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# Rehabilitation of patients with rheumatoid arthritis treated in stationary spa treatment

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## ABSTRACT

**Introduction:** Rheumatic diseases are nonsurgical diseases of the locomotor system and connective tissue. Rheumatoid arthritis (RA) is a systemic inflammatory disease of connective tissue of unknown cause, with progressive chronic or subacute course. The aim of the research is to determine whether stationary spa treatment leads to improvement of the functional status in patients with rheumatoid arthritis.

**Methods:** We included 35 patients with diagnosis of rheumatoid arthritis, referred for treatment at the spa " Ilidža " Gradačac from February to April 2014. Patients not adhering to treatment protocols were excluded. We used Visual analogue pain scale (VAS), HAQ questionnaire and assessment of the clinical condition before and after the treatment based on the scores 1-5.

**Results:** There were 32 female and 3 male patients. The average age was 62.28±8.31 years. Based on the HAQ, 12 patients had no difficulties, 9 of them perform activities with little difficulties, 10 with many difficulties, and 4 patients cannot perform certain activities. Before treatment VAS was 6.63±2.36, and after treatment the 2.51±2.27. Ratings of clinical condition before treatment was 2.38±0.74, and after the treatment 3.64±0.98. The most frequently used therapies were kinesitherapy, magnetotherapy and interferential electricity.

**Conclusions:** Stationary treatment at the spa „Ilidža" Gradačac leads to an improvement of the functional status in patients with rheumatoid arthritis.

**Keywords:** rheumatoid arthritis; rehabilitation treatment

## INTRODUCTION

Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease which affects about 1% of the adult population, and up to now, genetic factors explain <50% of risks (1). The disease is present throughout the world, among all races, in all climate regions, in rural and urban environments. The prevalence varies in different surroundings from 0.5 to 1%. Rheumatic diseases are characterized by the presence of pain and functional disability, which can be alleviated by physical medicine and rehabilitation (2).

Highly destructive nature of the disease is manifested by the appearance of erosions in 10-26% of patients in the first 3 months of the disease,

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in > 60% within the first year, and as many as 75% of patients have erosive joint damages during the first 2 years (3). Rheumatoid arthritis has frequent deterioration, which leads patients to reduced work ability, which represents a loss for the individual, family and community. Cause of the disease is still unknown. It is assumed that a number of external factors are affecting the body and in genetically predisposed people result in immunological changes, which are important for the initiation and maintenance of inflammation. Numerous studies have shown that the stress on the physical and physiological level is essential in the development of autoimmune diseases, which means that it may enhance the development of the disease (2). A lot of environmental factors, including hormones, dietary factors, infections and exposure to tobacco smoke, as well as an interaction of genetic environments are associated with an increased risk for development of rheumatoid arthritis (4). Clinically dominate inflammatory changes of synovia, joint capsule and ligaments. The disease begins gradually and most often symmetrical peripheral joints of hands and feet first get affected, and later other large joints can get affected. Rheumatoid arthritis can affect any joint in the body. It can start on one side and in 1-2 months a pain and swelling can appear on the other. Duration of swelling on the joints is important. The swelling which lasts less than six weeks does not indicate rheumatoid arthritis, more likely it's some other disease (5). The disease may start with general weakness, mild fever, fatigue and vague pains, and afterwards pain and swelling in the joints occur (6). An important feature of rheumatoid arthritis is morning stiffness of the joints, which is especially expressed in the joints of the hands. The patient, after waking up, hardly moves joints, cannot do anything until stretching, and until a certain time passes. It takes time from one hour to several hours. Duration of morning stiffness depends on the degree of activity of the disease and is an important information for the physician in determining treatment for patient (2).

