

# Nutrition in Rheumatoid Arthritis

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**Abstract**— Rheumatoid arthritis (RA) is a systemic inflammatory autoimmune disease of unknown etiology, resulting in the progressive destruction of cartilage and bone resulting in structural destruction and functional impotence. **Purpose:** The purpose of this work is to highlight the contribution of diet to rheumatoid arthritis. **Methodology:** The material in the study was articles on the subject that were found mainly in electronic databases such as Medline, PubMed, Google Scholar, and the Hellenic Academic Libraries Association (HEAL-Link). **Results:** Nutrition can play an important role in preventing the onset of the disease as it is directly related to improving bone mass and maintaining bone and joints. Of particular importance are the contribution of various nutrients, vitamins and antioxidants to reducing the risk of fractures, inflammation and pain and energy consumption. **Conclusions:** Proper information of patients on the disease and the available therapeutic methods can make a significant contribution to their activation and activation for participation in various therapies that will contribute significantly to the control of the disease with as few consequences as possible.

**Index Terms**— chronic diseases, rheumatoid arthritis, treatment of disease and nutrition

## I. INTRODUCTION

Rheumatoid arthritis (RA) is a systemic inflammatory autoimmune disease of unknown etiology, resulting in the progressive destruction of cartilage and bone, which results in structural destruction and functional disability. [1] It affects women more than men in a proportion of 3-4:1, at any age, but mostly affects the middle-aged. [2] However it can occur in people of any age, even in children. Worldwide there is a distribution of RA with an average annual incidence of 1/1000 individuals in the population. [3]

Various genetic, hormonal, immunological and environmental factors have been implicated as factors in the evolution of RA, leading to the heterogeneity of the incidence and severity of the disease. Laboratory findings include chronic type anemia and increased inflammation markers in active disease: autoantibodies against the Fc part of IgG – the so called rheumatoid factor- and the citrulylated peptides incorporating the citrulline amino acid. [4] A balanced program of rest, exercise and healthy eating is an integral part of the patient's rheumatoid arthritis treatment, because it is a prerequisite for a person's health, improves his activities while also contributing to his well-being. [5, 6]

**Purpose:** The purpose of this study was to review the literature on the nutrition of patients with rheumatoid arthritis

and its contribution to the health and well-being of these patients.

**Methodology:** The study material consisted of articles on the subject that were found mainly in electronic databases such as Medline, Pubmed, Google Scholar and the Hellenic Academic Libraries Association (HEAL-Link), with the following keywords: chronic disease, rheumatoid arthritis, disease management and diet. The search included research articles mainly of the last decades, about RA disease, its patients and their diet. The exclusion criteria of the articles were languages other than Greek and English.

## II. RHEUMATOID ARTHRITIS MANIFESTATIONS

The disease usually affects the synovium of the joints and the sheath tendons as well as other organs such as the lungs, skin, heart, eyes and so on. Dominant symptoms of RA include pain, morning stiffness and swelling of the peripheral joints. Rarely, it can be systematically observed subcutaneous nodules, Sjogren's syndrome, lung involvement or vasculitis. [7]

The onset of rheumatoid arthritis may be gradual or acute. In the gradual onset of RA usually manifest general symptoms, such as anorexia, weight loss, weakness, mild fever, arthralgia, and eventually arthritis with all the phenomena of inflammation. The acute onset of the disease is characterized by sudden arthritis, ie inflammation in the joints, which sometimes may be accompanied by fever. Symptoms are usually symmetrical, ie the same joints are inflamed in the left and right sides of the body, while inflammation in the small joints seems to precede the large joints. [8]

The main symptom of rheumatoid arthritis is morning stiffness, which is prolonged and usually lasts more than 30 minutes. This phenomenon is related to inactivity during sleep. The presence and duration of inactivity is useful for monitoring the course of the disease and should be evaluated from the first visit and in every patient. [9]

Rheumatoid arthritis is also of particular importance for public health due to its high co-morbidity. The chronic inflammatory nature of the disease appears to affect many organs of the body with unclear mechanisms. Thus, these patients often suffer from cardiovascular disease, osteoporosis, infections, gastrointestinal ulcers and malignant lymphocyte proliferation. [10] Early recognition of the aforementioned also helps the better treatment of the symptoms of the disease and improves the dietary management and health of these patients. [11]

## III. NUTRITION IN RHEUMATOID ARTHRITIS

With regard to the dietary status of patients with diagnosed rheumatoid arthritis, it appears that they have reduced nutrient intake, reduced energy intakes of carbohydrates and high saturated fat consumption, which can easily put them at risk for cardiovascular diseases. Also, patients appear to have low

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values in biochemical markers assessing their nutritional status, such as albumin, folate and iron. Weight loss and muscle mass loss often accompanies rheumatoid arthritis. Increased energy consumption may be associated with elevated levels of cytokine IL-1 and TNF- $\alpha$ . [12]

As for the association between diet and rheumatoid arthritis, diet can play an important role in preventing the onset of the disease as it is directly related to bone mass improvement and bone and joints maintenance. Thus, the relationship between diet and rheumatoid arthritis has been the subject of many discussions, seeking foods with a beneficial effect on the progression of the disease. [13]

