact that perceived targets, perceived environmental barriers and promoters, outcome expectations, and self-efficacy influence the organization of human behavior, motivation, and well-being. Perceived self-efficacy is the most important key consideration in this causative structure with the effect of other determiners. According to the social cognitive theory, social structure is also effective on health as much as personal determiners [91, 92].

Social cognitive theory added new concepts to the list of behaviors regarding health that are excluded from health belief model. First, it highlighted the motivational role of support and role of observational learning through modeling (imitating) others' behavior [93].

Second significant contribution is the definition of the concept of self-efficacy (efficacy expectations), which is distinct from the concept of outcome expectations. Outcome expectations are known as predictions of the individual regarding specific actions that would bring ultimate results, and it is quite similar to the concept of perceived benefit in the health belief model. Efficacy expectations are defined as the belief that the actions required to bring results can be managed successfully. Both efficacy and outcome expectations are required for the behavior (**Figure 1**) [94].



**Figure 1.** The effect of self-efficacy on behavior [95].

In the figure mentioned above, Bandura demonstrates this relation [95]. For instance, a woman with RA (person) wants to lose weight (behavior) to be healthier (outcome). For the woman to achieve this, she has to believe in the fact that both losing weight is beneficial for her health (outcome expectation) and that she has the ability to lose weight (efficacy expectation).

### 7.1.3. Transtheoretical model

The model consists of stages of pre-contemplation, contemplation, preparation, action, maintenance, and termination. At the pre-contemplation stage, individuals are either very

little aware or not aware at all of the problems; thus, they are unwilling to make a change in these problems. Behavioral change within the next 6 months is out of question for the individuals at this stage. Contemplation stage is when both the problem and change are evaluated and addressed. Individuals at this stage are more open to feedback and information regarding their behaviors, and they think of changing their behaviors within the next 6 months. In the preparation stage, individuals are usually determined to change their behaviors within the next 30 days. These people have tried changing in the past and have put some effort in getting prepared for the change. Stage of action is when behavioral change or the change occurs and at this stage some explicit changes have occurred in the last 6 months in the lifestyles of the individuals. Maintenance stage is when the unlimited period begins as the first 6 months of the change begin as well. Changes have already turned into habits and recurrence risk of the behavior is decreased. In the termination stage, individuals do not have the desire to return to unhealthy behaviors, and the efficacy level is 100% [96, 97].

Stages of change clarify the time of changes in individuals' intention, attitude, and behavior. The process of change, on the other hand, helps to understand which experiences individuals use in order to change their problematic behaviors. Ten variables consisting of five cognitive and five behavioral variables were found to facilitate change. The cognitive ones are emotions, values, and factors regarding awareness of the individuals, while behavioral processes indicate which behaviors individuals do choose on the path to change. Processes guide the studies on change, significantly [97, 98].

During the practice of TTM applications, it should be taken into account that not all the individuals in the study group are ready for the change, and even if they are thought to be ready, not everyone is at the same stage; thus, personalized interventions are required. At the first two stages, providing more information regarding change and how it is to be made and giving motivational support are very important. At the third and fourth stages, suggestions aiming at providing support about their self-efficacy may be made and discussed about, and motivational prizes may be benefitted from. At the fifth stage, determination of the conditions in order to prevent recurrence and planning of the required steps in order to sustain the change in the long term are necessary [98].

## 7.2. Self-management

In the last 20 years, self-management interventions in chronic diseases have gained significance. Self-management education programs highlight the role of patient education in protective and therapeutical health-care activities and consist of organized learning experiences usually designed to facilitate the adoption of health-promoting behaviors. Self-management interventions often involve various skills regarding the disease, including problem solving, decision-making, and relations with health professionals [99, 100]. Self-management interventions are person-centered, and they focus on encouraging active participation of the individuals in order for them to develop their well-being and to manage the symptoms [101].

Self-management training programs include three main topics: information sharing, behavioral change (skills development), and psychosocial counseling. Information about the diagnosis and symptoms of the disease is provided, and training is provided to develop self-management skills to manage these symptoms. The individuals are expected to participate actively in these trainings. Self-management skills are taught through observation and role-play within educational groups. Considering the individual needs, individuals are trained about joint protection, fatigue management, exercise, pain-related factors, and sleep adjustment [102, 103]. Psychosocial counseling can be provided to help individuals feel stronger about their self-efficacy and help them cope with arthritis to enable them to acquire a functional and socially active lifestyle [101].

The first step needs evaluation of self-management programs in RA. The first assessment is conducted via face-to-face interview. The interview is very important for recognizing the strong aspects of the individual and the aspects to be supported. A needs evaluation provides information about individual's notice, abilities, obstacles, strong sides, and motivation for self-management. It should also be addressed in demographic and environmental factors that may be effective in the behavioral change of the individual during evaluation interview. Arthritis patient education programs aim to teach the individual how to organize daily activities that are affected by the symptoms of the disease after the initial assessment interview with the patient. In other words, the patient is taught how to approach situations related to arthritis and how to arrange each individual needs [104, 105].

### *7.2.1. Self-management intervention programs for arthritis*

#### *7.2.1.1. Arthritis self-management program*

Although there are many different models, perhaps the most well-known program is the arthritis self-management program (ASMP) developed by Lorig and his colleagues. Arthritis self-management program (ASMP), also known as the arthritis self-help course (ASHC), is the arthritis education program. First developed by Kate Lorig, DrPH, at Stanford University, arthritis foundation adopted the program in 1981. The ASMP is a 6-week series of classes for 2–2.5 h per session (total 12 h). Standardized course materials have been developed to assess pain, fear, depression, and disability in arthritic individuals. It focuses on what people need to know about arthritis concerns and aims to learn problem-solving skills so that individuals can adapt to fluctuations in disease activity and disorder levels [106].

