

Comparing the Effect of Reflexology and Effleurage Massages on Fatigue and Insomnia in Multiple Sclerosis Patients

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ABSTRACT

Aims Patients with Multiple Sclerosis face many problems and complications; fatigue and insomnia are considered the common complications influencing their lives. Complementary therapies such as reflexology and effleurage massage can help reduce fatigue and insomnia in these patients, but no comparison has been made between the two effects on reducing these complications. The present study compared reflexology and effleurage massage on the severity of fatigue and insomnia among Multiple Sclerosis patients.

Methods This experimental study is a clinical trial and conducted on 90 Multiple Sclerosis patients in Ahvaz city in Iran from May 30 to July 30, 2019. The selected patients were assigned into three groups: reflexology massage, effleurage massage, and control (group 30) by blocked randomized sampling). The intervention was performed in the reflexology and effleurage groups twice a week for eight weeks. The control group received only routine medication prescribed by the pertinent physician. The data were collected using a demographic questionnaire, Fatigue Severity Scale (FSS), and Insomnia Severity Index (ISI) before and after the intervention. The data were analyzed by SPSS 21 software, using descriptive statistics, Chi-square test, independent t-test, pair t-test, and Scheffe post hoc test.

Findings Following the intervention, there was a significant difference between the three groups ($p \leq 0.001$), but the reflexology intervention has a greater effect on fatigue severity among the patients than the effleurage massage. The results indicated that the effect of interventions on fatigue severity was the same in both groups of reflexology and effleurage ($p = 0.069$); however, compared to the control group, insomnia severity diminished in reflexology and effleurage massage groups ($p \leq 0.001$).

Conclusion Applying reflexology and effleurage massage therapy techniques can be helpful to reduce the severity of fatigue and insomnia in Multiple Sclerosis patients, but reflexology is more effective in reducing insomnia. Accordingly, these techniques are suggested as effective, safe, and inexpensive nursing interventions.

Keywords Multiple Sclerosis; Reflexology; Massage; Fatigue; Insomnia

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Introduction

Multiple Sclerosis (MS) is a relatively common chronic inflammatory neurologic disorder associated with demyelination of the central nervous system. A total of 85% of MS patients are between 15 and 50 years old [1]. In Iran, the MS prevalence is estimated from 5.3 to 89. Per 100,000 people [2]. The major risk factors associated with MS are smoking, vitamin D deficiency, age (15-60 years), Epstein-Barr virus precedent, and autoimmune diseases [3]. Since there are different signs and symptoms of MS and the course of the disease varies from person to person, it generates various clinical manifestations [4]. The most debilitating common symptom of MS is fatigue, often emerging as the first symptom at the onset of the disease, which remains, severely or mildly, during its course [5]. More than 80% of MS patients suffer from fatigue, with approximately 1 out of 4 patients reporting fatigue as the worst and the most disturbing. Furthermore, fatigue is one of the most important causes of early retirement in MS people [6]. Among the other MS common symptoms are sleep disorder (insomnia) with patients complaining about constant awakenings during night sleep, increased sleepiness during the day, or abnormal behaviors, moods, and emotions while sleeping [7]. More than 50% of MS patients have insomnia; hence it can be assumed that they experience more sleep problems than the normal population and other chronic diseases. It is also supported that MS female patients are more likely to experience sleep problems than males [8].

The association between fatigue, sleep disorder, and the high prevalence of sleep disorder in MS patients has been shown in many studies. The fatigue treatment is still challenging as there is no proven treatment and its mechanisms are unknown, yet there is no valid and accurate data to prove its cause might be Restless Legs Syndrome (RLS). The RLS is four times more prevalent among MS patients, specifically those disabled with the sensory and pyramidal system, compared to other people. In addition, nocturia may cause fatigue in MS patients influencing their fatigue and sleep [9]. Antidepressants and clonazepam are more commonly used to treat sleep disorders in MS patients [10].