Diagnosis of the disease is often based on classification criteria. American College of Rheumatology (ACR) and the European League Against Rheumatism (EULAR) announced in 2010 new classification criteria for rheumatoid arthritis by which patients with high risk for persistent, chronic and erosive arthritis should be defined and in that way fulfill the current definition of rheumatoid arthritis (Wollenhaupt and Krueger, 2012) (7). Usage of various physical modalities and kinesiotherapy is an integral part of the therapy of rheumatoid arthritis (2).

The aim of this study is to determine whether stationary spa treatment leads to an improvement of the functional status in patients with rheumatoid arthritis.

## METHODS

### Study design

In the period of time from 01.02.2014 to 30.04.2014 retrospective - prospective research was conducted on 35 respondents who were staying in stationary treatment at the spa „Ilidža" Gradačac. All patients with rheumatoid arthritis regardless to gender and age were included in the research.

Examined variables that we have encompassed with this research were: age and gender structure of patients with rheumatoid arthritis, an employment status of respondents, assessment of activities of daily living based on Health Assessment Questionnaire (HAQ questionnaire), assessment of pain using a visual analogue pain scale (VAS) before and after the treatment, clinical condition of patients with rheumatoid arthritis before and after the treatment, modalities of the physical procedures in the treatment of patients with rheumatoid arthritis. Criteria for inclusion in the research were: diagnosis of RA, adherence to treatment protocol, agreement to participate in research. Criteria for exclusion were: discontinuation of rehabilitation treatment for any reason, non-adherence to treatment protocol.

### Assessment of pain

The measurement of pain is performed with a numerical rating scale (NRS) with ratings from 0 - no pain, to 10 - the worst possible pain, and between are ratings of gradation of pain: mild pain, moderate pain, moderately severe pain, and severe pain.

### Assessment of activities of daily living

Health Assessment Questionnaire (HAQ questionnaire) of inflammatory rheumatic diseases is used

for measuring a quality of life and an abilities to perform activities of daily living.

Condition of the patients before and after treatment

The clinical condition of patients before and after the treatment was verified by the following methodology:

- Rating «1» - permanently incapable to work, capable to activities of daily living.
- Rating «2» - temporarily incapable to work.
- Rating «3» - capable to activities of daily living with limited working ability
- Rating «4» - additional qualification or requalification required
- Rating «5» - capable to activities of daily living and work

### Statistical analysis

Statistical analysis was performed using SPSS 200 (IBM, Chicago, IL). Arithmetic mean, standard deviation, median, inter-quartile range, absolute and relative frequency were used for descriptive statistics. Chi square test ($\chi 2$) was used for comparison of groups. ANOVA was used for quantitative variable comparison. Shapiro-Wilk test was used for evaluation of normality of data. The differences between groups were considered significant if $p<0.05$

## RESULTS

In the Table 1 gender and age structure of respondents included in this research was analyzed. From the 35 patients included in this research, 32 (91.4%) were female, while only 3 (8.6%) were male. The average age of respondents was 62.28 ± 8.31 years. Female respondents had on average 62.28 ± 7.96 years, and male respondents had 74 ± 2 years.

By analyzing the employment status of respondents (Table 2) included in this research it was established that in the total sample there were mostly retirees (n = 20), followed by housewives (n = 12), and the lowest number was of employees total 3. Chi-square test showed that there is a statistically significant difference in the status of employment of respondents, and that retired people dominate.

Table 3 shows the incidence of obtained answers to the questions from HAQ questionnaire. The respondents did not have the most common problems during the getting up, reaching up and walking (climb up five stairs). Descriptive analysis showed that respondents were generally divided about answers to the questions from questionnaire, so 12 respondents on an average number of incidence of responses answered that had no difficulties, 9 of them that perform activities with some difficulties, 10 with many difficulties, and 4 of them cannot possibly perform certain activities.

Based on the numerical scale of responses (Table 4), respondents had the biggest problems during tasks around the house, such as vacuuming, gardening (1.62 ± 1.08); then climbing the stairs (1.57 ± 1.26), getting up from a chair without using a backrest (1.45 ± 1.6) and using the bathtub (1.48 ± 1.12).

