

Effects of progressive muscle relaxation on the life quality of patients with Rheumatoid Arthritis: A clinical trial

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Abstract

Background: Rheumatoid arthritis (RA) is a chronic disease with a profound effect on the life quality of the patients due to its chronic, painful, and disabling nature.

Objectives: This study aimed to determine the effects of progressive muscle relaxation technique on life quality in RA patients.

Methods: This clinical trial was conducted in a rheumatologist office on 62 RA patients. The participants were randomly divided into two groups: progressive muscle relaxation group and control group. While the intervention group underwent a daily 20-minute relaxation period for 8 weeks, no intervention was given in the control group. Data were collected using a two part questionnaire including demographic characteristic form and SF-36 life quality questionnaire, completed at the beginning and the end of the intervention. Data analysed using Chi-square test, independent t-test and paired t-test with SPSS software version 19.

Results: The findings of the study showed that, in the experimental group, the mean score of life quality changed from 37.84 to 54.54 after the intervention ($p=0.0001$), while, in the control group, it altered from 37.47 to 43.20. Therefore, the difference between the two groups was not considered as significant before intervention ($p=0.112$). Moreover, there was a significant difference between experimental and control groups regarding the six aspects of life quality including physical function ($p=0.041$), vitality ($p=0.029$), social function ($p=0.017$), mental health ($p=0.001$), general health ($p=0.002$), and psychological health ($p=0.002$). However, no significant difference was found in case of bodily pain ($p=0.149$) and physical constraint ($p=0.82$).

Conclusion: According to the findings, progressive muscle relaxation training could be an effective therapeutic method to improve quality of life in RA patients.

Key words: *progressive muscle relaxation, quality of life, rheumatoid arthritis*

Introduction

As one of the most common autoimmune diseases, Rheumatoid Arthritis (RA) is a chronic systemic inflammatory disease involving joints. It can lead to destruction and deformation of the joints or to reduce their function [1,2].

While the exact cause of rheumatoid arthritis is not clear, it is believed that a combination of

factors are involved in disease development including internal glands, metabolic factors, genetic factors, occupational factors, diet, geographical location, and psychosocial differences [1,3].

Research findings showed the survival rate in rheumatoid arthritis has decreased [3]. The prevalence of RA is approximately 1% worldwide

and is higher among women. In a demographic study in Iran, the prevalence of rheumatoid arthritis was estimated to be 19% [4].

Clinical manifestations of RA are associated with symmetrical pain and swelling, especially in the small joints of hands and are often accompanied by stiffness and fatigue [5]. The destruction of joint tissues leads to a diminished quality of life [6].

The RA is a chronic disease in which the patient suffers not only from pain and motor constraints and disability but also from a feeling of depression and anxiety which may affect his/her partner and family [7].

In the developing countries, the costs spent on RA are a major problem to be managed [8]. The economic burden of rheumatoid arthritis increases due to the costs of the disease either as direct costs associated with medical care (treatment and disability) or indirect costs resulting from inefficiency [9].

In recent years, there has been a growing interest in evaluating and improving the life quality of patients with chronic disease (10,11). World Health Organization (W.H.O) defines Quality of life as individuals' perception of their position in life in the cultural context and value-based systems in which they live and set their goals, expectations, standards, and concerns [12].

Da Rocha et al. (2012) believes that the higher severity of RA causes the lower quality of life [13]. The results of the study conducted by Razavian et al (2009). showed that the life quality of patients with RA has reached an undesirable level [14].

Considering the growing spread of RA and its high levels of mortality and expenses together with its impacts on various aspects of a patient's life including mental-spiritual, physical, social, economic, family life, and sexual function, it is essential to assist the patients suffering from this disease [10].

Although many measures have been taken to reduce RA symptoms and improve the life quality of patients inflicted with this disease each of them has problems that make them difficult to use. One of them is medication or drug therapy having lots of complications per se [10].

