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Research Article

Investigating the Comparative Effectiveness of Yoga and Relaxation Therapy on Restlessness, Fatigue and Difficulty Concentrating in Multiple Sclerosis Patients

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Abstract

Background: Multiple sclerosis (MS) is a long-term autoimmune disorder affecting the central nervous system, leading to reduced quality of life and impaired physical and psychological functions.

Objectives: This study aims to examine the relative efficacy of yoga and relaxation therapy in improving sleep disturbances, fatigue, and cognitive impairment among individuals diagnosed with MS.

Methods: This study employed a semi-experimental research design, including a pre-test, post-test, and follow-up over three months. The target population comprised all MS patients referred to the Iranian MS Association in Tehran between July and November 2023. Sixty participants were selected using purposive sampling and randomly assigned to research groups: Two yoga therapy groups with 17 participants each, a relaxation therapy group with 16 participants, and a control group with 18 participants. The yoga therapy group participated in twelve 90-minute sessions twice a week, while the control group received no intervention and was placed on a waiting list. Various tools, including the Multidimensional Fatigue Inventory (MFI), Cohen-Mansfield Agitation Inventory (CMAI-O), and a concentration skills questionnaire, were used to collect data. The data were analyzed using ANOVA, Bonferroni post hoc test, MANCOVA, and Kruskal-Wallis H tests with a significance level of 0.05, utilizing SPSS 27 software.

Results: The study found a significant difference ($P < 0.001$) in the restlessness factor in both the post-test and follow-up phases. Additionally, there was a significant difference ($P < 0.001$) in the levels of physical fatigue, mental fatigue, decreased activity, and decreased motivation in both the post-test and follow-up phases, indicating significant changes in the fatigue factor among the research groups. However, there was no significant difference in the general fatigue component between the research groups. A significant difference ($P < 0.001$) was also found in the concentration factor, particularly in the components of voluntary and involuntary concentration, during both the post-test and follow-up stages.

Conclusions: The results of this study indicate that both yoga and relaxation therapy techniques significantly reduce restlessness, physical tiredness, mental fatigue, decreased activity, and decreased motivation. Furthermore, the findings validate that both yoga and relaxation therapy techniques effectively enhance voluntary and involuntary concentration.

Keywords: Yoga; Relaxation Therapy; Restlessness; Fatigue; Lack of Concentration; Multiple Sclerosis Patients

1. Background

Multiple sclerosis (MS) is a significant inflammatory disease that affects the central nervous system. This disorder is characterized by irregular episodes of neurological impairment, which can last from a few days to several weeks, with symptoms such as impaired mobility, double vision, and reduced sensory perception (1). The majority of individuals diagnosed with MS are female, with 90% of cases occurring between the ages of 15 and 50 (2). Studies estimate that around 70,000 individuals in Iran have MS, placing the country among the top ten worldwide in terms of disease prevalence (3). Multiple sclerosis is often referred to as the "disease of myriad manifestations" due to its diverse effects on the central nervous system, which increase the likelihood of psychiatric symptoms.

As a result, mental distress and restlessness have been identified as primary or secondary risk factors for MS (4). Restlessness includes feelings of apprehension, inner turmoil, and impatience triggered by a constant flow of thoughts, along with physical symptoms. This creates pressure to engage in activity, leading to discomfort and emotional distress, often coexisting with anxiety and depression (5). Research indicates that emotional distress and restlessness, including negative affective states like anxiety, depression, traumatic symptoms, and general distress, are prevalent among individuals with MS (6).

Multiple sclerosis also affects the central nervous system, leading to various symptoms such as muscle weakness, spasticity, and fatigue, ultimately causing deterioration of the musculoskeletal system (7). Fatigue is the most disabling symptom associated with MS and significantly reduces the quality of life for individuals. More than 80% of MS patients report experiencing daily fatigue (8). Fatigue may present as an overwhelming sense of weariness or exhaustion and can be either a primary or secondary symptom (9). Research suggests that the intensity and impact of fatigue are closely related to quality of life, anxiety levels, depression, cognitive function, and sleep quality in both progressive and non-progressive MS patients (10). Furthermore, a study by Penner et al. confirmed that fatigue is a common, troublesome, and disabling symptom that severely affects the daily lives of people with MS (9).