By the statistical analysis of the value of VAS before and after the treatment (Table 5) it was found that an average value of VAS before treatment was 6.63 ± 2.36, and after the treatment a significant improvement has been noted so the value was 2.51 ± 2.27. By application of a paired t-test a statistically significant difference was found in the value of VAS before and after the treatment, which amounted 4.11 ± 1.65, t = 14 674; df = 34; p = 0.001.

From the total number of respondents included in this study, all patients were using kinesiotherapy, magnetotherapy and interferential electricity (Table 6). Among the other therapeutic procedures most frequently used were Diadynamic electricity (71.43%) and pool (51.43%).

By applying a rating scale of the clinical condition of respondents with rheumatoid arthritis before and after the treatment it was established that before the

**TABLE 1.** Gender and age structure of respondents

| Gender | N | X | SD | SE | 95% CI | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower | Upper | | |
| Female | 32 | 62.28 | 7.96 | 1.40 | 59.40 | 65.15 | 46.00 | 74.00 |
| Male | 3 | 74.00 | 2.00 | 1.15 | 69.03 | 78.96 | 72.00 | 76.00 |
| Total | 35 | 63.28 | 8.31 | 1.40 | 60.42 | 66.14 | 46.00 | 76.00 |

treatment four respondents had rating 1, rating 4 one respondent and rating 5 none of the respondents. After the treatment none of the respondents had rating 1, seven respondents had rating 4 and nine respondents had rating 5 (Table 7). Chi-square test showed the difference in the clinical condition before and after the treatment, and the improvement of clinical picture was noted ($p < 0.05$).

**TABLE 2.** Employment status of respondents

| Status | N | % |
|---|---|---|
| Employee | 3 | 8.6 |
| Housewife | 12 | 34.3 |
| Retiree | 20 | 57.1 |
| Total | 35 | 100.0 |

## DISCUSSION

Literature data show that women suffer three to five times more often than men, with the highest incidence of occurrence of rheumatoid arthritis between the fourth and sixth decade of life (4-6). From the total number of respondents included in our study, 32 (91.4%) were female, while only 3 (8.6%) were male, which correlates with study by Obradovic-Tomasevic B where female dominate (81.8 %: 18.2%), which was confirmed as a highly significant difference ($p < 0.001$) (8).

In study by Tomasevic- Todorovic there were 60 patients with rheumatoid arthritis (48 female, 12 male), with average age (53.92 ± 7.06). In our study average age of respondents was

**TABLE 3.** HAQ questionnaire answers

| Questions | Without any difficulties | With some difficulties | With many difficulties | Cannot possibly |
|---|---|---|---|---|
| 1. Dressing and grooming: Are you able to: | | | | |
| Get dressed, buckle buttons, lace up a tie, shoelaces? | 10 | 13 | 10 | 2 |
| Shampoo and wash the hair | 12 | 11 | 9 | 3 |
| 2. Getting up: Can you | | | | |
| Get up from a chair without using backrest? | 9 | 7 | 13 | 6 |
| Lie down and get out of bed? | 9 | 8 | 14 | 4 |
| 3. Food: Are you able to | | | | |
| Cut the meat into small pieces? | 15 | 9 | 11 | 0 |
| Can you pick up a full glass up to your mouth? | 20 | 11 | 4 | 0 |
| 4. Walking: Can you | | | | |
| Walk outside on a flat surface | 14 | 9 | 8 | 4 |
| Climb up 5 stairs | 10 | 8 | 4 | 13 |
| 5. Hygiene: Are you able to? | | | | |
| Take a bathe and dry entire body? | 10 | 9 | 9 | 7 |
| Use the bathtub? | 9 | 8 | 10 | 8 |
| Sit and raise up from the toilet? | 10 | 8 | 12 | 5 |
| 6. Reaching up: Are you able to | | | | |
| Lower the burden of 3 kg located a little above the head? | 9 | 10 | 13 | 3 |
| Bend down and pick up clothes from the floor? | 9 | 12 | 13 | 1 |
| 7. Squeeze: Can you | | | | |
| Open the lock on the car door? | 17 | 9 | 9 | 0 |
| Open a jar that had already been opened? | 15 | 10 | 9 | 1 |
| Open and close the water tap? | 17 | 14 | 4 | 0 |
| 8. Activity: Can you | | | | |
| Go to the store? | 13 | 7 | 7 | 8 |
| Get in and out of the car | 13 | 5 | 11 | 6 |
| Do tasks around the house, like vacuuming, home work, work in the garden | 7 | 8 | 11 | 9 |
| The average number of incidence of responses | 12 | 9 | 10 | 4 |