Although fatigue and insomnia in these patients can be partially controlled with medication, due to the problems and side effects of the drugs, the use of non-pharmacological methods such as complementary and alternative medicine has been considered too [11]. Massage is a manual operation on body tissues with normal pressures and taps. Reflexology is a type of massage using thumb and finger techniques to provoke certain areas in the feet. It is frequently done on soles and, at times, palms; however, this study has considered foot reflexology. Foot reflexology is a holistic approach to health involving pressure and

massage on the reflex points discovered on foot. Specialists believe that a life force or vital energy flows through the feet channels to all body organs, and any clog in the flow will ultimately lead to disease. They also believe that stimulation of reflex points on the feet can break these clogs along the flow path; reflexology aims to remove these clogs and free the flow of energy in these channels, leading to the patients' wellbeing [12]. Reflexology may reduce stress and tension and maintain the balance or homeostasis of the body [13].

Swedish massage is the most commonly used among all types of massages. It is painless, mild, and without side effects; it decreases the sympathetic system activity and boosts the parasympathetic system activity, causing enhanced blood flow and skin flexibility, and tissue relaxation [14]. Effleurage massage is one of the five Swedish massage techniques performed by rubbing the two palms gently on the skin, creating a calming effect. Its main effect is on venous and lymphatic return to the bloodstream to the heart. It can contribute to reducing pain, anxiety, and insomnia [15].

Sajadi *et al.*, in a study, showed that reflexology intervention in MS patients reduced fatigue and insomnia [16]. In Dikmen & Terzioğlu's study, simultaneous reflexology intervention with enhanced muscle relaxation significantly reduced pain intensity and fatigue in patients with female reproductive cancer during chemotherapy [17]. Tarrasch *et al.*, showed the effect of reflexology on reducing fatigue and insomnia in breast cancer patients during radiation therapy [18]. Also, in the study by Nazari *et al.*, reflexology showed a greater effect on reducing fatigue in women with MS than muscle relaxation [19].

The positive effect of massage therapy was found in Backus *et al.*'s study on fatigue in people with multiple sclerosis [20] and in Castro-Sánchez *et al.*'s study on sleep improvement in patients with fibromyalgia. However, in the study of Schroeder *et al.*, massage did not significantly affect the quality of life of patients with MS [21]. But no study was found to compare the effect of reflexology and Effleurage massage on fatigue and insomnia in patients with MS. Overall, massage therapy and reflexology are non-invasive, tranquil, and inexpensive methods with no side effects. However, no study has shown which of the reflexology and massage interventions has the greatest effect on reducing fatigue and insomnia in MS patients. Therefore, the present study was performed to compare the effect of reflexology and massage on reducing fatigue and insomnia in patients with MS.

Methods

This experimental study is a randomized clinical trial and done from May 30 to July 30, 2019 on who were members of the MS Association in Ahvaz, the capital

of Khuzestan situated in the southwest of Iran. The study population was those based on Nazari *et al.* $S1=0.83$, $S2=1.06$, $\mu1=3.62$, and $\mu2=4.1$, the sample size obtained 24 people and considering the probability of sample loss, 30 people in three groups (Control, Effleurage, and Reflexology) [18]. A total of 90 people in all three groups were counted by convenience sampling method. Inclusion criteria were 1- Age range entry of 18-50 years old; 2- Written consent to participate in the study; 3- Full consciousness and thorough health in feet and lack of physical injuries in organs as well as in spine; 4- Lack of any motion sickness that may disrupt the implementation of the tests; 5- Lack of history of surgery on legs and organs in the past six months; 6- Lack of wound, rash, and an abnormal lump on back, neck, legs, and organs; 7- No previous participation in complementary medicine therapies for the last six months; 8- No opium and psychiatric drug addiction; 9- A firm diagnosis of MS by a neurologist based on McDonald's criteria made for more than six months; 10- Obtaining at least score 45 for fatigue status based on FFS Questionnaire and 22 and higher for insomnia status based on ISI Questionnaire. Exclusion criteria include 1- Disease deterioration influencing the severity of fatigue and insomnia; 2- Disease relapse and changes in the course of disease resulting in patient's hospitalization 3- Lack of patient's willingness for cooperation 4- Acute illness such as fever and infection during the study. In this study, for each patient participating in the massage intervention group, a caretaker was needed to perform the intervention, and 30 family members participated. Selection criteria of the patients' caretaker including 1- Willingness to participate; 2- Age over 16; 3- Having basic literacy skills; 4- residence with the patient in the same place such as their home or elsewhere; 5- No history of seizure, migraine, asthma, and other respiratory illnesses; 6- Having the proper motor ability of their hands to massage.