Cognitive impairment, a frequent and debilitating symptom in MS, adversely affects cognitive functions such as learning, memory, comprehension, focus, and problem-solving (11). Concentrating on specific topics is particularly challenging for individuals with MS (3). Research by Wojcik et al. suggests that stages of cognitive impairment, including processing speed, visual and verbal learning, working memory/attention, and executive function, are predictors of greater neurological disability in MS patients (12). The study highlights the significant impact of cognitive impairment on the quality of life for MS patients and emphasizes the need for early assessment at the time of diagnosis (11).

Despite recent significant advancements in medical science, there is currently no definitive treatment for MS. Most available treatments focus on alleviating symptoms or slowing disease progression (3). Physical activity is commonly used to address symptoms of MS, including various exercises aimed at improving balance, muscle strength, cardiovascular endurance, and flexibility. Yoga, which involves both physical and mental practices such as controlled breathing, mindfulness, and a healthy diet, is a holistic exercise regimen that contributes to overall health (13). Yoga promotes a healthy lifestyle, reduces the negative effects of stress, and alleviates anxiety and depression often experienced by individuals with chronic illnesses (14). Research by Naisby et al. highlights that yoga gives individuals with MS a sense of control over their symptoms and provides a purposeful form of physical activity (15). Another study suggests that practicing yoga at home is both beneficial and enjoyable for individuals with MS (13). Incorporating relaxation techniques into treatment plans can be a cost-effective complementary approach to improve the quality of life for MS patients. Benson's relaxation technique, which is widely recognized for its efficacy, helps reduce depression, anxiety, and stress (16). Mindfulness techniques within this approach are designed to reduce various psychological symptoms, including anxiety, pain, depression, and stress, while also improving sleep quality (17). Recent studies have shown that relaxation therapies can lead to improved outcomes for people with MS (18). Additionally, a study by Hamdi Kamal Khalil et al. confirmed the effectiveness of the Benson relaxation technique in reducing fatigue and enhancing sleep quality in MS patients (17).

Given the absence of a specific and definitive cure for MS (3), it is crucial to focus on methods that alleviate symptoms or slow the progression of the disease. However, previous research has not directly compared the effectiveness of yoga and relaxation therapy in addressing restlessness, fatigue, and concentration difficulties in MS patients. This gap in the research makes this study one of the first to examine the comparative efficacy of yoga and relaxation therapy in improving these symptoms in individuals with MS.

2. Objectives

The aim of this study is to assess the effects of yoga therapy on restlessness, fatigue, and impaired concentration in MS patients in comparison to relaxation therapy.

3. Methods

This study employed a semi-experimental design with a pre-test, post-test, and follow-up structure over a three-month period. It included three groups: Two experimental groups and one control group. The target population consisted of all MS patients referred to the Iranian MS Association in Tehran between July and November 2023. The statistical sample comprised 60 individuals who were selected through purposive sampling and then randomly assigned to one of the two experimental groups or the control group, with 20 individuals in each group. The sample size was determined using G-Power software, considering a significance level (α) of 0.05, an effect size of 1.11, and a power of 0.90 (19).

To qualify for inclusion, participants had to meet the following criteria: A diagnosis of MS, be at least 18 years old, be physically able to attend the intervention sessions, and have a medical record with the Iranian MS Association. Those with physical conditions that hindered regular attendance or who missed more than two sessions were excluded from the study. Before the study began, the researchers obtained the necessary approv-

als from the university and the Iranian MS Association.

After consulting the association's management, an official announcement was made to initiate the interventions and research. This announcement was distributed through printed materials and posted on the association's social media platforms. A careful selection process was then carried out to choose individuals who responded to the research participation notices. From the 125 initial applicants, a telephone interview was conducted to clarify the research objectives, ethical considerations, and to answer any questions. Further insights into their conditions were gained through an additional interview. During this phase, written consent for participation was obtained using a consent questionnaire. A pre-test was then conducted with the final 60 individuals, who were randomly assigned to one of three groups: The yoga therapy group, the relaxation therapy group, or the control group.