The non-medical treatments which aimed at helping patients with RA may improve their life quality significantly [15]. The study by Shaban and his colleagues showed that patients are well versed in the admission of non-pharmacological methods or complementary therapies, and believe that these methods do not have side effects of drug interventions [16].

One of the non-medical treatments administered to improve life quality is believed to be the Progressive Muscle Relaxation Technique (PMR) [17,18]. The PMR derives from a psychological mechanism called musculoskeletal pressure that is the basis of many unpleasant emotional feelings as well as physical and mental illnesses [18].

The purpose of this technique is to make the person feel relaxed through active contraction and then relaxing certain muscle groups in a progressive state and complete relaxation will be felt through a 4 to 5 sessions of muscle relaxation technique [18].

The technique of PMR provides a balance between the posterior and the anterior hypothalamic activities; thus, preventing the undesirable side effects of stress and anxiety. Although many relaxation methods cause drowsiness, increase stress and anxiety, and are difficult to learn, they can be learned after 3-4 times of practice and repetition. As an easy method to be practiced in most places, PMR is a conscious technique in which the patient does not sleep [19].

Such treatments represent the art of nurses, which should provide more and better therapeutic care for their patients alongside nursing knowledge, and most importantly, these treatments create a deep relationship between the nurse and the patient [20]. Considering the adverse effects of rheumatoid arthritis on the quality of life of patients and no specific studies focusing on the improvement of life quality in patients with RA via PMR in Iran, this study investigated the effects of PMR on the life quality of the Iranian patients suffering from RA.

Methods

The present study is a clinical trial conducted

during 2103 and at the office of a rheumatologist working at Arya Hospital in Ahvaz, Iran. The research population included the clients with RA who had referred to Arya Hospital for treatment purposes. A purposeful sampling was used to select the subjects. Based on the previous studies and the suggested statistical formula, 62 patients were selected as the sample of the study ($S1=20.2$, $S2=15.3$, $X1=78.1$, $X2=62$).

Ghaffari et al, in their clinical trial study used Pockok's method and Gigi's statistics to determine and estimate the sample size respectively. The estimated sample size of this study is based on Ghafari's study [21].

The Inclusion criteria for the patients included the followings: Entry requirements include: satisfaction of the patient and their families, adults over 18 years of age, diagnosis of rheumatoid arthritis confirmed by the rheumatologist, having the disease for at least 6 months, having no mental illness such as severe depression, hearing and speech impairment, and having at least reading and writing literacy. The exclusion criteria included the patient's reluctance to continue participating in the intervention, his/her absence for more than 2 sessions and inability to perform PMR due to increased pain or other reasons.

The data were collected using the demographic and the SF-36 questionnaires at the beginning of the trial as well as two months after intervention. The content validity was ensured in case of demographic registration and the researcher-made disease information forms. After compilation, these forms were distributed to 10 faculty members based on whose comments the necessary amendments were made.

The life quality questionnaire contains with 36 questions (sf-36) and is one of the most common and comprehensive standard tools used for measuring health status and life quality worldwide. In Iran, The validity and reliability of this questionnaire was examined by Montazeri et al [22]. The questionnaire was piloted through a one-month interval. Through a test-retest method, the Pearson correlation coefficient was analyzed to be 0.82.

SF-3 included 36 questions and 8 subscales. The subscales encompass physical function (10 questions), physical constraints (4 questions),

bodily pain (2 questions), general health perceptions (6 questions), social function (2 questions), vitality (3 questions), mental health (6 questions) and Psychological problems (3 questions). The score range for the questions varies between 0 and 100, where 0 represents the worst and 100 the best situations. For the three-option questions, the scores of 0, 50, and 100 are considered. For five-option the questions, the score range includes 0, 25, 50, 75, and 100. And, for the six-option questions, 0, 20, 40, 60, 80, and 100 are the main scores.

