Original Article

A comparison the effects of reflexology and relaxation on the psychological symptoms in women with multiple sclerosis

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ABSTRACT

Background: Multiple sclerosis (MS) occurs with a variety of physical and psychological symptoms, yet there is not a conclusive cure for this disease. Complementary medicine is a current treatment which seems is effective in relieving symptoms of patients with MS. Therefore, this study is aimed to determine and compare the effects of reflexology and relaxation on anxiety, stress, and depression in women with MS. **Subjects and Methods:** This study is a randomized clinical trial that is done on 75 women with MS referred to MS Clinic of Kashani Hospital. After simple non random sampling, participants were randomly assigned by minimization method to three groups: reflexology, relaxation and control (25 patients in each group). In the experimental groups were performed reflexology and relaxation interventions within 4 weeks, twice a week for 40 min and the control group were received only routine treatment as directed by a doctor. Data were collected through depression anxiety and stress scale questionnaire, before, immediately after and 2 months after interventions in all three groups. Chi-square, Kruskal–Wallis, repeated measures analysis of variance and one-way analysis of variance and least significant difference *post hoc* test via SPSS version 18 were used to analyze the data ($P < 0.05$) was considered as significant level. **Results:** The results showed a significant reduction in the severity of anxiety, stress and depression during the different times in the reflexology and relaxation groups as compared with the control group ($P < 0.05$). **Conclusion:** The results showed that reflexology and relaxation in relieving anxiety, stress and depression are effective in women with MS. Hence, these two methods, as effective techniques, can be recommended.

Key words: Anxiety, multiple sclerosis, reflexology, relaxation, stress and depression

INTRODUCTION

Multiple sclerosis (MS) is a progressive autoimmune inflammatory disease of the central nervous system associated with a wide variety of different symptoms that has a profound effect on physical function and quality of life.[1] MS patients show a variety of neurological signs and symptoms. It typically presents in young adults between 20 and 50 years of age, with a peak occurring at 30 years of age. It is nearly 3 times more common in women. The total number of people living with MS worldwide is estimated to be 2–2.5 million. The disease is unevenly distributed

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throughout the world.[2] Its prevalence in Isfahan in Iran is almost 43.8 cases per 100,000 people.[3]

MS causes psychological symptoms due to no conclusive cure and chronic nature of the disease. The studies have shown that psychological disorders such as depression, stress and anxiety in patients with MS are more than healthy individuals.[4]

In this disease because of the extensive involvement of white matter in sub-cortical and central areas, mental health disorders can also occur.[5] Depression and anxiety have a point prevalence of 16–44%.[6] In these patients suicidal ideation and attempts are reportedly 2–7.5 times higher than the general population.[6] As another sign involved in MS, stress has been widely studied and very often is known as the agent of relapsing. Many MS patients report that their symptoms go worse as a result of stress. Anxiety, stress, and depression have a major role in triggering the onset of the attack, while there is no cure for MS.[7] Management of symptoms in MS thus becomes a critical issue, since these will inevitably lead to negative effects of daily living, social roles, professional and family involvement.[8,9]

Studies have shown that complementary medicine is used in patients with MS is more than in the general population.[10] Fear of medication side-effects and desire for symptom relief are possible reasons for the increasing use of complementary and alternative medicine (CAM) by MS patients, however many CAM modalities do not have enough scientific evidence to support their efficacy and safety. Therefore, nurses are in a unique position to assess client needs for these interventions to evaluate the strength of evidence and to adopt evidenced-based modalities.[10] Prevalence of use of complementary therapies including reflexology and relaxation are increasing among people with MS but there is not enough evidence to support their effectiveness.[11] Relaxation technique reduces pressure and muscle contraction and is a tool to increase relaxation of the body and the mind.[12] Reflexology is performed using the thumb and forefinger to apply pressure to specific areas on the feet that have been claimed to correspond to the internal organs.[11]

It is well acknowledged that foot reflexology therapy effectively facilitates blood and lymph circulation which accelerate the excretion of waste, soften, and stabilize the movement of muscle, joints, and tendons, reinforce muscle strength, and promote relaxation.[13] In addition, the human touch accompanied by reflexology offers care and attention for patients, and this psychological comforting has been reported as a primary benefit of the reflexology.[11]

Other hypotheses relate to improvement of blood flow; the theories that reflex points are nerve receptors, the stimulation of which reduces muscular or psychological tension, inducing deep relaxation[14] and about the relaxation, studies have found reduced sympathetic nervous system activity and salivary cortisol levels following relaxation training.[15] These are several hypotheses relate to these methods which have,

so far, not been submitted to sufficient experimental testing. Future investigations might address these issues.