The data collection instruments were Demographic, Fatigue Severity Scale (FSS), and Insomnia Severity Index (ISI) questionnaires. The demographic questionnaire captured demographics and disease information. To measure patients' fatigue, Fatigue Severity Scale (FSS) was employed. FSS is a validated self-report scale with nine items, certified by Krupp *et al.* for its construct validity and reliability among MS patients showing 81% Cronbach's alpha [15]. Five questions evaluate fatigue quality, three questions measure physical, mental, and fatigue outcomes on every individual's social status, and the last one compares the fatigue severity with other symptoms of MS patients. Each question is scaled 1 to 7; 1 shows lack of fatigue, and 7 shows the highest level of fatigue. To discern tired and untired, the total score of all nine questions: 9 to 18; 19 to 45; and upper 45 are correspondingly considered for the low fatigue, average fatigue, and high fatigue levels. To measure

insomnia, Insomnia Severity Index (ISI), including seven questions, was used. Each question scaled five options, zero=never and 4=very much, scoring 0 to 28. Insomnia is not clinically significant, scoring 0 to 7, 8 to 14 is subclinical, 15 to 21 is moderate clinical, and 22 to 28 is severe clinical insomnia. ISI is a brief self-assessment tool measuring a patient's perception of insomnia (Morin, 1993). Its psychometric properties have already been examined by him [22].

The ethics code for the study was granted by Yasuj University of Medical Sciences in Iran. Before data collection, written informed consent was obtained from the patients. Voluntary exclusion from the study, confidentiality and anonymity of questionnaire participants were other ethical considerations. A list of eligible patients by request from the Ahvaz MS Association was prepared. Next, the researchers called the patients to complete a consent form and make the final list of participants. In the next step, the patients were simply randomly assigned into three groups of reflexology and effleurage massage intervention and control by block randomization. After filling out the consent form, the researcher completed demographic, FSS, and ISI questionnaires by interviewing the patients. The effleurage massage interventions were performed by the patients' well-trained caregivers. Then, several training sessions were held to train the patients and their caretakers (the masseurs). The training session would be ended as the patient's caretaker performed the massage movements appropriately.

Further, to better perform the massage, educational brochures were provided and delivered to the caretakers. To carry out the intervention in time, the researcher would be reminded through text messages or telephone calls. Group 1 received reflexology intervention (foot reflex points massage), and group 2 received Effleurage massage intervention.

Reflexology Intervention: The patient lay down on a bed in a quiet and bright environment and a completely relaxed position. Then, after a gentle massage on their soles, the heel of each foot was taken with the left hand with the reflex points pressed by the right-hand thumb in alternating wavy and smoky movements (tree-worm-like movement). The pressures ranged from the gentlest possible contact to the deepest pressure on the reflex points, i.e., pituitary gland, thyroid, diaphragm, solar grid, and adrenal glands [23]. The massage lasted for 40 minutes (20 minutes for each foot).

Effleurage Massage Intervention: The patient lay down on the abdomen. The masseur's hands must be warm, calm, and stress-free. Once the patient was in the right massaging position, the masseur sat on one side of the patient and placed her both hands down the patient's waist, starting point, to make sure all the fingers and thumbs were in contact with each other with the masseur's entire palm being in contact with

the patients' skin. The slippery movements of the palm began from the lower waist and continued upward, and went all the way to the spine, sides, and shoulders. When the hands moved to the endpoint's shoulder and neck area, they slowly moved from shoulders down to the armpits and the waist area [24]. The intervention lasted for 40 minutes.

Two interventions were conducted twice a week for eight weeks (16 sessions). Patients of the control group stayed on medication based upon their physician's prescription. All patients in 3 groups received routine treatment prescribed by their physician after the end of the intervention period; the researcher completed the questionnaires while interviewing the patients in 3 group studies.

