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Investigating the comparative effectiveness of yoga and relaxation therapy on irritability, muscle tension, and sleep problems in patients with rheumatism

Meysam Mozafari[1], Monireh Azadeh Ghahfarokhi[2], Sona Fouladi[3], Kasra Amirzadeh-Gougheri[4], Elham Torabi[5]

1 Department of Psychology, Islamic Azad University, Shiraz Branch, Shiraz, Iran
2 Department of Psychology, Islamic Azad University, Najaf Abad Branch, Najaf Abad, Iran
3 Department of Psychology, Islamic Azad University, Yasouj Branch, Yasouj, Iran
4 Department of Psychology, Islamic Azad University, Kerman Branch, Kerman, Iran
5 Department of Psychology, Islamic Azad University, Karaj Branch, Karaj, Iran

Original Article

Abstract

BACKGROUND: Rheumatoid arthritis (RA), a debilitating autoimmune disease, has a significant impact on both the physical and mental well-being of those affected due to its long-lasting nature. The study aimed to investigate the comparative effectiveness of yoga and relaxation therapy in improving the control of irritability, increased muscle tension, and sleep problems encountered by individuals with rheumatism.

METHODS: A semi-experimental study was conducted using a pre-test, post-test, and follow-up design that spanned three months. The research involved three groups: one group of 18 participants who received yoga therapy, another group of 15 participants who received relaxation therapy, and a control group of 19 participants who did not receive any therapy. The population for this research involved all patients with rheumatism referred to the Iranian Rheumatism Center in Tehran City, Iran, between July and November 2023. Sixty individuals were selected using purposive sampling. The yoga therapy group received eight in-person sessions lasting 90 minutes each once a week, while the relaxation therapy group practiced at home with six 90-minute sessions once a week. The research utilized several tools, including the Irritability Questionnaire, the Pittsburgh Sleep Quality Index (PSQI), and a standardized visual scale for muscle tension measurement. The research data were analyzed using analysis of variance (ANOVA) and multivariate analysis of covariance (MANCOVA) with SPSS software.

RESULTS: The irritability variable showed a noteworthy disparity between the yoga therapy and relaxation therapy groups compared to the control group ($P < 0.05$). Both intervention approaches in this study influenced the irritability variable. Conversely, there was no notable distinction in muscle tension between the yoga therapy, relaxation therapy, and control groups ($P > 0.05$). Sleep problems displayed significant differences between the relaxation therapy and control groups ($P = 0.004$). However, the yoga therapy intervention in this study did not affect the sleep problem.

CONCLUSION: Based on the results of the current research, it appears that both yoga therapy and relaxation therapy could be beneficial in decreasing irritability in individuals with rheumatism. Additionally, relaxation therapy has the potential to enhance sleep quality in these patients.

KEYWORDS: Yoga Therapy; Relaxation Therapy; Irritable Mood; Muscle Tonus; Sleep Disorder; Rheumatoid Arthritis

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Introduction

Rheumatoid arthritis (RA), a prevalent autoimmune disorder, impacts a vast population globally. Its origins remain intricate and obscure, but this condition arises from a blend of genetic, hormonal, and environmental

Corresponding Author:
Elham Torabi; Department of Psychology, Islamic Azad University, Karaj Branch, Karaj, Iran
Email: barantorabi1362@gmail.com

components.[1] The prevalence of RA is remarkably consistent worldwide, at about 0.5% to 1.0%, although the prevalence is higher in certain populations, such as Indigenous North Americans. The disease is 2 to 3 times as common among women as it is among men.[2] In Iran, urban areas have an estimated frequency of 0.19%, and rural areas have an estimated frequency of 0.33%.[3]