Problem-solving, decision-making, communication with providers, exercise, relaxation, and energy-saving techniques are utilized in training how to deal with illnesses during the program. Self-efficacy strategies (goal setting/contract, role modeling, peer support and persuasion, reinterpretation of symptoms), experiential training methods (problem-solving discussions, brainstorming, demonstration, and feedback), behavioral change techniques (behavior shaping, repetitive implementation and feedback, self-monitoring/diaries, environmental sign), and social support strategies (important other people's involvement, time sharing, and feedback for group sharing) are used during the program [107, 108].

#### 7.2.1.2. *Bone up on arthritis*

The bone up on arthritis (BUOA) program is a home-based self-management education program. It consists of six 2-h lessons on audiocassettes, supplemented by illustrated print materials. The program, the contents of which are similar to the arthritis self-management program, was adopted by the arthritis foundation in 1989. The BUOA concept is based on basic disease information, communication, disease management skills, and problem-solving strategies. Coping with depression, sleep regulation and pain management techniques, relaxation techniques, and exercise are taught. Self-efficacy strategies and behavioral strategies (promoting the repeated application of self-care behaviors, problem-solving), similar to ASMP training, are used in the training process [109].

#### 7.2.1.3. *Self-management arthritis treatment*

Self-management arthritis treatment (SMART)] program was developed by Healthtrac, Inc. and is also known as the arthritis home health program. Course materials including self-management plan, self-care books, relaxation audiotapes, and an exercise videotape are uploaded to attendees' personal computers. The letter created in the computer environment is transmitted via e-mail and communication is provided in this way. The program is intended to teach individuals improve in order to use self-care activities and problem-solving skills, and enhance their self-efficacy, and to use health-care services to reduce side effects of medication [109].

#### 7.2.1.4. *Physical activity*

Physical activity is a core self-management activity for people with arthritis. The recommendation for early treatment of arthritis recommends a professional-directed therapeutic exercise for arthritic individuals. In 2002, the American Rheumatism Academy (ARA) recommended physical activity involving individuals exercising aerobic activity and lower extremities for 2–3 days per week for 30–60 min [34, 110]. People with arthritis can exercise (PACE) program developed by the arthritis foundation in 1987 and revised in 1999, is a group exercise program, preferably 1–3 times a week. It is applied in two levels according to the skills of the individuals. The advanced level includes more aerobic activities. The trainer selects 72 exercises that are appropriate to the needs of the group. The program includes endurance exercises and relaxation techniques [109].

## 8. Joint protection and energy conservation

When the changes that patients with rheumatoid arthritis experienced during the course of the disease are examined, permanent and progressive changes have a direct impact on maintaining joint independence in daily life, such as joint limitations, edema, general or regional pain complaints, and fatigue. From this point of view, ergotherapists use joint and energy conservation techniques in the treatment process in order to ensure the independence of the individual in daily life, to protect the joints in order for the activities to be performed by the individual, and to perform the activity in the most effective manner [39, 79, 111].

Why should we protect the joints?



### **8.1. In inflammatory arthritis, the aims of joint protection are to:**

- Reduce pain during activity and at rest resulting from pressure on nociceptive endings in joint capsules from inflammation and mechanical forces on joints.
- Reduce forces on joints: internal (i.e., from muscular compressive forces, e.g., during strong grip) or external (i.e., forces applied to joints while carrying or pulling/pushing objects).
- Help preserve joint integrity and reduce risk of development and/or progression of deformities.
- Reduce fatigue by reducing effort required for activity performance and improve or maintain function [19].

### **8.2. What can be done in this situation?**

- Informing the patient about his/her progress and living conditions.
- Patient joint and energy conservation techniques can be taught.
- Patient splinting techniques can be applied to reduce pain and maintain ideal mechanical position; assistive device and physical environment modification can be applied to make the daily life activities of the patient easier, to provide pain control, and to achieve fatigue.
- Depending on the current capacity of the individual, activities at home and at work can be re-organized [19].

## **9. Joint protection and energy conservation principles**

Different authors have identified a variety of principles. A consensus was published by the College of Occupational Therapy specialist section in rheumatology [19].

### **9.1. Joint protection**

- Respect pain: use this as a signal to change activities, distribute load over several joints.
- Reduce the force and effort required to perform activities by altering working methods.
- Using assistive devices and reducing the weight of objects.
- Use each joint in its most stable anatomic or functional plane.
- Avoid positions of deformity and forces in their direction.
- Use the strongest, largest joint available for the job.
- Avoid staying in one position for too long.

- Avoid gripping too tightly.
- Avoid adopting poor body positioning, posture, and using poor moving and handling techniques.
- Maintain muscle strength and range of movement [19].

## 9.2. Energy conservation

- Pace activities by balancing rest and activity, alternating heavy and light tasks, and performing activities more slowly.
- Use work simplification methods, for example, planning ahead, prioritizing, using labor-saving gadgets, and delegating to others when necessary.
- Avoid activities that cannot be stopped immediately if it proves to be beyond the person's ability.
- Modify the environment to suit ergonomic/joint protection practices [19].

## 10. Assistive technology and reorganization of living areas

When the disease prognosis of the individual is taken carefully, it is necessary to support the individual's maximum independence in life and to be able to cope with pain and fatigue in a place where the occupational therapists should primarily emphasize (**Table 3**) [20]. At this point, it is important that the living space of the individual is arranged and a suitable auxiliary device is proposed. The term "assistive technology" has replaced the expression disability equipment to describe products and services used by people of all ages to gain increased autonomy and maximize their occupational performance [19]. Evaluation is made within the scope of the concept when a suitable auxiliary device is suggested. This assessment is effectively an interaction with each other similar to successive gear wheels. Moreover, it is impossible for this interaction process to be isolated from the living environment of the individual (**Figure 2**).