Studies have shown that 64.9–84% patients with MS use at least one of complementary medicine therapies such as reflexology and relaxation,[16] while their applications has not been specifically evaluated and thus information about possible side-effects is limited, leading to a lack of understanding of the safest and most effective complementary therapies.[17] Therefore, this study was aimed to compare the effects of reflexology and relaxation on anxiety, stress and depression in women suffering MS.

SUBJECTS AND METHODS

This study is a single-blind randomized clinical trial with three groups that is done on 75 patients with MS referred to MS Clinic of Ayatollah Kashani Hospital (Isfahan, Iran) in during April 2014–July 2014 and is the result of part of the research plan approved by Ethical Committee and research vice chancellery of Isfahan University of Medical Sciences. This research been registered in center clinical trial of Iran with number 2014050117387.

The sample size was calculated with the power = 80% and $\alpha = 0.05$ equal proportions of experimental and control groups. Each group was determined to have 30 patients (totally 90 patients), which 15 patients were excluded from the research (two subjects due to leg fracture, one subject due to hospitalization for plasmapheresis and 12 subjects due to unwillingness to participation) and in the end, the research was conducted on 75 patients (25 in the reflexology group, 25 in the relaxation group and 25 in the control group) [Figure 1].

The participants were randomly assigned by minimization method with MiniPy software to three groups: Reflexology, relaxation and control. In the process of randomization it is probable that the treatment groups develop significant differences in some prognostic factors, especially when the
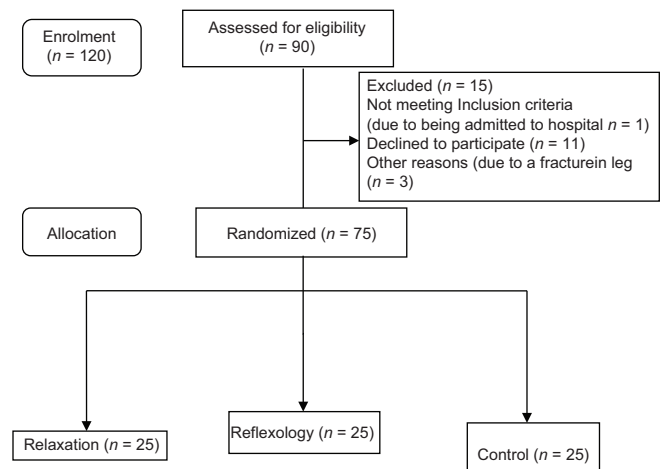

Figure 1: Patient disposition

sample size is relatively small (<200). If these factors have important effects on the primary or secondary outcomes of the study, any important difference in the levels of these factors invalidate the trial results, and necessitate complicated statistical analysis. Various methods have been used to overcome the problem of unmatched trial groups, including minimization and stratification, with minimization providing more acceptable results.[18]

Inclusion criteria were: Female patients with a definite diagnosis of MS (relapsing-remitting, primary progressive and secondary progressive) by a medicine specialist, has not received a series of reflexology treatments or formally taught and practiced relaxation. Age between 18 and 75 years, healthy feet without injury, damage, thrombosis, inflation, lesion, or fractures in foot and willingness to participate in the study; have no drug addiction, no pregnant and not being medical staff 0<expanded disability status scale <7.5 and high scores of depression (more than 13), anxiety (more than 9) and stress (more than 18).

Exclusion criteria were treatment with another CAM, either current or within the previous 6 months and acute relapse of the disease 1 month preceding ordering the study period or within the study, no wanting to continue cooperation in research and absence of more than two sessions.

In order to collect data, a three-part questionnaire was filled out by the samples. The first part of the questionnaire involved demographic data such as age, marital status, educational degree, and employment status. The second part was about the characteristics of the disease with four questions including duration, the clinical pattern of MS, medication and symptoms of disease. The third part was depression anxiety and stress scale-21 (DASS-21) to assess depression, anxiety, and stress in which each cluster of seven items measures one factor or emotional state. Each question has a Likert scale from 0 to 3. Ghafari *et al.* calculated internal consistency for DASS-21 scale using Cronbach's alpha and the results for scales of depression, anxiety, and stress equal 0.97, 0.71, and 0.74 respectively.[4] The validity of the first and second part of the questionnaire was approved by 10 faculty members of the School of Nursing and Midwifery at Isfahan University of Medical Sciences. In order to assess the reliability, the questionnaires were given to 10 patients with MS after 10 days; the questionnaires were distributed among the same people and collected again. The Pearson correlation coefficient between the scores of the items of the questionnaire was calculated. The reliability of the questionnaire was confirmed with a value of 0.85. The Questionnaire was completed before, immediately and 2 months after interventions by questioner. Questioner was unaware of the type of interventions about the samples.