In this study, using the table of random numbers, the patients were randomly assigned to two groups of PMR group and control group. Demographic data form, disease information and quality of life questionnaire (SF-36) were completed by the researcher by interviewing the patient and using the information in the patient medical records before the intervention. Samples were matched based on demographic variables [D1] and some of the variables related to the disease as interfering variables. Patients in the intervention group, in addition to their usual treatment, were treated with progressive muscle relaxant technique once a day for 2 months (60 sessions). During this period, the control group did not receive any progressive muscle relaxant treatment other than their usual treatment. Patients in the intervention and control group were asked to visit the doctor's office on different days. In order to teach the relaxation technique to the members of the intervention group, they were divided into 3 groups. Teaching PMR technique for each group was done within 4 days. On the first day, the patients were presented some information about research and its related objectives. On the remaining 3 days, the training sessions were devoted the implementation of PMR techniques. More specifically, the training program was designed and implemented in seven stages for each group: the recognition of muscles and muscle groups, training on the implementation of the technique using explanation and practical presentation by the researcher, answering the questions of the patients about the implementation of the relaxation technique, performing the technique by the researcher using the audio tape, performing the

technique by the patients along with the help of the researcher, patients' expression of their physical and mental feelings after the relaxation and at the final stage, and performing the technique by the patients under the supervision of the researcher. This technique was carried out by the samples in the test group at home for two months that was followed by the researcher's daily telephone call and weekly face to face interviews and self-report checklists completion (60 sessions). In the case of the people who were illiterate or had little literacy, the training was carried out with the attendance of the patient's companions. This type of training was easily carried out and more treatment sessions were conducted for illiterate people.

In summary, in a PMR method, the patients sit or lie in a comfortable chair (it is better to offer comfortable clothes without a watch and a bracelet) and listen to an audio cassette or CD while shrinking and expanding the various muscle groups with an effective deep breath. The patient keeps doing this exercise until he feels the difference between the contraction and expansion of the muscles and is able to express it. Afterwards, he will be able to do the same individually using the audio tape.

Finally, after the data collection, they were analyzed using SPSS, version 19. To assess the consistency of demographic information and disease information, Chi-square test was used. Besides, in order to compare the quality of life in the two groups, the independent t-test was run. Paired t-test was used for comparing each group before and after treatment.

Results

The findings showed that the average age of the patients in the intervention and control groups

was 50.3 ± 9.65 and 48 ± 9.19 years old, respectively. In the experimental group, the majority of the patients were female (80.6%) and married (87.1 %). In the control group, however, 83.9 percent of the patients were female and 93.5 percent married. 71% of patients of the control group and 61.3% of patients of the intervention group were housewives. Most of the patients (70.9%) were illiterate or had primary education degree. There was no significant difference between the two groups in terms of the mentioned variables. With regard to the history of the RA patients admitted to the hospital, the chi-square test didn't show any significant difference between the two groups ($p=0.7$). Therefore, the patients were homogeneous in terms of the demographic variables.

The independent t-test showed that there was no significant difference between the mean scores of quality of life of PMR and control groups before the intervention. The highest mean score in the intervention group was related to physical function 47.09 ± 15.37 and in control group to mental health (43.22 ± 15.25). While in both groups, bodily pain had the lowest mean score before intervention. The independent t-test results showed no significant difference between two groups before intervention (Table 1). At the post-intervention stage, the psychological problems with (67.74) had the highest score and the bodily pain (40.00) had the lowest mean score while in control group physical function with mean scores of 48.38 was the highest and bodily pain with 39.51 was the lowest.

The independent t-test showed significant differences in all dimensions of life quality except for the two aspects of bodily pain ($p=0.14$) and physical limitation ($p=0.08$) after intervention (Table 1).