The yoga therapy group, consisting of 17 individuals, participated in twelve 90-minute sessions held twice a week, while the relaxation therapy group, with 16 individuals, attended six 90-minute sessions once a week. Each experimental group received their designated number of training sessions, while the control group received no intervention and was placed on a waiting list. The primary difference between yoga therapy and relaxation therapy was that in the relaxation therapy group, participants also received exercises to practice at home, with encouragement and support provided by phone. The interventions took place at one of the MS Association clinics.

After the study concluded, in adherence to research ethics, the control group (comprising 18 individuals) received a comprehensive program of yoga training and relaxation therapy exercises to complete at home. The treatment sessions for the yoga therapy group (20) and relaxation therapy group (21, 22) are summarized in Tables 1 and 2, respectively. After the final session, the experimental groups completed the research questionnaires as part of the post-test, and three months later, they filled out the same questionnaires again.

Table 1. Summary of Yoga Therapy Sessions

Sessions	Content
First	The purpose of this meeting was to introduce the yoga method and teach breathing techniques. Breathing techniques were taught in the upper body and lower breathing (abdominal and diaphragmatic).
Second	The purpose of this session was to teach middle breathing techniques. Middle breathing techniques were taught in the chest area.
Third	The purpose of this session was to teach full breathing. In this session, a review of the previous two sessions was performed, and then the three-step breathing technique was performed.
Fourth	The purpose of this session was to teach deep breathing. In this session, the deep breathing technique was taught in a state where both the surface and the lungs are full and empty.
Fifth	The purpose of this session was to practice breathing techniques. In this session, the previous breathing techniques were practiced and the client's problems were solved.
Sixth	The purpose of this session was to teach Kaplabhati breathing techniques. In this session, the breathing technique was performed with strong contraction and making sound.
Seventh	The purpose of this session was to teach Kaplabhati breathing techniques and basically it is 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 session was to teach Bhastrika breathing techniques and basically this exercise causes blowing and spreading heat in the body.
Ninth	Practicing the breathing techniques of the previous sessions and solving the client's problems.
Tenth	The purpose of this session was to teach breathing techniques and basically this exercise makes the client hear his own voice and become aware of it.
Eleventh	The purpose of this session was to teach alternating breathing techniques, and basically this exercise causes inhaling and exhaling during breathing.
Twelfth	The purpose of this meeting is to provide a summary for the previous meetings and an overview of all methods is done.

Table 2. Summary of Relaxation Therapy Sessions

Sessions	Content
First	In the first session, 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. Each participant received a video therapy guide to facilitate practice at home.
Second	In the second training session, the participants performed the relaxation technique on their own using the therapist's instructions. Participants took home audio cassette tapes with the same instructions to practice twice a day during the study period. They were asked to quickly record their relaxation exercises in an exercise log.
Third	In the third training session, 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. Then by saying the word release, they could return to the original state.
Fourth	In the fourth training session, 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.

3.1. Tools

3.1.1. Multidimensional Fatigue Inventory (MFI)

The Smets et al. survey is a self-evaluation questionnaire consisting of 20 questions designed to measure fatigue (23). Participants respond on a five-point Likert Scale, ranging from 1 (indicating "true") to 5 (indicating "not true"). The questionnaire covers five main components: General fatigue (four items), physical fatigue (four items), mental fatigue (four items), decreased activity (four items), and decreased motivation (four items). The total score ranges from 4 to 20, with overall scores between 20 and 100 indicating higher levels of fatigue. Researchers in Iran have reported the scale's internal consistency to be between 0.85 and 0.96, underscoring its reliability (24). In this study, the Cronbach's alpha coefficient for the scale was found to be 0.871, further confirming its reliability.