**TABLE 4.** Average values of obtained answers from the HAQ questionnaire based on a numerical scale

| Questions | Minimum | Maximum | X | SD |
|---|---|---|---|---|
| 1. Dressing and grooming: Are you able to: | | | | |
| Get dressed, buckle buttons, lace up a tie, shoelaces? | 0.00 | 3.00 | 1.11 | 0.90 |
| Shampoo and wash the hair | 0.00 | 3.00 | 1.08 | 0.98 |
| 2. Getting up: Can you | | | | |
| Get up from a chair without using backrest? | 0.00 | 3.00 | 1.45 | 1.06 |
| Lie down and get out of bed? | 0.00 | 3.00 | 1.37 | 1.00 |
| 3. Food: Are you able to | | | | |
| Cut the meat into small pieces? | 0.00 | 2.00 | 0.88 | 0.86 |
| Can you pick up a full glass up to your mouth? | 0.00 | 2.00 | 0.54 | 0.70 |
| 4. Walking: Can you | | | | |
| Walk outside on a flat surface | 0.00 | 3.00 | 1.05 | 1.05 |
| Climb up 5 stairs | 0.00 | 3.00 | 1.57 | 1.26 |
| 5. Hygiene: Are you able to? | | | | |
| Take a bathe and dry entire body? | 0.00 | 3.00 | 1.32 | 1.09 |
| Use the bathtub? | 0.00 | 3.00 | 1.48 | 1.12 |
| Sit and raise up from the toilet? | 0.00 | 3.00 | 1.34 | 1.05 |
| 6. Reaching up: Are you able to | | | | |
| Lower the burden of 3 kg located a little above the head? | 0.00 | 3.00 | 1.28 | 0.95 |
| Bend down and pick up clothes from the floor? | 0.00 | 3.00 | 1.17 | 0.85 |
| 7. Squeeze: Can you | | | | |
| Open the lock on the car door? | 0.00 | 2.00 | 0.77 | 0.84 |
| Open a jar that had already been opened? | 0.00 | 3.00 | 0.88 | 0.90 |
| Open and close the water tap? | 0.00 | 2.00 | 0.62 | 0.68 |
| 8. Activity: Can you | | | | |
| Go to the store? | 0.00 | 3.00 | 1.28 | 1.20 |
| Get in and out of the car | 0.00 | 3.00 | 1.28 | 1.15 |
| Do tasks around the house, like vacuuming, home work, work in the garden | 0.00 | 3.00 | 1.62 | 1.08 |
| The average number of incidence of responses | 0 | 3 | 1.16 | 0.99 |

0-0.5 without difficulties; 0.51-1.50 with some difficulties; 1.51-2.50 with many difficulties; 2.51-3-00 cannot possibly do

**TABLE 5.** Analysis of the visual analogue scale of pain (VAS) before and after the treatment

| | Time point | X | N | SD | SEM |
|---|---|---|---|---|---|
| VAS | Before the treatment | 6.63 | 35 | 2.365 | 0.39 |
| | After the treatment | 2.51 | 35 | 2.27 | 0.38 |
| Paired T test for the value of VAS before and after the treatment | | | | | |
| X | SD | SEM | t | df | p |
| 4.11 | 1.65 | 0.28 | 14.674 | 34 | 0.001 |

62.28 ± 8.31 years. By analysis of the age of respondents in relation to the gender structure of respondents, it was found that female respondents had on average 62.28 ± 7.96 years, and male respondents 74 ± 2 years. In the study by Obradovic-Tomasevic B. an average age of patients was 62.9 ± 10 years (9).