Table 1: The comparison of the mean and standard deviation of quality of life dimensions before and after intervention between PMR group and control group

| phase Group | Before intervention | | t-test P value | After intervention | | t-test P value |
|-----------------------------|---------------------|-------------|-------------------|--------------------|-------------|-------------------|
| | PMR | Control | | PMR | Control | |
| quality of life dimensions | Mean±SD | Mean±SD | | Mean±SD | Mean±SD | |
| Physical function | 15.37±47.09 | 15.25±43.22 | 0.324 | 17.40±57.90 | 18.36±48.38 | 0.041 |
| Physical limitation | 17.99±35.48 | 17.73±33.87 | 0.810 | 22.80±50.80 | 22.86±41.12 | 0.082 |
| mental problems | 29.16±32.25 | 20.15±34.40 | 0.573 | 30.40±67.74 | 33.29±41.93 | 0.002 |
| Vitality | 10.59±41.61 | 9.51±40.48 | 0.661 | 13.70±56.93 | 9.06±44.51 | 0.029 |
| mental health | 11.59±44.25 | 8.13±43.35 | 0.724 | 12.55±59.48 | 9.31±45.38 | 0.001 |
| Social function | 11.34±41.04 | 11.52±41.37 | 0.912 | 14.33±53.62 | 15.09±44.43 | 0.017 |
| Bodily pain | 12.64±27.41 | 13.05±26.45 | 0.631 | 18.43±40.00 | 17.92±32.90 | 0.149 |
| general health | 8.67±33.54 | 10.43±36.61 | 0.21 | 13.06±49.83 | 12.60±39.51 | 0.002 |
| Total Quality of Life Score | 9.33±37.84 | 7.8±37.47 | 0.867 | 12.46±54.54 | 13.39±43.20 | 0.001 |

The mean and standard deviation of quality of life and its dimensions are presented in the PMR group in table 2. There was a significant difference between the mean score of overall life quality and its dimensions in the PMR group

before and after the intervention (Table 2). In the control group, the paired T-test showed no significant difference between the mean score of overall life quality and its aspects before and after the intervention (Table 2).

Table 2: The Comparison of the mean and standard deviation of quality of life dimensions in the PMR and control groups before and after intervention

| Groups phase | PMR group | | Paired t-test Pvalue | Control group | | Paired t-test Pvalue |
|-----------------------------|-------------|-------------|----------------------------|---------------|-------------|----------------------------|
| | Before | After | | Before | After | |
| quality of life dimensions | Mean± SD | Mean± SD | | Mean±SD | Mean±SD | |
| Physical function | 15.37±47.09 | 17.40±57.90 | 0.001 | 15.25±43.22 | 18.36±48.38 | 0.277 |
| Physical limitation | 17.99±35.48 | 22.80±50.80 | 0.004 | 17.73±33.87 | 22.86±41.12 | 0.210 |
| mental problems | 29.16±32.25 | 30.40±67.74 | 0.001 | 20.15±34.40 | 33.29±41.93 | 0.226 |
| Vitality | 10.59±41.61 | 13.70±56.93 | 0.001 | 9.51±40.48 | 9.06±44.51 | 0.101 |
| mental health | 11.59±44.25 | 12.55±59.48 | 0.001 | 8.13±43.35 | 9.31±45.38 | 0.225 |
| Social function | 11.34±41.04 | 14.33±53.62 | 0.001 | 11.52±41.37 | 15.09±44.43 | 0.443 |
| Bodily pain | 12.64±27.41 | 18.43±40.00 | 0.001 | 13.05±26.45 | 14.92±32.90 | 0.244 |
| general health | 8.67±33.54 | 10.43±36.61 | 0.001 | 10.43±36.61 | 12.60±39.51 | 0.293 |
| Total Quality of Life Score | 9.33±37.84 | 12.46±54.54 | 0.001 | 7.87±37.47 | 13.39±43.20 | 0.112 |

Discussion

The aim of this study was to investigate the effect of PMR on the life quality of the patients with rheumatoid arthritis (RA). The findings

demonstrated that PMR improved these patients' quality of life. Moreover, the PMR technique affected the patient's quality of life except for two dimensions of bodily pain and physical limitation.

The results of this study are consistent with various studies using muscle relaxation technique [17,22-25].