Relaxation technique was the combination of Jacobson and Benson was used compound relaxation method via audio tape. The Jacobson method followed previously standardized and validated procedures of Bernstein and Borkovic based on a classic muscle relaxation program by Jacobson. This technique involved systematically relaxing the major muscle groups of the body with the goal of physical and mental relaxation.[19] Patients were divided into five groups (consisting of five patients in each group). The subjects were taught as to how to relax and contract the muscles of the body. They contracted and relaxed each muscle group for 5 and 15s, respectively. They focused their attention on their respiration and they visualized a beach, a village, or a beautiful garden and relaxed in a comforting opportunity. Participants were asked to put themselves in comfortable conditions. Before treatment participants were also recommended to wear comfortable clothing. The patients were told not to use the techniques alone at home until the end of the study.

In reflexology group first the legs were washed with body shampoo and dried. Then, the subjects were placed in a comfortable position, usually lying on the back, with their pants being removed up to their knees. While standing in front of the patient, the researcher started general reflexology with massage all reflex points in plantar with thumb and fore finger and then specialized reflexology was done through the pressure point of foot reflex such as (solar plexus, hypothalamic, pituitary, spinal cord, (K1), and adrenal gland sand pelvic). First, for the left foot and then for the right foot (20 min each). Index and pointing fingers were placed on reflex points. They moved apart and reached back for several times in a worm-like movement. The major reflexive points in the feet were put under pressure using the thumb and index finger. Finally, the intervention was completed by the researcher with massage of the solar plexus.

The interventions of reflexology and relaxation were performed for 4 weeks, twice a week for 40 min in each session, in a bright, silent, warm room with suitable temperature and ventilation at Kashani MS Clinic and the control group were received care and routine medical treatment as directed by a doctor. All patients in each group were informed of the details of the procedures and of the details of the study. Written informed consent was obtained from all participants.

Statistical tests such as Chi-square, Kruskal–Wallis, repeated measures analysis of variance (ANOVA) and one-way ANOVA and least significant difference (LSD) *post hoc* test via SPSS version 18 (Chicago, Il: SPSS Inc.) were used to analyze the data.

RESULTS

The mean age of the reflexology (34.4 ± 6.6), relaxation (33.9 ± 5.6) and control group was (34.04 ± 7.7) years, respectively. The mean duration of MS in the reflexology (6.66 ± 5.47), in relaxation (5.18 ± 4.69) and control group was (4.78 ± 3.36) years. Overall, in three groups more than 75%of persons were married. Moreover, 88% of the reflexology group and 84% of the relaxation group and 80% of the control group had a relapsing-remitting type of MS. Overall, 100% of the reflexology group and 96% of

relaxation and 88% control group were housewives. More than 65% persons in three groups had an education level of high school diploma or more. There was no significant difference in terms of personal details between the three groups.

Findings obtained from repeated measures analysis of variance showed that the severity of anxiety, stress and depression during the different times in reflexology and relaxation had significant difference ($P < 0.05$) While, this difference was not significant in the control group. Findings obtained from ANOVA also showed that the mean of severity of stress between groups during the preintervention did not differ significantly, but immediately and 2 months after interventions are statistically significant. This test also showed that the severity of anxiety and depression between the three groups in the preinterventions and 2 months after interventions did not a significant difference, but immediately after of study is statistically significant ($P < 0.05$) [Tables 1-3].

Furthermore, LSD *post hoc* test revealed that a significantly higher reduction in the severity of anxiety and depression in the reflexology and relaxation groups immediately after the interventions when compared with control group, but there were no significant differences between reflexology and relaxation groups and there was no significant difference between three groups during 2 months after interventions, ($P > 0.05$). Also, the mean of severity of stress were compared between the groups two by two in which LSD *post hoc* test. Results showed that the mean scores of stress severity immediately and 2 months after interventions were lower in the reflexology and relaxation groups than in the control group. Yet, the reflexology and relaxation groups did not have a significant difference with each other in immediately and 2 months after the interventions ($P > 0.05$) [Tables 4-6].