In our study, Chi-square test showed that there is a statistically significant difference in the employment status of respondents and that retired people dominate.

In our study, respondents had the biggest problems during tasks around the house, such as vacuuming, gardening (1.62 ± 1.08); then climbing the stairs (1.57 ± 1.26), getting up from a chair without using a backrest (1.45 ± 1.6) and using the bathtub (1.48 ± 1.12). Functional ability of patients was reduced in all respondents (HAQ = 1.99) (10). In the study by Tomasevic-Todorovic an average values of the questionnaire index were 1.25 ± 0.70 (11), whereas in our study, an average value of the questionnaire index was 1.16 ± 0.99. In the study of

**TABLE 6.** Modalities of physical procedures in the treatment of patients with rheumatoid arthritis

| Therapy procedure | Yes | | No | |
|---|---|---|---|---|
| | N | % | N | % |
| Kinesiotherapy | 35 | 100.00 | 0 | 0.00 |
| Pearly underwater bath | 10 | 28.57 | 25 | 71.43 |
| Mineral underwater bath | 5 | 14.29 | 30 | 85.71 |
| Pool | 18 | 51.43 | 17 | 48.57 |
| Magnetotherapy | 35 | 100.00 | 0 | 0.00 |
| Interferential electricity | 35 | 100.00 | 0 | 0.00 |
| Diadynamic electricity | 25 | 71.43 | 10 | 28.57 |
| Transcutaneous electrical nerve stimulation | 9 | 25.71 | 26 | 74.29 |
| Manual massage | 2 | 5.71 | 33 | 94.29 |
| Cryotherapy | 9 | 25.71 | 26 | 74.29 |
| Four cell bath | 6 | 17.14 | 29 | 82.86 |
| Ultrasound | 3 | 8.57 | 32 | 91.43 |
| Galvanization | 3 | 8.57 | 32 | 91.43 |

**TABLE 7.** Comparison of the clinical condition before and after the treatment based on the scale of ratings

| Clinical condition | Before the treatment | After the treatment |
|---|---|---|
| Rating 1 | 4 | 0 |
| Rating 2 | 15 | 3 |
| Rating 3 | 15 | 16 |
| Rating 4 | 1 | 7 |
| Rating 5 | 0 | 9 |
| Total | 35 | 35 |

$X^2$=25.532; df=4; P<0.05

Krishnan E from 6436 patients 1673 patients were male, while 4763 patients were female. An average value of the questionnaire index was 1.13 (12). In the study by C. Armstrong from 253 patients, an average age of patients was 62.0 ± 11.2, whereas in our study an average age of patients is 62.28 ± 8:31, an average duration of the disease according to C. Armstrong is 13.4 ± 10.2, an average value of the questionnaire index is 1.86 ± 0.78 (13). By the statistical analysis of the value of VAS before and after the treatment it was found that an average value of VAS before treatment was 6.63 ± 2.36, and after the treatment a significant improvement has been noted so the value was 2.51 ± 2.27. In our study, patients had a signs of improvement after a spa treatment, like in the study by Mustur D. where patients, after completion of spa physical treatment, have signs of improvement of functional status of people suffering from rheumatoid arthritis (p <0.01), as well as their quality of life in all monitored segments of the applied questionnaire (p <0.01) (14).

## CONCLUSION

Our findings proved that stationary treatment at the spa „Ilidža“ Gradačac leads to an improvement of the functional status in patients with rheumatoid arthritis.

## CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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