The data were analyzed by SPSS 21 software, using descriptive statistics, Chi-square test, independent t-test, analysis of variance (ANOVA), and Scheffe post hoc test.

Findings

The 90 qualified patients were equally distributed in three groups of thirty. The participants' average age was 31.87 ± 7.83 years old (Reflexology = 33.17 ± 7.51 , Effleurage = 32.7 ± 8.15 , and Control = 29.73 ± 7.61) and this variable was not significantly different in groups ($p=0.1$); the youngest was 19, and the oldest was 50 years old. Furthermore, the mean disease duration was 6.32 ± 4.33 (range between 1 and 18 years). There was no significant difference between groups ($p=0.1$) in the mean \pm SD of Reflexology = 6.6 ± 5.32 , Effleurage = 6.27 ± 3.85 , and Control = 6.1 ± 3.79 . Some participants (53%) had an academic educational degree. There was no significant difference between the three groups in age, illness duration, sex, educational level, and marital status (Table 1).

Table 1) Comparison of demographic characteristics of groups

Variables	Reflexology	Effleurage	Control	p.
	N (%)	N (%)	N (%)	
Sex				
Male	18 (60)	18 (60)	13 (43.3)	0.3**
Female	12 (40)	12 (40)	17 (56.7)	
Marriage				
Single	7 (23.3)	10 (33.3)	11 (36.7)	0.5**
Married	23 (76.7)	20 (66.7)	19 (63.3)	
Education				
Primary School	0	2 (6.7)	0	0.03**
Secondary School	1 (3.3)	1 (3.3)	0	
Diploma	15 (50)	9 (30)	14 (46.7)	
Academic Education	14 (46.7)	18 (60)	16 (53.3)	
Job				
Housekeeper	16 (53.3)	12 (40)	11 (36.7)	0.13**
Governmental Employee	5 (16.7)	12 (40)	8 (26.7)	
Non-governmental Employee	7 (23.3)	6 (20)	11 (36.7)	
Retired	2 (6.7)	0	0	

The results showed a normal distribution of data for both variables of fatigue and insomnia. There was no significant difference in the severity of fatigue and insomnia between the three groups before the interventions, but after the interventions, there was a significant difference between the three groups (Table 2). The pairwise comparison results showed that the mean fatigue intensity increased significantly in the reflexology group compared to the affluent group and the control group, and the effleurage group compared to the control group (Table 2).

There was a significant increase in reflexology and effleurage massage intervention groups on the fatigue and insomnia severity after the interventions compared with before interventions. But there was no significant difference in the control group after the intervention compared with before the intervention (Table 3).

Table 2) Mean \pm SD comparison of fatigue and insomnia severity between/within three groups of participants

Variable	Reflexology	Effleurage	Control	p.
Fatigue				
Before	55.57 \pm 5.46	53.33 \pm 4.58	53.93 \pm 3.92	0.2
After	26.83 \pm 8.67	37.03 \pm 6.66	54.97 \pm 3.86	0.001
p.	0.001	0.001	0.3	-
Insomnia				
Before	23.8 \pm 1.85	23.73 \pm 1.46	24 \pm 1.95	0.83
After	16 \pm 1.15	15.2 \pm 1.22	23.1 \pm 1.56	0.001
p.	0.001	0.001	0.4	-

Table 3) Two-to-two comparison of mean scores of fatigue and insomnia between study groups

Variable		Mean Difference	p.
Fatigue			
Reflexology	Effleurage	-10.2	0.001
	Control	-28.13	0.001
Effleurage	Control	-17.93	0.001
Insomnia			
Reflexology	Effleurage	0.8	0.06
	Control	-7.1	0.001
Effleurage	Control	-7.9	0.001

Discussion

This study was performed on 90 patients with MS to compare the effect of reflexology with effleurage massage on fatigue and insomnia in these patients. This is probably a new study, as no study has been found so far.