Of particular importance is the contribution of various nutrients, vitamins and antioxidants in reducing the risk of fractures, inflammation, pain and energy consumption. Due to their antioxidant properties as well as their anti-inflammatory action, they can contribute significantly to the prevention of cytokine and free radical production, the protection of bone loss and the regeneration of bone cells. Thus, adopting and maintaining a proper diet program contributes not only to the improvement of the disease but also to the maintenance of the patient at steady healthy levels. [14]

It has been observed that increased consumption of fruits and vegetables, as well as a significant intake of vitamins and other trace elements, is associated with a reduced risk of developing the disease. In people with rheumatoid arthritis, a balanced diet rich in n-3 fatty acids, iron and vitamin C (in case of anemia) is recommended, as well as adequate intake of calcium, zinc, B vitamins and other antioxidants. [15]

### A. Antioxidants

Antioxidants inhibit the oxidation and production of free radicals that are responsible for the inflammation and etiology of the disease. They also contribute significantly in boosting the body's defense. The main antioxidants are: vitamin-C, vitamin E,  $\beta$ -carotene, flavonoids and selenium. Vitamins C and E contribute to the removal of free radicals as well as to the body's antioxidant defense. Selenium contributes to the reduction of inflammation markers. Vitamin E is found in vegetable oils, olive oil, almonds and others. [16]

### B. Calcium and Vitamin D

Patients with rheumatoid arthritis belong to a high-risk group of osteoporosis either due to the pathophysiology of the disease or due to the use of corticosteroids, which are responsible for calcium absorption. Vitamin D is a key factor in regulating calcium metabolism and bone synthesis. Supplemental treatment of calcium and vitamin D has a positive effect on the bone density loss. However, high doses may lead sometimes to hypercalcemia, resulting in bone mass loss. [17]

### C. Iron

Low levels of iron have been observed in patients with rheumatoid arthritis, which can lead to anemia. Iron deficiency anemia can develop due to chronic inflammation, medication or poor dietary intake. Iron levels can be increased either by diet or by iron supplements. [18]

### D. Folic acid and vitamins B

Patients often have low folic acid levels and increased energy consumption. In most patients receiving medication, methotrexate is administered as the main drug, which is

considered to be an antagonist of folic acid. Therefore, folic acid supplements in combination with vitamins B6 and B12 often contribute to increase levels of folic acid, particularly in patients receiving methotrexate. [19]

### E. Zinc

Low levels of zinc have been observed in patients with rheumatoid arthritis due to corticosteroid or nonsteroidal anti-inflammatory drugs (NSAIDs). Zinc is considered a cellular enzyme catalyst. It also characterized by antioxidant properties. [16]

### F. N-3 Fatty Acids

There is particular interest in the role of omega-3 fatty acids in reducing inflammation and relieving pain. Their contribution to reducing NSAIDs is also important. Omega-3 and omega-6 fatty acids inhibit the function of T-lymphocytes. Their long-term uptake can significantly contribute to the reduction of disease activity and the production of cytokines IL-1, TNF- $\alpha$  and interferon IFN- $\gamma$ . It is recommended to consume fishes 1-2 times a week such as sea bream and salmon. Fish oil is administered supplementally with significant beneficial effects and relief. [20]

With regard to the foods to be consumed, it is noted that foods rich in  $\beta$ -carotene are fruits and vegetables such as tomatoes, carrots, spinach, cherries, apricots and apples. In addition, foods rich in flavonoids include apples, berries, onions, tea and wine, and selenium-rich foods are cereals, rice, black bread, fish meat and egg. Vitamin C-rich foods are citrus, kiwi, broccoli, potatoes, spinach and strawberries, and calcium-rich foods and vitamin D are dairy products, fish, liver and egg. Foods rich in iron are beans, spinach, lentils, liver, spinach and cereals, and folic acid rich foods are green leafy vegetables such as broccoli, lettuce, cabbage, avocados. Finally, foods rich in zinc are protein foods, soy and sunflowers. [21]

### G. Mediterranean Diet

It has been found that patients with rheumatoid arthritis have benefited from the adoption of a Mediterranean diet. Its benefits are the inflammation reduction, physical function increase and vitality improvement. Fruits, vegetables and olive oils have a dominant position in the Mediterranean diet as they are good sources of antioxidant substances. Furthermore, the Mediterranean diet has been shown to reduce the risk of a recurrence of cardiovascular events. [22, 23]

## IV. CONCLUSION

In recent years, rheumatoid arthritis has become more and more in the background of people's everyday lives. Proper patient information on the disease and the available therapeutic methods can make a significant contribution to participate in various treatment programs that will contribute significantly to the control of the disease with as few as possible consequences. The important contribution of nutrition to managing the disease has also been the cause of many studies about its benefits to people with rheumatic diseases. [24]

Applying a framework that includes a right lifestyle with frequent exercise and rest as well as a healthy diet can make a significant contribution to reduce the risk of developing the

disease and improve its quality and lifestyle. Despite the severe clinical picture of rheumatoid arthritis, it is the patient's potential with simple lifestyle changes, such as healthy eating, to relieve pain and improve their living status, in order to return as an active member of society.

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