The arrangements to be made in the living environment of the individual are made by changes in the physical environment and adaptations of assistive devices. This intervention is called inclusive design. In other words, "inclusive design" is the term used to describe a design process whereby designers "address the needs of the widest possible audience by including the needs of groups who are currently excluded from or marginalised by mainstream design practices" [112]. The purpose here is to provide a maximum benefit by intervening in a holistic way to individuals who are not in normal life events. Given the external forces that individuals are exposed to in the home and work environment, interventions made with a holistic view are important at the point of raising quality of life and ensuring pain control. The following are a combination of living room regulations and ancillary technology recommendations applied to various problems (**Tables 4–6**) [19].

Person	Technology	Social environment
Age/gender	Quality of performance	Physical environment in which it will be used E.g., home, workplace
Functional abilities		Cultural issues
Functional needs	Comfort	Attitudinal factors
Lifestyle		
Occupational adaptation	Appearance	Political environment
Personal preferences	Cost	
Feelings about self	Availability	Economic environment
Feelings about devices	Support requirements	

**Table 3.** An example of relationship between person, social environment, and technology.



**Figure 2.** The dynamic relationship between person, social environment, and technology.

Activity limitation	Mainstream design	Assistive technology	Home adaptation
Bathing	Modern wet room area	Portable bath lift	Level access shower with shower seat
Toileting	Wall-mounted toilet installed at the appropriate height	Raised toilet seat	Toilet plinth fitted between floor and toilet to raise height
Personal hygiene	Bidet	Bottom wiper	Electric bidet with wash/dry facility
Personal care	Powered toothbrush/shaver	Tubing to enlarge grip, easy grip handles	

**Table 4.** Personal care and hygiene.

Activity limitation	Mainstream design	Assistive technology	Home adaptation
Standing tolerance	Energy-saving kitchen layout	Perching stool	It would be unusual for a major kitchen adaptation to be undertaken for a person with a rheumatic condition
Carrying	Continuous worktops and limited distances between key work areas	Wide range of small devices, for example, trolley, cooking baskets	
Lifting	Consideration of weight of household appliances, for example, irons, and products, for example, saucepans		
Reduced reach	Organization of cupboards, pull out/Down shelving in units	Wide range of small devices, for example, helping hand, cleaning products with extended handles	
Bending	Plug sockets at relevant height		
Grip	Attention to controls on appliances	Large handled plugs	

**Table 5.** Food preparation and household tasks.

Activity limitation	Mainstream design	Assistive technology	Home adaptation
Mobility	Intercom	Small mobility aids manual wheelchair, powered scooter or wheelchair	Intercom
Steps and stairs	Additional rails	Stairlift, ramped access	
Communication	<ul style="list-style-type: none"> <li>• Large button phones</li> <li>• Use of Skype with headset</li> <li>• Ergonomic computer keyboard</li> <li>• Voice-activated computer software</li> </ul>	Non-slip grips for pens	

**Table 6.** Mobility and other activities.

## 11. Splinting techniques for rheumatoid arthritis

There are various important wrist and hand structures that may be affected by the inflammatory and degenerative process experienced by people with rheumatic conditions. Therefore, hand splints are a recommended conservative option for occupational therapists to prescribe to support vulnerable structures, reduce pain, and optimize function, and they have been used for many years [113]. Evidence continues to emerge regarding the clinical effectiveness of splints with the most robust evidence reporting their ability to reduce levels of the wrist and hand pain when worn [62].

The splints given to individuals must be made appropriately to the client. Because splinting is aimed at improving activity performance by reducing the pain and fatigue of individuals. Splints that are made of standard uniform type may damage the client [114].

There are two types of splint therapy according to the prognosis of the disease. The aim of correcting the deformities that occur when the primary disease is chronic is the deformity orthoses given to provide pain control and to increase the fatigue tolerance of the patient. These are ulnar deviation orthoses, swan necks, and ring orthoses for thumb hypertension. The second group of splints is the resting orthoses that are given to prevent pain and inflammation in the acute phase of the disease and to help the individual to rest while protecting the function. These are volar wrist orthosis, static wrist orthosis, metacarpophalangeal joint stabilization orthosis, static volar and dorsal wrist orthoses, and air pressure splint. The splints given to treat deformity should be used intensively throughout the day. Resting orthoses should be worn during the rest of the day and after exercises during the day, provided that they are removed at night [114–116].

## 12. Vocational rehabilitation

Rate of erythrocyte sedimentation, which is also known as patient activity, and sensitive joints causes structural harms such as joint destruction and deformation. Structural harms emerged in RA result in limitation of physical functions such as force, endurance, mobility, and manual skills. Work disability may develop at early stages for this reason [117, 118].

Work disability in individuals with RA depend on factors related to both work and RA; physical effort demands at work being too high and keeping work pace under control are factors related to work. On the other hand, factors related to the disease may differ among individuals. Unlike factors related to the disease, factors such as functional capacity, high age, educational status, and stress management skill are also related with work disability [117].

One of the goals of rehabilitation in rheumatoid arthritis is ensuring return to work. It may require job modification, vocational training, and vocational rehabilitation in order to achieve this goal. Vocational rehabilitation helps an individual with a health problem for continuing to work, returning to work, or getting a new job. Occupational therapists play an important role in individuals' continuation to work and getting a new job by means of increasing the capacity of the individual with RA. Moreover, occupational therapists aim to maximize the level of individual-environment occupation harmony and to develop work performance [26].

In vocational rehabilitation, the occupational therapy process is based on interview, observation, and individual evaluations made through standardized procedures. A comprehensive starter interview that gathers detailed information regarding the individual's medical record, performance level of daily life activities and work activities, and work background is held. Furthermore, participation of the individual to the daily life activities, leisure activities, and productive activities is evaluated. Positive factors supporting individual's participation and negativities preventing him/her from participating are determined. This process is important in order to rely on the strengths of the individual during the intervention. Moreover, during the evaluation, person's roles, abilities, interests, and needs regarding work performance and work task demands are determined. In occupational therapy evaluations, functional capacity analysis to determine the suitability of the individual and the work that he/she desires to do;



work analysis to detect the task demands expected from the individual in the corresponding work; and work place analysis including ergonomic assessment and assessment of the equipment, work routine, and accessibility in order to determine the factors related to the work place, are considerably important [26, 119, 120].