These patients have a significantly lower quality of life (QOL) due to pain, fatigue, and disability, leading to mood shifts in the form of anxiety, depression, and irritability.[4] Individuals with RA often experience persisting systemic manifestations such as fatigue, weakness, and myalgia, which can be attributed to muscular changes.[5] According to Lin et al., the decrease in skeletal muscle mass is a strong predictor of deteriorating joint damage within a year, especially in instances of remission from RA.[6] Irwin et al. discovered that a misaligned inflammatory profile in individuals with RA disrupted their sleep-wake cycles, ultimately resulting in increased inflammation and pain sensitivity.[7] However, a substantial percentage, roughly 70%, of people suffering from RA encounter difficulties in attaining and maintaining sleep, resulting in excessive tiredness during the daytime.[8] Katz et al. have shown that there is a strong connection between the severity of symptoms and the pain experienced by individuals with RA, and their sleep patterns play a significant role relationship. It is common for these patients to experience sleep disorders.[9]

At times, individuals necessitate extended periods of utilizing anti-inflammatory medications to control symptoms alongside traditional disease-modifying drugs (DMDs) and biologics. Occasionally, the dosage is raised but without any recovery in symptoms; instead, side effects become prevalent. Consequently, patients are seeking alternative therapies, non-pharmacological in nature, to explore different treatment approaches.[10] One possible approach in this scenario may involve the implementation of yoga therapy, which possesses the ability to produce favorable outcomes. Yoga, an ancient discipline that amalgamates the mind and body, has increasingly demonstrated positive effects on the immune system. It can serve as a beneficial intervention for the management of RA.[11] Yoga has an impact on the body's autonomic function, metabolism, and neurochemistry, leading to changes in brain structure, improved sleep, and enhanced cognitive skills.[12] In addition, research suggests that integrating yoga into sports and sports science can help in preventing and managing musculoskeletal injuries, disorders, and related mental health issues.[13]

Another method of psychological rehabilitation that assists individuals with RA in managing the disease by addressing pain through emotion regulation and psychotherapy intervention is the relaxation technique.[14] Progressive relaxation, which involves learning to monitor and regulate muscle tension, is an activity that aids in relaxation and the reduction of anxiety, stress, or anger.[15] A study deemed progressive muscle relaxation as an effective strategy for ameliorating sleep quality and diminishing fatigue levels among individuals with RA.[16]

RA typically follows a chronic trajectory in the majority of patients, indicating that the disease persists over an extended period.[3] Investigating effective interventions to help reduce the challenges experienced by individuals with RA is crucial due to its significant impact on patients' QOL. Consequently, a research gap exists in this area, and the present study stands as one of the pioneering efforts to examine the comparative efficacy of yoga and relaxation therapy in ameliorating irritability, increasing muscle tension, and improving sleep quality in patients with RA. The present study aims to investigate the impact of yoga therapy on enhancing irritability, elevating muscle

tension, and addressing sleep issues among individuals with rheumatism as opposed to relaxation therapy.

Methods

The method utilized for this research was a semi-experimental design consisting of a pre-test, post-test, and follow-up design over three months. All patients diagnosed and confirmed by rheumatism treatment specialists and referred to the Iranian Rheumatology Center in Tehran City, Iran, from July to November 2023, were included as the statistical population for this research. Sixty individuals were chosen for the statistical sample using the purposeful sampling method. This method involved participants' self-selecting by removing numbers from an envelope. The sample was divided into two groups: a yoga and relaxation therapy training group and a control group, each consisting of 20 people. The adequacy of the sample size was determined using G*Power software, with parameters set at α = 0.05, effect size = 1.11, and power test = 0.90.[17]

The inclusion criteria involved individuals who experienced rheumatism, aged 30 years or older, possessed adequate physical health to attend in-person intervention sessions, held a medical history at the Iranian Rheumatism Center, did not engage in yoga or relaxation within the past six months, and did not participate in any other alternative educational program. Exiting the study would occur if there was a lack of adequate attendance at the intervention sessions (more than two sessions), physical or mental incapacity to perform yoga and relaxation, inability to access social networks and the internet for online exercises, or voluntary withdrawal from the study.