The results revealed that reflexology and effleurage massages significantly decreased the severity of fatigue and insomnia in MS patients. Similar to the present study, in Hughes *et al.*, reflexology intervention and sham as placebo decreased fatigue, disability, spasm, depression, and pain in MS patients [25]. However, sham has also had a positive effect, probably because of stimulation of reflex points in the feet using non-specific massage or a possible placebo effect. The difference between the present study and the above study is that in the present study, although the frequency of intervention was higher, no placebo was used for the control group, and only the effect of

reflexology intervention was measured. Also similar to the present study, in the study by Ozdelikara *et al.*, reflexology reduced anxiety and fatigue in patients with MS [26].

In line with the present study results, a meta-analysis by Lee *et al.* was performed on the effects of foot reflexology on fatigue, sleep, and pain of patients. They found that reflexology prevents the decline of quality of life and significantly improves fatigue and patients' sleep quality [27]. Similar to the present study, Bastani & Haghani found that foot reflexology effectively reduces the severity of fatigue in the mothers who delivered their babies via cesarean section. They applied sesame oil to massage feet, while no massage oil was employed in the present study [28]. Also, Tarrasch *et al.* investigated the effect of reflexology on pain, fatigue, and insomnia in breast cancer patients during radiation therapy. The results indicated that reflexology therapy significantly influenced the patients' quality of life and improved their fatigue and sleep [18]. Although the frequency of reflexology interventions and follow-up time in the above study was less compared to the present study, as in the present study, it has reduced patients' fatigue and sleep. In the Dogan study, fatigue reflex was reduced in MS patients after five weeks [29]. Also, in the study by Sajadi *et al.*, Reflexology intervention reduced insomnia and fatigue in patients with MS [16]. In the present study, after eight weeks of intervention (16 sessions), the results showed a decrease in fatigue in these patients, but in the two above studies, fatigue was reduced in patients after 5 and 4 weeks, respectively. Therefore, reflexology can help reduce fatigue and insomnia in MS patients in less time.

The results showed the effect of effleurage massage on reducing fatigue. Backus *et al.* studied the effect of massage therapy on fatigue, pain, and spasm in MS patients. Similar to the present study, they found that massage therapy is a beneficial intervention for fatigue and pain management among MS people [20]. The results of the present study also showed that effleurage massage reduced insomnia in MS patients. Khoshno *et al.* conducted a study on increasing the effleurage massage duration to improve older men's sleep quality. In their study, the effect of massage duration was 10 minutes in the first group and 20 minutes in the second group. The results of their study indicated that there was no significant difference between the two intervention groups after 10- and 20-minute massage. However, in the present study, the effleurage massage intervention lasted for 40 minutes. Also, like to the present study, Khoshno *et al.* revealed that the effleurage massage influenced the elderly's sleep quality [30]. Schroeder *et al.* examined how massage therapy influences the MS patients' quality of life and foot function. Their findings indicated no significant change in Six-Minute Walk Test (6MWT) scores and Hamburg Quality of Life in Multiple Sclerosis (HAQUAMS) [31]. In the above study, different variables from the variables of

the present study were measured, and massage intervention did not show an effect on the quality of life in MS patients, but in the present study, the effect of this intervention on fatigue and insomnia in these patients was reduced.

In the present study, reflexology intervention was more efficient than effleurage on fatigue severity, but no significant difference was found between the effect of reflexology and effleurage massage on insomnia. However, no study was found to compare the effect of reflexology and effleurage massage on fatigue and sleep in MS patients, which is one of the strengths of the present study. The present study also had some limitations. Fatigue and insomnia, as mental phenomena, are very hard to measure are influenced by numerous variables such as affective changes and distressing symptoms associated with MS. Finally, not employing a placebo group to partly control is yet another limitation.

Future studies are suggested to investigate the effect of simultaneous use of reflexology and massage on fatigue and insomnia in MS patients.

Conclusion

According to the results, both effleurage massage and reflexology have been beneficially influenced by decreasing the severity of fatigue and insomnia. The results also revealed that the effect of reflexology in reducing fatigue severity in MS patients was greater than the impact of effleurage massage. Nonetheless, the effect of the two interventions was the same on the severity of insomnia. Therefore recommended that nurses use these methods as adjunctive therapies for MS patients and that patients and their companions be educated about these interventions. Results should also be reported to health care providers who report these procedures as complementary therapies to MS care centers.

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