After the interviews and evaluations, short- and long-term intervention plans are formed. These formed plans should be suitable to the roles, habits, functional capacity, life choices, and the living environment of the individual. The interventions should be aimed at bringing educational performance skill and developing daily life skills, preparation to work skills and work performance. In vocational rehabilitation, education about occupational therapy, RA, and medication involves education on employee rights, employer rights, ergonomic recommendations, prevention of injury in order to reduce disability regarding injuries, stress management, sleep posture and hygiene, choice of shoe, and splinting. Moreover, occupational activity training in order to develop producer behaviors, employee roles, and skills; work modifications and adaptations in order to develop the work performance, and personalized programs on transition to work are also quite significant in occupational therapy interventions [26, 120].

## Author details

Zeynep Bahadır Ağce<sup>1\*</sup>, Esma Özkan<sup>2</sup> and Barkın Köse<sup>2</sup>

\*Address all correspondence to: fztzeynepbahadir@gmail.com

1 Faculty of Health Sciences, Occupational Therapy Department, Üsküdar University, Turkey

2 Faculty of Health Sciences, Occupational Therapy Department, Hacettepe University, Turkey

## References

- [1] Loyola-Sanchez A, Richardson J, Pelaez-Ballestas I, Alvarez-Nemegyei J, Lavis JN, Wilson MG, et al. The impact of arthritis on the physical function of a rural Maya-Yucateco community and factors associated with its prevalence: A cross sectional, community-based study. *Clinical Rheumatology*. 2015;1-10
- [2] Hootman JM, Helmick CG, Barbour KE, Theis KA, Boring MA. Updated projected prevalence of self-reported doctor-diagnosed arthritis and arthritis-attributable activity limitation among US adults, 2015-2040. *Arthritis & Rheumatology*. 2016
- [3] Mann WC, Hurren D, Tomita M. Assistive devices used by home-based elderly persons with arthritis. *American Journal of Occupational Therapy*. 1995;49(8):810-820
- [4] Griffith LE, Raina P, Levasseur M, Sohel N, Payette H, Tuokko H, et al. Functional disability and social participation restriction associated with chronic conditions in middle-aged and older adults. *Journal of Epidemiology and Community Health*. 2016;71. DOI: 10.1136/jech-2016-207982

- [5] Theis KA, Furner SE. Shut-in? Impact of chronic conditions on community participation restriction among older adults. *Journal of Aging Research*. 2011;**2011**
- [6] Deshaines L. Arthritis. In: Khron HMPWS, editors. *Pedretti's Occupational Therapy Practice Skills for Physical Dysfunction*. 6th ed. California: Mosby/Elsevier; 2005. pp. 950-982
- [7] Cavalli G, Koenders M, Kalabokis V, Kim J, Tan AC, Garlanda C, et al. Treating experimental arthritis with the innate immune inhibitor interleukin-37 reduces joint and systemic inflammation. *Rheumatology*. 2016;**55**(12):2220-2229.
- [8] Sandles L. *Occupational Therapy in Rheumatology: An Holistic Approach*. Campling J, editor. London: Springer; 2013. 1-10 p
- [9] Dziedzic K, Hammond A. *Rheumatology: Evidence-Based Practice for Physiotherapists and Occupational Therapists*. Elsevier Health Sciences; 2011
- [10] Organization WH. Chronic Diseases and Health Promotion 2016 [Available from: <http://www.who.int/chp/topics/rheumatic/en/>]
- [11] Steultjens EE, Dekker JJ, Bouter LM, Schaardenburg DD, Kuyk MAM, Van den Ende EC. Occupational therapy for rheumatoid arthritis. *The Cochrane Library*. 2004
- [12] Okely JA, Cooper C, Gale CR. Wellbeing and Arthritis Incidence: The Survey of Health, Ageing and Retirement in Europe. *Annals of Behavioral Medicine*. 2016;**50**(3):419-426
- [13] Roy N, Tanner K, Merrill RM, Wright C, Miller KL, Kendall KA. Descriptive epidemiology of voice disorders in rheumatoid arthritis: Prevalence, risk factors, and quality of life burden. *Journal of Voice*. 2016;**30**(1):74-87
- [14] Di WT, Vergara F, Bertiller E, de los Angeles Gallardo M, Gandino I, Scolnik M, et al. Incidence and prevalence of rheumatoid arthritis in a health management organization in Argentina: A 15-year study. *The Journal of Rheumatology*. 2016;**44**. DOI: 10.3899/jrheum.151262
- [15] Rudan I, Sidhu S, Papana A, Meng SJ, Xin-Wei Y, Wang W, et al. Prevalence of rheumatoid arthritis in low-and middle-income countries: A systematic review and analysis. *Journal of Global Health*. 2015;**5**
- [16] Kraus VB. Editorial [Hot topic: Waiting for action on the osteoarthritis front (Guest Editors: Virginia Byers Kraus and Thomas Aigner)]. *Current Drug Targets*. 2010;**11**(5):518-20
- [17] Dubouloz C-J, Laporte D, Hall M, Ashe B, Smith CD. Transformation of meaning perspectives in clients with rheumatoid arthritis. *American Journal of Occupational Therapy*. 2004;**58**(4):398-407
- [18] Poole JL, Chiappisi H, Cordova JS, Sibbitt W. Quality of life in American Indian and White women with and without rheumatoid arthritis. *American Journal of Occupational Therapy*. 2007;**61**(3):280-289
- [19] Goodacre L, McArthur M. *Rheumatology Practice in Occupational Therapy: Promoting Lifestyle Management*. John Wiley & Sons; 2013