After receiving the required authorizations to proceed with the study and obtaining approval from the university, the researchers initially contacted the Iranian Rheumatism Center. Following necessary arrangements with the center's management, an announcement was made to invite individuals to participate in the interventions and research. This announcement was shared through the social media platforms associated with the Rheumatism Center. Subsequently, the researchers targeted specific individuals from those who responded and provided their information based on the research participation notices.

The research initially involved selecting 74 individuals who expressed their willingness to participate. These individuals were then given a detailed explanation of the research objectives and ethical principles during an in-person interview at the center. They also had the opportunity to ask questions regarding the implementation of the interventions. Afterward, a screening procedure was conducted, in which more queries were posed to reduce the number of participants. Individuals who fulfilled the required conditions were given written details about the intervention sessions. Individuals who did not meet these criteria, such as lacking the time or resources to attend the training sessions, were excluded from consideration.

At the conclusion, a total of sixty individuals were chosen by the researchers. Written consent was obtained from the participants through a consent questionnaire for their involvement in the study. Subsequently, a pre-test was administered to the individuals using research instruments. The data from the pre-test stage were collected from the sixty individuals, who were then randomly divided into three groups: the yoga therapy group, the relaxation therapy group, and the control group.

The yoga therapy group (consisting of 18 individuals) attended eight 90-minute sessions once a week, held in person at one of the offices of the Rheumatism Center. These sessions were based on the teachings presented in Pradhan's 2014 book.[18] On the

other hand, the relaxation therapy group (consisting of 15 individuals) participated in six 90-minute sessions once a week through home practice.[19]

For the control group, no intervention was done until the end of the study. The ethical standards followed in studies with human participants were under the guidelines established by the institutional and national research committee under the code IR.IAU.K.REC.1402.126. To adhere to research ethics, the control group (consisting of 19 individuals) received a comprehensive program of yoga sessions and relaxation therapy exercises at home upon completion of the research. Treatment sessions for the yoga therapy group and the relaxation group are summarized in table 1, respectively. After the last session, the groups involved in the experiment filled out research questionnaires for the post-test. Three months down the line, the participants were requested to answer the research questionnaires again. To guarantee precise answers, all the questionnaires were conducted face-to-face. Figure 1 presents a visual representation of the Consolidated Standards of Reporting Trials (CONSORT) flow chart. In general, to comply with the ethical principles in the research, the participants were assured that none of the questionnaires used in the research included personal information; moreover, people could withdraw from the research process at any stage if they did not want to. At the end of the research, to comply with research ethics, an intensive course of yoga training sessions and relaxation therapy exercises at home was provided to the control group in the form of a video.

Tools

The Irritability Questionnaire: In 2008, Craig et al. created a questionnaire consisting of 21 items to evaluate irritability.[20] Each question in the questionnaire is assessed using a four-point Likert scale that ranges from 0 to 3.

Table 1. Summary of therapeutic interventions

Summary of yoga therapy sessions	
Session	**Content**
First	Familiarizing the members with each other, introducing the yoga method, and teaching breathing techniques
Second	Teaching focused meditation, calming breathing meditation techniques, middle breathing techniques
Third	Mental and physical awareness, full breathing training, and exercises from the previous sessions
Fourth	Teaching deep breathing
Fifth	Practicing breathing techniques
Sixth	Teaching Kaplabhati breathing techniques
Seventh	Teaching Kaplabhati breathing techniques; basically, it was a continuation of the previous sessions. In this session, the breathing technique was performed with strong contraction and making sound.
Eighth	The purpose of this meeting was to summarize and the training and advanced breathing techniques, and basically this exercise causes blowing and spreading heat in the body.
Summary of relaxation therapy sessions	
First	Teaching the main concepts and familiarization with the treatment method and teaching tension and systematic relaxation of 16 muscle groups with a regular breathing pattern to increase relaxation
Second	The participants performed the relaxation technique on their own using the therapist's instructions.
Third	The presenter took the name of a part of the body, and people should stretch and contract that muscle for 5 to 10 seconds at the same moment.
Fourth	First, a review of the previous sessions was done, and then the therapist taught special stretching exercises for the elbows as much as possible, as well as training for pulling the shoulders back and tightening and pulling the abdomen in.
Fifth	A workshop was held to review the skills taught and after the implementation of the taught methods, a re-evaluation of the skills learned by the participants and home exercises was carried out.
Sixth	In the final session, an overview of the learned skills was done and special exercises were given to people to implement the methods at home.