3.1.2. Cohen-Mansfield Agitation Inventory (CMAI-O)

Cohen-Mansfield developed a self-assessment questionnaire in 1991 consisting of 29 questions designed to measure restlessness (25). The questionnaire employs a seven-point Likert Scale to assess the frequency of restlessness, ranging from "never" (1) to "several times in an hour" (7). The restlessness score ranges from 29 to 203, with higher scores indicating greater restlessness. In Iran, researchers reported a high internal consistency of 0.84 for this scale. The reliability coefficient, determined using the split-half method, was 0.92 (26). In this study, the Cronbach's alpha coefficient for the scale was found to be 0.751, indicating acceptable reliability.

3.1.3. Concentration Skill Questionnaire

Savary and Oraki developed a self-assessment survey aimed at evaluating both voluntary and involuntary concentration (27). The questionnaire uses a five-point Likert Scale and is divided into two main components: Voluntary concentration (questions 1 to 8) and involuntary concentration (questions 9 to 13). The score range for voluntary concentration is 8 to 40, while for involuntary concentration, it is 5 to 25. Lower scores reflect greater difficulties with concentration. A study conducted in Iran by Savary and Oraki (27) demonstrated good internal consistency, with a Cronbach's alpha of 0.74 for the entire questionnaire, 0.72 for the voluntary concentration subscale, and 0.70 for the involuntary concentration subscale. The questionnaire's validity was confirmed through factor analysis, showing model fit indices of DF = 63, IFI = 0.86, CFI = 0.906, AGFI = 0.90, and RMSEA = 0.059 (28). In the present study, the Cronbach's alpha coefficients for the voluntary and involuntary subscales were found to be 0.75 and 0.73, respectively, indicating acceptable reliability.

3.2. Statistical Analyses

This study utilized descriptive measures, including mean and standard deviation for descriptive statistics, and analysis of covariance (ANCOVA) for inferential statistics. The collected data were analyzed using Kruskal-Wallis H, ANOVA, and MANCOVA, with a significance level set at 0.05. All statistical analyses were performed using SPSS version 27. The Kolmogorov-Smirnov test was conducted to assess the normality of the data distribution, while Levene's test was used to evaluate the homogeneity of variances. Additionally, Bonferroni's post hoc test was applied to compare the means between groups (Table 3).

Table 3. Bonferroni's Post hoc Test to Check the Difference Between the Three Phases of the Research

Variables	(I) TIME	(J) TIME	Men Difference	Std. Error	P-Value a
Restlessness	Pre- test	Post-test	11.035	0.745	< 0.001
		Follow up	14.105	1.048	< 0.001
	Post-test	Follow up	3.069	0.863	0.003
General fatigue	Pre- test	Post-test	1.043	0.316	0.005
		Follow up	1.159	0.299	0.001
	Post-test	Follow up	0.116	0.224	1.000
Physical fatigue	Pre- test	Post-test	4.129	0.303	< 0.001
		Follow up	4.583	0.315	< 0.001
	Post-test	Follow up	0.454	0.313	0.461
Mental fatigue	Pre- test	Post-test	3.126	0.412	< 0.001
		Follow up	4.200	0.295	< 0.001
	Post-test	Follow up	1.074	0.344	0.009
Decreased activity	Pre- test	Post-test	2.663	0.246	< 0.001
		Follow up	2.379	0.240	< 0.001
	Post-test	Follow up	-0.284	0.257	0.824
Decreased motivation	Pre- test	Post-test	3.837	0.318	< 0.001
		Follow up	4.006	0.318	< 0.001
	Post-test	Follow up	0.169	0.272	1.000
Willful concentration	Pre- test	Post-test	-3.321	0.327	< 0.001
		Follow up	-5.568	0.503	< 0.001
	Post-test	Follow up	-2.247	0.401	< 0.001
Involuntary concentration	Pre- test	Post-test	-1.224	0.322	0.001
		Follow up	-0.866	0.340	0.042
	Post-test	Follow up	0.358	0.268	0.564

[a] $P < 0.05$ was considered statistically significant.