- [20] Poole JL, Cordova JS, Sibbitt WL, Skipper B. Quality of life in American Indian women with arthritis or diabetes. *American Journal of Occupational Therapy*. 2010;**64**(3):496-505
- [21] Matcham F, Rayner L, Steer S, Hotopf M. The prevalence of depression in rheumatoid arthritis: a systematic review and meta-analysis. *Rheumatology*. 2013;**52**(12):2136-2148
- [22] Klaassen K, Nyklíček I, Traa S, de Nijs R. Distressed personality is associated with lower psychological well-being and life satisfaction, but not disability or disease activity in rheumatoid arthritis patients. *Clinical Rheumatology*. 2012;**31**(4):661-667
- [23] de Almeida PHTQ, Pontes TB, Matheus JPC, Muniz LF, da Mota LMH. Occupational therapy in rheumatoid arthritis: What rheumatologists need to know?. *Revista Brasileira de Reumatologia (English Edition)*. 2015;**55**(3):272-280
- [24] Law M, Cooper B, Strong S, Stewart D, Rigby P, Letts L. The person-environment-occupation model: A transactive approach to occupational performance. *Canadian Journal of Occupational Therapy*. 1996;**63**(1):9-23
- [25] WHO. Chronic Diseases and Health Promotion World Health Organization: WHO: World Health Organization: WHO; 2016 [Available from: <http://www.who.int/chp/topics/rheumatic/en/>]
- [26] Macedo AM, Oakley SP, Panayi GS, Kirkham BW. Functional and work outcomes improve in patients with rheumatoid arthritis who receive targeted, comprehensive occupational therapy. *Arthritis Care & Research*. 2009;**61**(11):1522-1530
- [27] Smolen JS, Aletaha D, McInnes IB. Rheumatoid arthritis. *The Lancet*. 2016;**388**
- [28] Ağılı M, Ekinçi Ş, Aydın FN, Şener İ, Parlak A, Yaman H. Anti-siklik Sitrülinlenmiş Peptid/Protein (Anti-CCP) ve Romatoid Artrit Tanısındaki Değeri. *TAF Preventive Medicine Bulletin*. 2014;**13**(1)
- [29] Jiang X, Sandberg ME, Saevarsdottir S, Klareskog L, Alfredsson L, Bengtsson C. Higher education is associated with a better rheumatoid arthritis outcome concerning for pain and function but not disease activity: Results from the EIRA cohort and Swedish rheumatology register. *Arthritis Research & Therapy*. 2015;**17**(1):1
- [30] Rossini M, Rossi E, Bernardi D, Viapiana O, Gatti D, Idolazzi L, et al. Prevalence and incidence of rheumatoid arthritis in Italy. *Rheumatology International*. 2014;**34**(5):659-664
- [31] Eriksson JK, Neovius M, Ernestam S, Lindblad S, Simard JF, Askling J. Incidence of rheumatoid arthritis in Sweden: A nationwide population-based assessment of incidence, its determinants, and treatment penetration. *Arthritis Care & Research*. 2013;**65**(6):870-878
- [32] Ma VY, Chan L, Carruthers KJ. Incidence, prevalence, costs, and impact on disability of common conditions requiring rehabilitation in the United States: Stroke, spinal cord injury, traumatic brain injury, multiple sclerosis, osteoarthritis, rheumatoid arthritis, limb loss, and back pain. *Archives of Physical Medicine and Rehabilitation*. 2014;**95**(5):986-995. e1

- [33] Zlatkovic-Svenda M, Saraux A, Tuncer T, Dadoniene J, Miltiniene D, Gilgil E, et al. FRI0558 rheumatoid arthritis prevalence in Europe, a eular-endorsed survey. *Annals of the Rheumatic Diseases*. 2016;**75**(Suppl 2):643
- [34] Fina-Aviles F, Medina-Peralta M, Mendez-Boo L, Hermosilla E, Elorza J, Garcia-Gil M, et al. The descriptive epidemiology of rheumatoid arthritis in Catalonia: a retrospective study using routinely collected data. *Clinical Rheumatology*. 2016;**35**(3):751-757
- [35] Choy E. Understanding the dynamics: Pathways involved in the pathogenesis of rheumatoid arthritis. *Rheumatology*. 2012;**51**(suppl 5):v3-v11
- [36] Smolen JS, Emery P, Fleischmann R, van Vollenhoven RF, Pavelka K, Durez P, et al. Adjustment of therapy in rheumatoid arthritis on the basis of achievement of stable low disease activity with adalimumab plus methotrexate or methotrexate alone: The randomised controlled OPTIMA trial. *The Lancet*. 2014;**383**(9914):321-332
- [37] Kurowska W, Kuca-Warnawin E. New evidence for a role of bone marrow in the pathogenesis of rheumatoid arthritis. *Reumatologia*. 2016;**54**(5):215-216
- [38] Seegobin SD, Ma MH, Dahanayake C, Cope AP, Scott DL, Lewis CM, et al. ACPA-positive and ACPA-negative rheumatoid arthritis differ in their requirements for combination DMARDs and corticosteroids: Secondary analysis of a randomized controlled trial. *Arthritis Research & Therapy*. 2014;**16**(1):1
- [39] Furst DE, Emery P. Rheumatoid arthritis pathophysiology: Update on emerging cytokine and cytokine-associated cell targets. *Rheumatology*. 2014;**53**. DOI: 10.1093/rheumatology/ket414
- [40] Padyukov L, Seielstad M, Ong RT, Ding B, Rönnelid J, Seddighzadeh M, et al. A genome-wide association study suggests contrasting associations in ACPA-positive versus ACPA-negative rheumatoid arthritis. *Annals of the Rheumatic Diseases*. 2010;annrhumdis126821
- [41] Lundström E, Källberg H, Alfredsson L, Klareskog L, Padyukov L. Gene–environment interaction between the DRB1 shared epitope and smoking in the risk of anti–citrullinated protein antibody–positive rheumatoid arthritis: All alleles are important. *Arthritis & Rheumatism*. 2009;**60**(6):1597-1603
- [42] Aletaha D, Neogi T, Silman AJ, Funovits J, Felson DT, Bingham CO, et al. 2010 rheumatoid arthritis classification criteria: An American College of Rheumatology/European League Against Rheumatism collaborative initiative. *Arthritis & Rheumatism*. 2010;**62**(9):2569-2581
- [43] Kim S, Hwang J, Xuan J, Jung YH, Cha H-S, Kim KH. Global metabolite profiling of synovial fluid for the specific diagnosis of rheumatoid arthritis from other inflammatory arthritis. *PLoS One*. 2014;**9**(6):e97501
- [44] Aggarwal R, Liao K, Nair R, Ringold S, Costenbänder KH. Anti–citrullinated peptide antibody assays and their role in the diagnosis of rheumatoid arthritis. *Arthritis Care & Research*. 2009;**61**(11):1472-1483