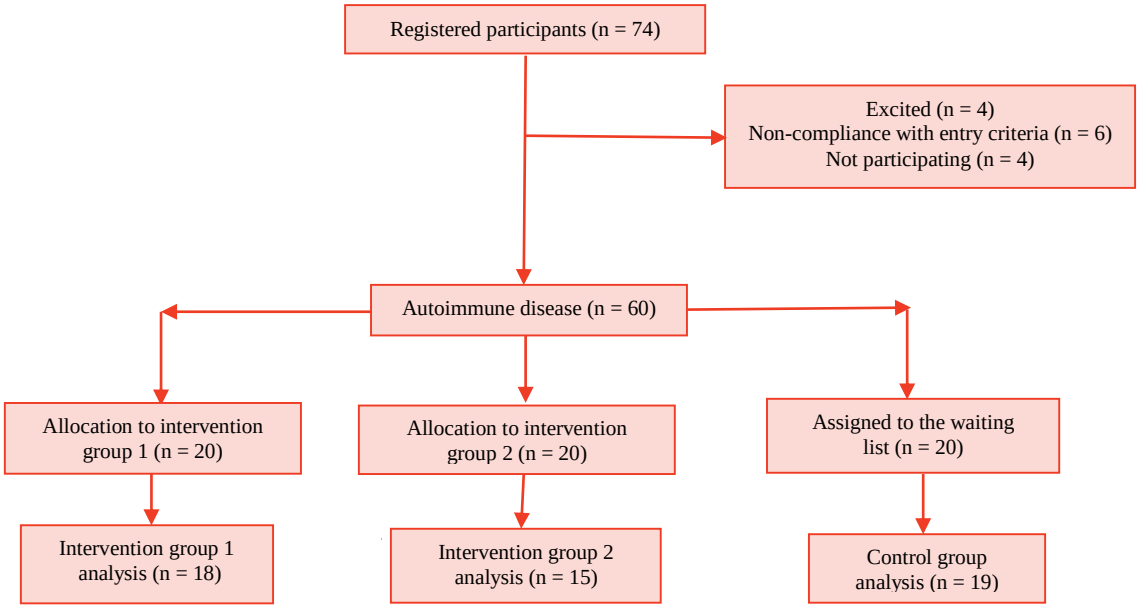

Figure 1. The flow diagram of the study

The overall score on the scale is calculated by summing up the individual scores, which can vary from 0 to 63. The scale's reliability was evaluated by the authors, who reported a Cronbach's alpha value of 0.90. In Iran, the reliability of the scale was reported to be 0.71 using Cronbach's alpha.[21] In the present study, the researcher determined the Cronbach's alpha coefficient of the scale to be 0.75.

Pittsburgh Sleep Quality Index (PSQI): This scale was created by Buysse et al. (1989) to evaluate sleep quality and help distinguish people who sleep well or hard.[22] This questionnaire examines the patient's attitude about the quality of sleep during the last four weeks. It includes 18 questions. The scores of this scale range from 0 to 54, and a high score indicates poor sleep quality. The validity and reliability of this questionnaire have also been confirmed in Iran, and the Cronbach's alpha coefficient of this questionnaire was found to be 0.78 to 0.82 in a research.[23] In this research, the researcher found the Cronbach's alpha coefficient of this scale to be 0.88.