4. Results

The researchers collected data from the participants at three stages: Before the study, after the study, and during the follow-up period. Data was gathered from different groups, including individuals who underwent yoga therapy, relaxation therapy, and a control group. Initially, the researchers examined and described the participants' demographic characteristics. The participants were categorized into three age groups: 20 to 30 years, 31 to 40 years, and 41 years and above. Similarly, they were divided into three groups based on their level of education: Diploma, Bachelor's degree, and higher education (PhD or MSc). The participants were also classified into two groups based on gender: Male and female. Additionally, the research focused on the duration of time the individuals had been affected by MS, classifying them into three categories: One to 2 years, 3 to 4 years, and more than four years. Furthermore, the results of the Kruskal-Wallis test showed no significant differences among the participants regarding their demographic factors ($P > 0.05$) (Table 2).

Table 4 shows that the mean value of the restlessness variable in the pre-test stage was similar across all three groups: Yoga therapy, Relaxation therapy, and the control group. However, both the Yoga therapy and Relaxation therapy groups exhibited a decrease in average scores for this variable in the post-test and follow-up stages, compared to the control group. No changes were observed in the control group.

Table 4. Description of Research Variables a

Variables and Groups	Pre-test	Post-test	Follow-up
Restlessness			
Yoga therapy	101.7059 ± 3.704	86.2941 ± 2.084	86.2941 ± 2.084
Relaxation therapy	102.2500 ± 4.328	85.5000 ± 2.280	75.6250 ± 9.105

Control	101.0000 ± 4.130	100.0556 ± 4.358	100.7222 ± 4.762
General fatigue			
Yoga therapy	16.5882 ± 1.577	15.1176 ± 1.317	15.1176 ± 1.317
Relaxation therapy	16.5000 ± 1.549	15.0625 ± 1.340	14.9375 ± 1.340
Control	16.2778 ± 1.363	16.0556 ± 1.433	15.8333 ± 1.382
Physical fatigue			
Yoga therapy	17.1176 ± 1.452	11.4118 ± 2.623	11.4118 ± 2.181
Relaxation therapy	17.1250 ± 1.204	11.0000 ± 1.032	10.2500 ± 2.144
Control	16.9444 ± 1.349	16.3889 ± 1.460	15.7778 ± 1.395
Mental fatigue			
Yoga therapy	16.5882 ± 1.502	11.4118 ± 2.623	8.6471 ± .931
Relaxation therapy	16.2500 ± 1.732	12.4375 ± 2.682	11.8125 ± 2.455
Control	16.5000 ± 1.424	16.1111 ± 1.604	16.2778 ± 1.406
Decreased activity			
Yoga therapy	15.6471 ± 1.221	11.2353 ± .970	11.7059 ± 1.649
Relaxation therapy	15.0000 ± 1.211	11.3125 ± 1.302	11.2500 ± 1.000
Control	15.1111 ± 1.529	15.2222 ± 1.352	15.6667 ± 1.236
Decreased motivation			
Yoga therapy	16.5882 ± 1.583	8.4118 ± .712	8.4118 ± .618
Relaxation therapy	16.6250 ± 1.668	13.1250 ± 3.074	13.5625 ± 2.827
Control	16.2222 ± 1.437	16.3889 ± 1.613	15.4444 ± .983
Willful concentration			
Yoga therapy	15.2353 ± 1.480	21.8235 ± 1.911	29.2941 ± 4.779
Relaxation therapy	15.1250 ± 1.543	18.0000 ± 2.097	17.4375 ± 1.787
Control	15.0556 ± 1.764	15.5556 ± 1.199	15.3889 ± 1.577
Involuntary concentration			
Yoga therapy	15.7059 ± 1.649	17.9412 ± 2.461	18.1176 ± 2.934
Relaxation therapy	15.3750 ± 1.310	16.8125 ± 1.376	15.5625 ± 1.590
Control	15.7222 ± 1.601	15.7222 ± 1.601	15.7222 ± 1.601

[a] Values are expressed as mean ± SD.

Similarly, the average values for general fatigue, physical fatigue, mental fatigue, decreased activity, and decreased motivation within the fatigue variable were not significantly different among the three groups in the pre-test stage.