- [45] van der Helm-vanMil AH, le Cessie S, van Dongen H, Breedveld FC, Toes RE, Huizinga TW. A prediction rule for disease outcome in patients with Recent-onset undifferentiated arthritis: How to guide individual treatment decisions. *Arthritis & Rheumatism*. 2007;**56**(2):433-440
- [46] Dür M, Coenen M, Stoffer MA, Fialka-Moser V, Kautzky-Willer A, Kjekken I, et al. Do patient-reported outcome measures cover personal factors important to people with rheumatoid arthritis? A mixed methods design using the International Classification of Functioning, Disability and Health as frame of reference. *Health and Quality of Life Outcomes*. 2015;**13**(1):1
- [47] Manning VL, Hurley MV, Scott DL, Coker B, Choy E, Bearne LM. Education, self-management, and upper extremity exercise training in people with rheumatoid arthritis: A randomized controlled trial. *Arthritis Care & Research*. 2014;**66**(2):217-227
- [48] Dellhag B, Bjelle A. A five-year followup of hand function and activities of daily living in rheumatoid arthritis patients. *Arthritis Care and Research*. 1999;**12**:33-41
- [49] Keefe FJ, Affleck G, Lefebvre J, Underwood L, Caldwell DS, Drew J, et al. Living with rheumatoid arthritis: The role of daily spirituality and daily religious and spiritual coping. *The Journal of Pain*. 2001;**2**(2):101-110
- [50] Hammond A, Tyson S, Prior Y, Hawkins R, Tennant A, Nordenskiöld U, et al. Linguistic validation and cultural adaptation of an English version of the Evaluation of Daily Activity Questionnaire in rheumatoid arthritis. *Health and Quality of Life Outcomes*. 2014;**12**(1):1
- [51] Suurmeijer TP, Waltz M, Moum T, Guillemin F, Van Sonderen F, Briançon S, et al. Quality of life profiles in the first years of rheumatoid arthritis: results from the EURIDISS longitudinal study. *Arthritis Care & Research*. 2001;**45**(2):111-121
- [52] Lapsley H, March L, Tribe K, Cross M, Courtenay B, Brooks P. Living with rheumatoid arthritis: Expenditures, health status, and social impact on patients. *Annals of the Rheumatic Diseases*. 2002;**61**(9):818-821
- [53] Shaul MP. From early twinges to mastery: The process of adjustment in living with rheumatoid arthritis. *Arthritis & Rheumatism*. 1995;**8**(4):290-297
- [54] Ziarko M, Mojs E, Kaczmarek Ł, Warchol-Biedermann K, Malak R, Lisinski P, et al. Do urban and rural residents living in Poland differ in their ways of coping with chronic diseases? *European Review for Medical and Pharmacological Sciences*. 2015;**19**(22):4227-4234
- [55] Walter MJ, van't Spijker A, Pasma A, Hazes JM, Luime JJ. Focus group interviews reveal reasons for differences in the perception of disease activity in rheumatoid arthritis. *Quality of Life Research*. 2016;**1**-8
- [56] Janssens X, Decuman S, De Keyser F, group BRADAs. Assessment of activity limitations with the health assessment questionnaire predicts the need for support measures in patients with rheumatoid arthritis: A multicenter observational study. *PloS One*. 2014;**9**(9):e106749



- [57] Nordgren B, Fridén C, Jansson E, Österlund T, Grooten WJ, Opava CH, et al. Criterion validation of two submaximal aerobic fitness tests, the self-monitoring Fox-walk test and the Åstrand cycle test in people with rheumatoid arthritis. *BMC Musculoskeletal Disorders*. 2014;**15**(1):1
- [58] Luqmani R, Hennell S, Estrach C, Birrell F, Bosworth A, Davenport G, et al. British Society for Rheumatology and British Health Professionals in Rheumatology guideline for the management of rheumatoid arthritis (the first two years). *Rheumatology*. 2006;**45**(9):1167-1169
- [59] Kirchberger I, Stamm T, Cieza A, Stucki G. Does the comprehensive ICF core set for rheumatoid arthritis capture occupational therapy practice? A content-validity study. *Canadian Journal of Occupational Therapy*. 2007;**74**(5 suppl):267-280
- [60] Strand V, Wright GC, Bergman MJ, Tambiah J, Taylor PC. Patient expectations and perceptions of goal-setting strategies for disease management in rheumatoid arthritis. *The Journal of rheumatology*. 2015;**42**(11):2046-2054
- [61] Stamm TA, Cieza A, Machold KP, Smolen JS, Stucki G. Content comparison of occupation-based instruments in adult rheumatology and musculoskeletal rehabilitation based on the International Classification of Functioning, Disability and Health. *Arthritis Care & Research*. 2004;**51**(6):917-924
- [62] Steultjens EM, Dekker J, Bouter LM, Van Schaardenburg D, van Kuyk MAH, Van Den Ende CH. Occupational therapy for rheumatoid arthritis: a systematic review. *Arthritis Care & Research*. 2002;**47**(6):672-685
- [63] Dubouloz CJ, Vallerand J, Laporte D, Ashe B, Hall M. Occupational performance modification and personal change among clients receiving rehabilitation services for rheumatoid arthritis. *Australian Occupational Therapy Journal*. 2008;**55**(1):30-38
- [64] Phipps S, Richardson P. Occupational therapy outcomes for clients with traumatic brain injury and stroke using the Canadian Occupational Performance Measure. *American Journal of Occupational Therapy*. 2007;**61**(3):328-334
- [65] Carswell A, McColl MA, Baptiste S, Law M, Polatajko H, Pollock N. The Canadian occupational performance measure: A research and clinical literature review. *Canadian Journal of Occupational Therapy*. 2004;**71**(4):210-222
- [66] Ripat J, Etcheverry E, Cooper J, Tate R. A comparison of the Canadian occupational performance measure and the health assessment questionnaire. *Canadian Journal of Occupational Therapy*. 2001;**68**(4):247-253
- [67] Tack BB. Fatigue in rheumatoid arthritis: Conditions, strategies, and consequences. *Arthritis & Rheumatism*. 1990;**3**(2):65-70
- [68] Nikolaus S, Bode C, Taal E, de Laar MA. Fatigue and factors related to fatigue in rheumatoid arthritis: A systematic review. *Arthritis Care & Research*. 2013;**65**(7):1128-1146
- [69] Cramp F, Hewlett S, Almeida C, Kirwan JR, Choy EH, Chalder T, et al. Non-pharmacological interventions for fatigue in rheumatoid arthritis. *The Cochrane Library*. 2013