Visual-standard scale for measuring muscle tension: A visual-standard scale was used to assess muscle tension in patients. This scale involves a horizontal line that is ten centimeters long and is divided from zero to ten. A score of zero indicates the absence of muscle tension symptoms and restlessness, while a score of ten represents the highest intensity of muscle tension symptoms. Various research studies have examined the efficacy of this visual-normative scale.[24]

Statistical analyses: All statistical analyses were performed using SPSS software (version 27, IBM Corporation, Armonk, NY, USA), with a significance level of 0.05. The collected data underwent analysis using Kruskal-Wallis H, analysis of variance (ANOVA), and multivariate analysis of covariance (MANCOVA). The normal distribution was evaluated through the Kolmogorov-Smirnov test, while the homogeneity of variances was assessed using Levene's test. Additionally, means were compared using Tukey honestly significant difference (HSD) test and Bonferroni's post hoc test.

Results

Initially, the researcher examined and

elucidated the demographic variables relevant to the study. The participants were categorized into three age groups: 30 to 40 years, 41 to 50 years, and 51 years and above. Similarly, the participants were divided based on their level of education: diploma, bachelor, and higher education (MSc, PhD). The outcomes obtained from the Kruskal-Wallis test also indicated that there were no significant differences among the participants about their demographic variables ($P > 0.050$).

According to the outcomes obtained from the MANCOVA presented in table 2, the P-value for the irritability variable in the between-subjects effects was solely significant during the follow-up stage ($P = 0.001$). The analysis further revealed that the P-value for the muscle tension variable in the between-subjects effects did not exhibit any significant disparity among the research groups ($P > 0.05$), implying the absence of a significant difference between the research groups. Concurrently, the P-value for the sleep problem variable in the between-subjects effects was significant solely during the follow-up phase ($P = 0.006$).

Based on the results presented in table 3, a significant difference in irritability scores was observed across the three stages of pre-test, post-test, and follow-up ($P < 0.050$). The importance of this disparity suggests that the changes in irritability scores remained stable during the three months following the introduction of interventions. Additionally, a significant distinction in muscle tension scores was evident when comparing the pre-test and follow-up stages ($P = 0.010$). Conversely, no disparity was detected between the post-test and pre-test stages ($P > 0.990$). Regarding the sleep problem variable, a significant variation was observed among the three stages of pre-test, post-test, and follow-up ($P < 0.050$).

Based on the data shown in table 4, a significant difference was observed in the irritability variable between the yoga and relaxation therapy groups when compared to the control group ($P < 0.050$). It can be ascertained that both intervention techniques employed in this study effectively address and alleviate irritability. However, no substantial discrepancy was observed in muscle tension when comparing the groups undergoing yoga and relaxation therapy with the control group ($P > 0.050$).

Analysis of table 4 indicates a significant contrast in sleep problems between the relaxation therapy group and the control group ($P = 0.004$). During the post-test and follow-up stages within the relaxation therapy group, compared to the control group, the relaxation therapy intervention employed in this study effectively addressed and alleviated sleep problems. Conversely, no significant difference was observed between the control group and yoga therapy ($P = 0.886$). The present study concludes that yoga therapy intervention did not yield any discernible impact on sleep-related concerns.

Discussion

The main objective of this study was to examine the efficacy of yoga and relaxation therapy in alleviating irritability, muscle tension, and sleep difficulties in patients with rheumatism. Both yoga therapy and relaxation therapy have proven to be effective in decreasing irritability, as per the findings of this study. However, neither intervention approach has any influence on muscle tension. In addition, the results indicate that relaxation therapy is successful in treating sleep issues, while yoga therapy does not affect this aspect.

The results of the current study suggest that yoga and relaxation therapy techniques effectively reduce irritability. Although there is a lack of specific research on the direct effects of yoga therapy and relaxation therapy on irritability, it should be acknowledged that irritability is defined by an abundance of anger, annoyance, impatience, and a decline in emotional regulation.