Based on the results of the multivariate covariance analysis in Table 5, the P-value for the Between-Subjects Effects in the Restlessness variable was significant in both the post-test and follow-up stages ($P < 0.001$). This indicates that, by controlling for the effects of the pre-test stage, a significant difference was observed between the research groups. Therefore, there was a significant difference among the groups. Additionally, for the components of Physical fatigue, Mental fatigue, Decreased activity, and Decreased motivation, the P-value for the Between-Subjects Effects was also significant ($P < 0.001$) in both the post-test and follow-up stages. This demonstrates that, regarding the components of the fatigue variable, there was a significant difference between the research groups.

Table 5. Tests of Between-Subjects Effects and Covariance Analysis Test

Variables	Source	Dependent Variable	Sum of Squares	Mean Square	F	P-Value
Restlessness	Pre-test	Post-test	2.739	2.739	0.275	0.602
		Follow up	11.909	11.909	0.332	0.567
	Group	Post-test	2283.990	1141.995	114.752	< 0.001
		Follow up	5258.080	2629.040	73.246	< 0.001

General fatigue	Pre-test	Post-test	5.427	5.427	3.029	0.088
		Follow up	1.560	1.560	0.856	0.360
	Group	Post-test	9.493	4.747	2.649	0.081
		Follow up	7.167	3.584	1.967	0.151
Physical fatigue	Pre-test	Post-test	1.826	1.826	0.535	0.468
		Follow up	1.517	1.517	0.404	0.528
	Group	Post-test	315.311	157.656	46.147	< 0.001
		Follow up	295.624	147.812	39.314	< 0.001
Mental fatigue	Pre-test	Post-test	3.079	3.079	0.559	0.458
		Follow up	3.735	3.735	1.308	0.259
	Group	Post-test	214.619	107.309	19.492	< 0.001
		Follow up	516.561	258.280	90.458	< 0.001
Decreased activity	Pre-test	Post-test	.288	0.288	0.190	0.665
		Follow up	2.592	2.592	1.487	0.229
	Group	Post-test	181.656	90.828	59.856	< 0.001
		Follow up	207.512	103.756	59.516	< 0.001
Decreased motivation	Pre-test	Post-test	8.796	8.796	2.230	0.142
		Follow up	.359	0.359	0.119	0.732
	Group	Post-test	568.691	284.346	72.103	< 0.001
		Follow up	457.343	228.672	75.612	< 0.001
Willful concentration	Pre-test	Post-test	.306	0.306	0.097	0.757
		Follow up	3.054	3.054	0.317	0.576
	Group	Post-test	345.649	172.825	54.658	< 0.001
		Follow up	1936.553	968.276	100.530	< 0.001
Involuntary concentration	Pre-test	Post-test	1.848	1.848	0.520	0.475
		Follow up	5.459	5.459	1.200	0.279
	Group	Post-test	43.161	21.580	6.068	0.005
		Follow up	67.274	33.637	7.393	0.002

According to Table 5, there was a significant difference in Restlessness scores among the three stages: Pre-test, post-test, and follow-up ($P < 0.05$). This indicates that the changes in Restlessness scores remained stable over the three months following the interventions. Additionally, there was a significant difference in the scores of the Physical fatigue, Decreased activity, and Decreased motivation components between the pre-test stage and the post-test and follow-up stages ($P < 0.05$). However, no significant difference was found between the post-test and follow-up stages ($P > 0.05$), indicating that the changes in these components were not stable. In the Mental fatigue component, there was a significant difference between the pre-test, post-test, and follow-up stages ($P < 0.05$).

Table 6 demonstrates a significant disparity in the Restlessness factor among the Yoga therapy, Relaxation therapy, and control groups ($P < 0.001$). Given the significance of this disparity and the decline in average scores within this factor during the post-test and follow-up stages in the Yoga therapy and Relaxation therapy groups compared to the control group, it can be concluded that both intervention approaches had a positive impact on reducing restlessness. Similarly, for the Physical fatigue and Decreased activity components, there was a significant difference between the Yoga therapy and Relaxation therapy groups and the control group ($P < 0.001$).