- [70] Matcham F, Ali S, Hotopf M, Chalder T. 087. Psychological correlates and predictors of fatigue in rheumatoid arthritis: A systematic review. *Rheumatology*. 2015;**54**(suppl 1):i84-i.
- [71] Grassi W, De Angelis R, Lamanna G, Cervini C. The clinical features of rheumatoid arthritis. *European Journal of Radiology*. 1998;**27**:S18-S24
- [72] Shankar V, Sharma P, Mittal R, Mittal S, Kumar U, Gamanagatti S. Effectiveness of arthroscopic elbow synovectomy in rheumatoid arthritis patients: Long-term follow-up of clinical and functional outcomes. *Journal of Clinical Orthopaedics and Trauma*. 2016;**7**
- [73] Häkkinen A, Sokka T, Kotaniemi A, Hannonen P. A randomized two-year study of the effects of dynamic strength training on muscle strength, disease activity, functional capacity, and bone mineral density in early rheumatoid arthritis. *Arthritis & Rheumatism*. 2001;**44**(3):515-522
- [74] Steinbrocker O, Traeger CH, Batterman RC. Therapeutic criteria in rheumatoid arthritis. *Journal of the American Medical Association*. 1949;**140**(8):659-662
- [75] Clarkson HM. *Musculoskeletal Assessment: Joint Range of Motion and Manual Muscle Strength*. Lippincott Williams & Wilkins; 2000
- [76] Hwang YS, Moon KP, Kim KT, Kim JW, Park WS. Total knee arthroplasty for severe flexion contracture in rheumatoid arthritis knees. *Knee Surgery & Related Research*. 2016;**28**(4):325
- [77] Fraser A, Vallow J, Preston A, Cooper R. Predicting 'normal' grip strength for rheumatoid arthritis patients. *Rheumatology*. 1999;**38**(6):521-528
- [78] Ekelman BA, Hooker L, Davis A, Klan J, Newburn D, Detwiler K, et al. Occupational therapy interventions for adults with rheumatoid arthritis: An appraisal of the evidence. *Occupational therapy in health care*. 2014;**28**(4):347-361
- [79] Rapolienė J, Kriščiūnas A. The effectiveness of occupational therapy in restoring the functional state of hands in rheumatoid arthritis patients. *Medicina*. 2006;**42**(10):823-828
- [80] Hammond A, Young A, Kidao R. A randomised controlled trial of occupational therapy for people with early rheumatoid arthritis. *Annals of the Rheumatic Diseases*. 2004;**63**(1):23-30
- [81] Hammond A. The Elizabeth Casson Memorial Lecture 2014: Changing ways; changing times. *British Journal of Occupational Therapy*. 2014;**77**(8):392-399
- [82] Ndosi M, Johnson D, Young T, Hardware B, Hill J, Hale C, et al. Effects of needs-based patient education on self-efficacy and health outcomes in people with rheumatoid arthritis: A multicentre, single blind, randomised controlled trial. *Annals of the Rheumatic Diseases*. 2015;**75**:10.1136/annrheumdis-2014-207171
- [83] Hill J, Bird H, Johnson S. Effect of patient education on adherence to drug treatment for rheumatoid arthritis: A randomised controlled trial. *Annals of the Rheumatic Diseases*. 2001;**60**(9):869-875