Table 2. Description of research variables and analysis of covariance (ANCOVA) test

Variable	Groups	Mean ± SD			Tests of between-subjects effects				
		Pre-test	Post-test	Follow-up	Source	Dependent variable	SS	F	P
Irritability	Yoga therapy	38.33 ± 3.62	36.05 ± 4.96	33.50 ± 6.67	Pre-test	Post-test	61.518	4.294	0.044
						Follow-up	199.141	9.991	0.003
	Relaxation therapy	40.66 ± 2.58	38.40 ± 2.64	29.53 ± 4.61	Group	Post-test	46.900	1.637	0.205
	Control	39.21 ± 3.70	38.57 ± 3.59	36.73 ± 2.35		Follow-up	341.725	8.572	0.001
Muscle tension	Yoga therapy	6.50 ± 1.24	6.05 ± 1.47	5.44 ± 1.38	Pre-test	Post-test	0.030	0.017	0.898
						Follow-up	4.423	2.446	0.124
	Relaxation therapy	6.40 ± 1.29	7.06 ± 1.27	5.40 ± 1.50	Group	Post-test	8.857	2.473	0.095
	Control	6.26 ± 1.24	6.31 ± 1.20	6.21 ± 1.22		Follow-up	8.302	2.296	0.112
Sleep problem	Yoga therapy	37.50 ± 5.26	32.83 ± 4.27	29.66 ± 5.24	Pre-test	Post-test	266.048	13.438	0.001
						Follow-up	33.745	1.370	0.248
	Relaxation therapy	30.20 ± 5.40	30.66 ± 5.17	24.40 ± 4.35	Group	Post-test	7.315	0.185	0.832
	Control	35.10 ± 5.69	31.84 ± 5.42	31.31 ± 5.17		Follow-up	280.505	5.696	0.006

SS: Sum of squares; SD: Standard deviation

Table 3. Bonferroni's post hoc test to check the difference between the three phases of the research

Variables	Time (I)	Time (J)	Mean difference	SE	P	95% CI	
						Lower bound	Upper bound
Irritability	Pre-test	Post-test	1.725*	0.611	0.020	0.211	3.240
	Post-test	Follow-up	6.147*	0.974	< 0.001	3.733	8.560
		Follow-up	4.421*	0.802	< 0.001	2.434	6.409
Muscle tension	Pre-test	Post-test	-0.092	0.252	> 0.999	-0.717	0.534
		Follow-up	0.703*	0.229	0.010	0.136	1.270
	Post-test	Follow-up	0.794*	0.281	0.020	0.097	1.491
Sleep problem	Pre-test	Post-test	2.488*	0.753	0.005	0.620	4.355
		Follow-up	5.808*	0.941	< 0.001	3.475	8.141
	Post-test	Follow-up	3.320*	0.854	0.001	1.202	5.437

SE: Standard error; CI: Confidence interval

*The mean difference is significant at the 0.05 level.

Table 4. Tukey's honestly significant difference (HSD) test to examine differences between three groups

Variables	Group (I)	Group (J)	Mean difference	SE	P
Irritability	Yoga therapy	Relaxation therapy	-0.237	0.825	0.956
	Relaxation therapy	Control	-2.212*	0.776	0.017
		Control	-1.975*	0.815	0.049
Muscle tension	Yoga therapy	Relaxation therapy	-0.288	0.275	0.549
		Control	-0.263	0.258	0.570
	Relaxation therapy	Control	0.025	0.271	0.995
Sleep problem	Yoga therapy	Relaxation therapy	4.911*	1.308	0.001
		Control	0.578	1.231	0.886
	Relaxation therapy	Control	-4.332*	1.292	0.004

SE: Standard error
*The mean difference is significant at the 0.05 level.