Table 6. Post Hoc Test to Examine Differences Between Three Groups

Variables	(I) Group	(J) Group	Men Difference	Std. Error	P-Value a
Restlessness	Yoga therapy	Relaxation therapy	3.640	0.921	0.001
		Control	-9.161	0.895	< 0.001
	Relaxation therapy	Control	-12.801	0.909	< 0.001

General fatigue	Yoga therapy	Relaxation therapy	0.108	0.272	1.000
		Control	-0.448	0.264	0.289
	Relaxation therapy	Control	-0.556	0.268	0.131
Physical fatigue	Yoga therapy	Relaxation therapy	0.522	0.402	0.602
		Control	-3.057	0.391	< 0.001
	Relaxation therapy	Control	-3.579	0.397	< 0.001
Mental fatigue	Yoga therapy	Relaxation therapy	-1.284	0.421	0.011
		Control	-4.081	0.408	< 0.001
	Relaxation therapy	Control	-2.796	0.415	< 0.001
Decreased activity	Yoga therapy	Relaxation therapy	0.342	0.278	0.676
		Control	-2.471	0.270	< 0.001
	Relaxation therapy	Control	-2.812	0.275	< 0.001
Decreased motivation	Yoga therapy	Relaxation therapy	-3.300	0.439	< 0.001
		Control	-4.881	0.426	< 0.001
	Relaxation therapy	Control	-1.581	0.433	0.002
Willful concentration	Yoga therapy	Relaxation therapy	5.263	0.507	< 0.001
		Control	6.784	0.492	< 0.001
	Relaxation therapy	Control	1.521	0.500	0.011
Involuntary concentration	Yoga therapy	Relaxation therapy	1.338	0.472	0.020
		Control	1.533	0.458	0.005
	Relaxation therapy	Control	0.194	0.465	1.000

[a] $P < 0.05$ was considered statistically significant.

5. Discussion

The primary goal of this study was to explore and compare the effectiveness of yoga and relaxation therapy in improving restlessness, fatigue, and difficulty concentrating in patients with MS. The findings indicate that both yoga and relaxation therapy significantly reduced sensations of uneasiness, bodily fatigue, and reduced engagement in activities. However, no notable distinction was observed between the two cohorts, suggesting that both treatments are equally effective in diminishing these factors. Additionally, the results suggest that both yoga and relaxation therapy techniques are effective in reducing mental fatigue and decreasing motivation. Furthermore, the research revealed that both interventions were efficacious in enhancing deliberate and inadvertent focus.

The research findings regarding the impact of yoga and relaxation therapy on restlessness, physical exhaustion, and reduced mobility are consistent with prior studies (29-32). These results showed a significant improvement in fatigue among individuals with MS who engaged in yoga practices (29). Another investigation recommended relaxation techniques for effectively managing symptoms of pain and fatigue, which can often be debilitating for MS patients (30). The outcomes also suggested that yoga can enhance overall quality of life, reduce fatigue, promote physical activity, and alleviate anxiety during various stages of the illness and its treatment (31). Additionally, Toussaint et al. corroborated in their study that relaxation training can effectively promote relaxation at both psychological and physiological levels (32).

In explaining this finding, one can assert that yoga contributes to the coordination of bodily movements and respiration by strengthening and elongating muscles, thereby inducing profound relaxation. Moreover, yoga can significantly enhance functional mobility, hamstring flexibility, and overall physical activity levels (31). Yoga encompasses physical activity through postures, meditation, and breathing exercises. This integrated approach of exercise and mindfulness yields beneficial outcomes for the structural integrity of the brain in neurological diseases associated with chronic stress (33). All yoga techniques aim to facilitate deep relaxation, improve body flexibility, balance, ambulation, and muscle strength in individuals with MS, ultimately reducing symptoms of anxiety, depression, pain, and fatigue (34).