- [84] Hirano PC, Laurent DD, Lorig K. Arthritis patient education studies, 1987-1991: A review of the literature. *Patient Education and Counseling*. 1994;**24**(1):9-54
- [85] Riemsma RP, Taal E, Kirwan JR, Rasker JJ. Systematic review of rheumatoid arthritis patient education. *Arthritis Care & Research*. 2004;**51**(6):1045-1059
- [86] Mullen PD, Laville EA, Biddle AK, Lorig K. Efficacy of psychoeducational interventions on pain, depression, and disability in people with arthritis: A meta-analysis. *The Journal of Rheumatology Supplement*. 1987;**14**:33-39
- [87] Iversen M. *Arthritis Patient Education and Team Approaches to Management*. Rheumatology Philadelphia: Elsevier. 2011:427-432
- [88] Harrison JA, Mullen PD, Green LW. A meta-analysis of studies of the health belief model with adults. *Health Education Research*. 1992;**7**(1):107-116
- [89] Glanz K, Rimer BK, Viswanath K. *Health behavior and health education: Theory, research, and practice*. John Wiley & Sons; 2008
- [90] Carpenter CJ. A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Communication*. 2010;**25**(8):661-669
- [91] McAlister AL, Perry CL, Parcel GS. How individuals, environments, and health behaviors interact. *Health Behavior*. 2008;**169**
- [92] Bandura A. Health promotion from the perspective of social cognitive theory. *Psychology and Health*. 1998;**13**(4):623-649
- [93] Bandura A. Health promotion by social cognitive means. *Health Education & Behavior*. 2004;**31**(2):143-164
- [94] Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the health belief model. *Health Education & Behavior*. 1988;**15**(2):175-183
- [95] Bandura A, Walters RH. *Social Learning Theory*. 1977
- [96] Prochaska J, Marcus B, Dishman R. *Advances in Exercise Adherence*. 1994
- [97] Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *American Journal of Health Promotion*. 1997;**12**(1):38-48
- [98] Prochaska JO. Decision making in the transtheoretical model of behavior change. *Medical Decision Making*. 2008;**28**(6):845-849
- [99] Ackerman IN, Ngian G-S, Van Doornum S, Briggs AM. A systematic review of interventions to improve knowledge and self-management skills concerning contraception, pregnancy and breastfeeding in people with rheumatoid arthritis. *Clinical Rheumatology*. 2016;**35**(1):33-41
- [100] Warsi A, Wang PS, LaValley MP, Avorn J, Solomon DH. Self-management education programs in chronic disease: A systematic review and methodological critique of the literature. *Archives of Internal Medicine*. 2004;**164**(15):1641-1649

- [101] Iversen MD, Hammond A, Betteridge N. Self-management of rheumatic diseases: State of the art and future perspectives. *Annals of the Rheumatic Diseases*. 2010;**69**:annrheumdis129270
- [102] Hammond A, Badcock L. Improving education about arthritis. *Rheumatology*. 2002;**41**:87
- [103] Hammond A, Bryan J, Hardy A. Effects of a modular behavioural arthritis education programme: A pragmatic parallel-group randomized controlled trial. *Rheumatology*. 2008;**47**(11):1712-1718
- [104] Schwarze M, Kirchhof R, Schuler M, Musekamp G, Nolte S, Jordan J, et al. Ein blick down under. *Zeitschrift für Rheumatologie*. 2008;**67**(3):189-198
- [105] Riemsma RP, Kirwan JR, Taal E, Rasker J. Patient education for adults with rheumatoid arthritis. *The Cochrane Database of Systematic Reviews*. 2003;**2**
- [106] Lorig K, Holman H. Arthritis self-management studies: A twelve-year review. *Health Education Quarterly*. 1993;**20**(1):17-28
- [107] Lorig K, González VM, Laurent DD, Morgan L, Laris B. Arthritis self-management program variations: Three studies. *Arthritis & Rheumatology*. 1998;**11**(6):448-454
- [108] Lorig K, Ritter PL, Plant K. A disease-specific self-help program compared with a generalized chronic disease self-help program for arthritis patients. *Arthritis Care & Research*. 2005;**53**(6):950-957
- [109] Brady TJ, Kruger J, Helmick CG, Callahan LF, Boudaugh ML. Intervention programs for arthritis and other rheumatic diseases. *Health Education & Behavior*. 2003;**30**(1):44-63
- [110] Bartlett SJ. Clinical care in the rheumatic diseases: Association of Rheumatology Health Professionals; 2006
- [111] Tonga E, Uysal SA, Karayazgan S, Hayran M, Düger T. Development and reliability of a Turkish version of the short form-joint protection behavior assessment (JPBA-S). *Journal of Hand Therapy*. 2016;**29**(3):275-280
- [112] Yang C-W, Yen Z-S, McGowan JE, Chen HC, Chiang W-C, Mancini ME, et al. A systematic review of retention of adult advanced life support knowledge and skills in health-care providers. *Resuscitation*. 2012;**83**(9):1055-1060
- [113] Williams A, Lee P, Kerr A. Scottish intercollegiate guidelines network (SIGN) guidelines on tonsillectomy: A three cycle audit of clinical record keeping and adherence to national guidelines. *The Journal of Laryngology & Otology*. 2002;**116**(06):453-454
- [114] Kaya T. İnflamatuvar Romatizmal Hastalıkların Ortezle Tedavisi. *Turkish Journal of Rheumatology*. 2009;**24**(1)
- [115] Günendi Z, Göğüş F, Keleş Z, Durukan T. Romatoid Artritli Hastaların El-El Bileği İstirahat Splintli Kullanımına Uyumu. *Türkiye Klinikleri Journal of Medical Sciences*. 2010;**30**(1):213-217

- [116] Taşkiran ÖÖ. Romatoid El. *Journal of Physical Medicine & Rehabilitation Sciences/ Fiziksel Tıp ve Rehabilitasyon Bilimleri Dergisi*. 2011;**14**
- [117] de Buck PD, Schoones JW, Allaire SH, Vlieland TPV, editors. *Vocational Rehabilitation in Patients with Chronic Rheumatic Diseases: A Systematic Literature Review*. *Seminars in Arthritis and Rheumatism*. Elsevier; 2002
- [118] De Croon E, Sluiter J, Nijssen T, Dijkmans B, Lankhorst G, Frings-Dresen M. Predictive factors of work disability in rheumatoid arthritis: A systematic literature review. *Annals of the Rheumatic Diseases*. 2004;**63**(11):1362-1367
- [119] Désiron HA, de Rijk A, Van Hoof E, Donceel P. Occupational therapy and return to work: A systematic literature review. *BMC Public Health*. 2011;**11**(1):615
- [120] Wenborn J, Challis D, Pool J, Burgess J, Elliott N, Orrell M. Assessing the validity and reliability of the Pool Activity Level (PAL) checklist for use with older people with dementia. *Aging and Mental Health*. 2008;**12**(2):202-211