Moreover, indications show that intense irritability is connected to mental health issues and impairments in daily functioning.[4] Therefore, we can interpret and support these findings based on the known effects of yoga and relaxation therapy on psychiatric disorders. For instance, a study by Childs-Fegredo et al. highlighted that yoga showed promise as a mind-body technique for treating emotional disorders, reducing symptoms of depression and anxiety, and improving overall well-being.[25] Sayadi et al. study found that progressive muscle relaxation techniques were successful in decreasing depression symptoms among patients.[26]

To elaborate on this matter, it can be stated that both yoga therapy and relaxation therapy techniques induce relaxation in individuals. Yoga primarily focuses on triggering the physiological relaxation response to counteract the negative impact of unregulated emotions (body postures) that involve muscle strengthening, stretching, relaxation, and breath control. The relaxation response produces various beneficial physiological effects.[11] In comparison to yoga, relaxation therapy techniques also assist individuals in positively expressing their feelings and emotions. This technique can be employed by anyone to reduce distressing and harmful emotional symptoms such as anxiety or insomnia. Relaxation therapy has been found to decrease muscle tension and respiratory rate. Additionally, in relaxation therapy, engaging in deep breathing exercises enhances an individual's physical and mental well-being.[16]

The research findings indicated that both yoga and relaxation therapy interventions did not have an impact on muscle tension, contradicting previous studies by Anderson et al.[27] and Ferendiuk et al.[28] Anderson et al. demonstrated the potential benefits of yoga in reducing muscle tension in nurses,[27] while Ferendiuk et al. suggested using relaxation techniques to treat high muscle tension.[28] The discrepancy between the current study and previous research could be attributed to societal and geographical differences. It is important to recognize that various treatments may have different effects on individuals with different health conditions, with some cases requiring pharmaceutical or dietary interventions in addition to complementary medicine. Generally, yoga practice can improve blood circulation, breathing, muscle strength, nutrient absorption, and overall well-being.[25] Conversely, relaxation techniques involve simple exercises such as voluntary muscle contractions and relaxations to alleviate pain and muscle tension in various body parts like legs, abdomen, back, hips, chest, arms, neck, and head.[26] Recent studies have shown that relaxation therapy can have a beneficial effect on sleep problems and can help alleviate them. This finding is in line with previous research on the subject.[18,29]

Bakavoly et al. discovered in their research that relaxation therapy could enhance patients' sleep quality.[29] This finding suggests that the relaxation technique enhances sleep quality by balancing activity in the anterior and posterior hypothalamus, decreasing sympathetic nervous system activity, reducing physical discomfort, promoting muscle relaxation, and alleviating anxiety disorders, ultimately aiding in better sleep for patients.[16]

The current study also had some limitations. Both intervention approaches included exercises that needed to be implemented correctly for the interventions to be effective. However, it is possible that some patients did not perform the exercises properly because of impatience or the severity of their illness. Another limitation of the study was the inability to control certain intervening variables, such as participants' motivation and nutritional conditions, as well as their activities outside of study time and genetic differences. This study did not take into account factors such as gender, past medical history, treatment received, and current disease status. It is recommended that future research incorporate these demographic features for a more comprehensive analysis.

Conclusion

Based on the results of the current research, it appears that both yoga therapy and relaxation therapy could be beneficial in decreasing irritability in individuals with rheumatism. Additionally, relaxation therapy has the potential to enhance sleep quality in these patients. Healthcare professionals, including doctors, nurses, and other members of the treatment team, can integrate yoga and relaxation therapy into the treatment programs for individuals with RA, thereby aiding them in completing their treatment regimen. Moreover, it is recommended that future studies explore yoga that yields optimal outcomes and identify the patient population that can derive the most benefits from yoga interventions.

Conflict of Interests

Authors have no conflict of interests.

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The ethical standards followed in studies with human participants were in accordance with the guidelines established by the institutional and national research committee.

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