The results of Dehdari et al. study are in agreement with this study in which PMR technique increased all the aspects of the life quality in patients with coronary artery bypass graft surgery ($p<0.05$). In Dehdari et al.'s study, the relaxation method was implemented during one month. Although the duration of the intervention in this study was two months, there was no significant difference in physical function and body pain in patients with RA. The difference between the two studies may be attributed to the difference in the physiopathology of the two diseases [23].

Using the paired t-test, in the experimental group, it was found that there was a significant difference between the mean scores of the eight aspects of life quality and the overall value for the RA patients before and after the intervention ($p<0.05$) indicating efficiency of PMR in improving the life quality for this group of patients. Arthur et al. concluded that relaxation technique improved the symptoms of arthritis and the pain intensity significantly ($p=0.001$) [24]. This is consistent with the finding of the present study. Additionally, in a study by Bagheri et al, the relaxation technique has been reported as an effective factor in creating a good sense in the patients with RA ($p=0.001$). In Bagheri's study, most of the clinical symptoms of RA and the laboratory findings were improved, but there was no statistically significant difference [25]. In the same way, the study carried out by Ghaffari et al. illustrated that the use of relaxation technique has been effective in improving the quality of life in patients with multiple sclerosis. In concert with the finding of this study, in Ghaffari et al.'s research, the results of the t-test showed a significant difference in the mean scores of different aspects of quality of life after the relaxation intervention and between the two groups ($p<0.05$) [17]. In the study of Jafari et al, the results showed that the muscle relaxation reduced the level of anxiety significantly in the patients awaiting the electrophysiological diagnostic and therapeutic interventions (26).

Similarly, Akmeşe and Oran suggested that the muscle relaxation can be effective in improving the quality of life in women with lumbar pain [27]. Xie and et al study results showed that muscle relaxation is helpful in individuals with upper bone fractures [28].

Bikmoradi et al. results showed that the PMR had a beneficial effect on the reduction of chronic pain in multiple sclerosis patients and can be used frequently due to its low cost, safety, and simplicity that acts as a complementary therapy to reduce pain in these patients [29]. The use of PMR technique was shown to reduce the severity of restless legs syndrome in the hemodialysis patients and recommended as a non-pharmacological method for improving the restless leg syndrome in these patients [30].

Hagh-Shenas et al. examined "The Effect of Muscle Relaxation on anxiety in pre-university students" and showed that this method was effective in reducing the level of anxiety in those people [31]. Sharifirad et al, in their study, investigated the effect of PMR program on the parameters of depression, anxiety, and stress in female students with premenstrual syndrome. The results of their research indicated that the PMR programs led to decreasing levels of anxiety, stress, and depression in students [32]. In a study entitled "The Effect of Progressive Muscle Relaxation Technique on Anxiety and Depression in Multiple Sclerosis Patients", the researchers, via implementing an interventional muscle relaxation technique within two months, concluded that the mean scores of depression in patients with multiple sclerosis decreased in the relaxation group; however, there was no significant difference between the two groups of relaxation and control. The researchers stated that there was no significant difference between the two groups of relaxation and control due to the complexity of depression in patients with multiple sclerosis [17].

Herizchi et al, in a clinical trial study in 2009 in Cancer patients undergoing chemotherapy in Tabriz Hematology and Oncology Center did not report any significant difference between the two groups [33] which is not in agreement with the results of the present study.

In present study some changes in the mean score of both aspects of bodily pain and physical limitations occurred that were not significant ($p>0.05$). This may be due to the nature of the disease as well as the type of pain experienced by these patients from the other disease. The different results may be also due to the different type of relaxation methods, population and the sample size were used in different studies.

According to the findings of this study, the PMR has significant impact on the life quality of patients with RA and is one of the treatments for which special equipment is not required. Besides, this method is easy to learn and implement, have no complications and needn't any special equipment.

The results of this study should be interpreted with caution since the limitations of this study were: patients were different in terms of learning talent and fulfilling relaxation skills. Other limitation of this study was non-blindness. Future studies can focus on tailoring the PMR technique via considering the blinding factor in case of the patients with different degrees of depression and anxiety.

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