In contrast, relaxation techniques offer significant practicality in reducing autonomic nervous system activity, restoring balance between the anterior and posterior hypothalamus, reducing sympathetic activity and catecholamine secretion, relieving muscle tension, regulating blood pressure and heart rate, and achieving synchronization in respiration. Relaxation techniques are simple, safe, effective, cost-efficient, and easily accessible, requiring no specialized tools or expertise. By fostering a state of deep relaxation, these techniques help sustain a

passive mindset, leading to feelings of comfort and tranquility (16).

The research further supports previous literature by showing that yoga and relaxation therapy interventions reduce mental fatigue and decrease motivation, consistent with earlier studies (35-37). Additionally, the research demonstrates that relaxation therapy positively impacts emotional exhaustion and depression levels (35). A study conducted by Fasczewski et al. in 2022 reported increased motivation for physical activity and improved quality of life in MS patients following yoga therapy (36). Furthermore, the findings indicate that yoga may be valuable in addressing fatigue and depression (37).

This finding can be explained by the fact that yoga exercises have the capacity to enhance performance by improving the adaptability of the nervous and cognitive systems and modulating the autonomic nervous system. Consequently, mental fatigue is reduced, and physical stability is enhanced. After mental fatigue sets in, elevated levels of adenosine in the brain lead to increased resistance to exertion and the onset of exhaustion and reduced energy. However, yoga exercises decrease the activity of the central and autonomic nervous systems during stressful situations, thereby promoting relaxation. The influence of yoga on the autonomic nervous system and emotional regulation ultimately contributes to an overall sense of well-being.

In comparison, relaxation therapy techniques can regulate the hypothalamic-pituitary axis through attention-regulation methods, such as meditation and autogenic exercises, or muscle tone regulation techniques, such as muscle stretching and progressive relaxation. These approaches positively affect adrenal function, resulting in reduced stress hormone levels and lower burnout rates by counteracting negative emotional states.

Another result from this research indicates that both yoga and relaxation therapy positively impact willful and involuntary concentration, enhancing these aspects. This finding aligns with previous studies (38, 39). One study reported significant improvements in sustained and focused attention, as well as increased attentional control processing due to yoga practice (38). Additionally, research has demonstrated that relaxation therapy can effectively improve concentration (39). This can be attributed to the emphasis on breathing during yoga sessions, which enhances sustained focus. Breath control exercises have a calming effect on the mind, aiding concentration and leading to better performance and attentiveness as a result of reduced stress levels in yoga practitioners.

Regular engagement in yoga improves the ability to cope with stress, promotes mental relaxation, and heightens concentration (38). In contrast, relaxation therapy encourages individuals to focus on achieving a relaxed state of both body and mind, allowing them to enter the alpha state. The alpha state is characterized by a calm yet attentive and imaginative mind, focused on one task at a time. In this state, the mind experiences heightened concentration, the body relaxes, and responsiveness to suggestions increases. Therefore, relaxation therapy can effectively enhance concentration (39).

Among the limitations of this study were the individual differences and psychological states of the participants, which could influence their response to the therapeutic interventions and impact their overall condition. Furthermore, while the findings suggest that yoga and relaxation therapy are effective in alleviating anxiety, fatigue, and concentration issues in patients with MS, the primary focus of the study was on fatigue and concentration difficulties. In terms of precise measurements, programs, and study samples, the research was often confined to specific geographic regions, limiting the ability to address broader inquiries. Therefore, to generalize the results, it is important to employ larger samples from diverse geographic areas and consider various ailments.

5.1. Conclusions

The findings of the current investigation indicate that both yoga and relaxation therapy positively affect restlessness, physical exhaustion, reduced activity, mental exhaustion, and decreased motivation, leading to a reduction in these factors. Additionally, both therapies were shown to effectively enhance voluntary and involuntary concentration. Given the significant impact of MS on individuals' quality of life, it is recommended to implement appropriate interventions that improve mental health services for MS patients. One potential approach is to offer yoga and relaxation therapy training classes through welfare organizations and the MS Association. It is important to note that this study specifically focused on MS patients in Tehran. Therefore, future research should consider applying these treatment methods to MS patients in other cities to broaden the scope of the findings obtained in this study.

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