Table 1: Determine and compare the mean anxiety score in different times (before, immediately after and 2 months after interventions) in three groups

Time	Groups (mean±SD)				
	Reflexology (25)	Relaxation (25)	Control (25)	One-way ANOVA	
				F	P
Before intervention	16.72±6.66	16.56±6.79	16.80±6.90	0.008	0.99
After intervention	10.40±7.37	11.60±4.86	14.88±6.50	3.35	0.04
Follow-up	12.12±6.95	13.76±4.8	14.80±6.11	1.25	0.29
Repeated measures ANOVA					
F	12.52	19.41	2		
P	0.001	<0.001	0.15		

Values are mean±SD. ANOVA=Analysis of variance, SD=Standard deviation

Table 2: Determine and compare the mean stress score in different times (before, immediately after and 2 months after interventions) in three groups

Time	Groups (mean±SD)				
	Reflexology (25)	Relaxation (25)	Control (25)	One-way ANOVA	
				F	P
Before intervention	24.04±6.02	23.52±5.06	23.88±4.14	0.06	0.93
After intervention	19.04±5.94	18.32±6.62	23.68±4.98	6.09	0.004
Follow-up	20.48±5.17	19.28±4.89	23.36±5.05	4.32	0.01
Repeated measures ANOVA					
F	6.46	10.24	0.40		
P	0.006	0.001	0.67		

ANOVA=Analysis of variance, SD=Standard deviation

Table 3: Determine and compare the mean depression score in different times (before, immediately after and 2 months after interventions) in three groups

Time	Groups (mean±SD)							
	Reflexology (25)		Relaxation (25)		Control (25)		One-way ANOVA	
							F	P
Before intervention	20.72	7.56	19.36	5.85	19.52	6.06	0.32	0.72
After intervention	13.20	6.16	14.40	7.30	18.64	6.99	4.36	0.01
Follow-up	16	7.30	15.68	5.24	18.56	5.95	1.60	0.20
Repeated measures ANOVA								
F	14.31		11.60		0.58			
P	>0.001		>0.001		0.56			

ANOVA=Analysis of variance, SD=Standard deviation

Table 4: Paired comparison of the mean anxiety scores in different groups

Groups	Immediately after P	2 months after P
Reflexology and control	0.007	0.06
Reflexology and relaxation	0.025	0.16
Relaxation and control	0.03	0.27

Table 5: Paired comparison of the mean stress scores in different groups

Groups	Immediately after P	2 months after P
Reflexology and control	0.007	0.04
Reflexology and relaxation	0.33	0.2
Relaxation and control	0.002	0.006

Table 6: Paired comparison of the mean depression scores in different groups

Groups	Immediately after P	2 months after P
Reflexology and control	0.006	0.15
Reflexology and relaxation	0.53	0.85
Relaxation and control	0.03	0.1

DISCUSSION

The findings from this research show that the techniques of reflexology and relaxation caused a decrease in anxiety, stress and depression in women with MS and that these symptoms decreased in the two groups of reflexology and relaxation compared to the control group, These findings reveal that the mean reduction in anxiety, stress and depression scores immediately after the interventions were similar in the experimental groups whereas the both techniques only have long-term effects on stress.

In our study, relaxation technique was performed by the subjects while supervised by the researcher. The patients were asked not to use the techniques alone at home until the end of study to achieve homogeneity progressive muscle relaxation (PMR) training and Benson relaxation are one of the cost effective, self-help methods promoting mental health in patients with chronic diseases such as MS. In this technique all body muscles are relaxing group by group and finally the person feels relaxed.[20]

The findings of Ghafari *et al.* showed MS patients in experimental group had less anxiety, stress and depression after PMR in comparison to control group.

In this study, the relaxation group received only progressive muscular relaxation (Jacobson) for 2 months and patients practiced PMR at home 63 times during 2 months for 40 min in each time[4] while in our study the relaxation group received compound relaxation (combination of the Jacobson and Benson relaxation) within 4 weeks, twice a week for 40 min in a bright and silent room with suitable temperature and ventilation at MS Clinic of Kashani Hospital, so it seems that compound relaxation (Jacobson and Benson) with less sessions has similar effect to progressive muscular relaxation (Jacobson) with more sessions.

In different studies by Mackereth *et al.* Torabi *et al.* Mokhtarinouri *et al.* that had compared the effects of foot reflexology and relaxation on anxiety results showed that there were not significant differences between two experimental groups.[15,21,22] Mackereth *et al.* studied the effectiveness of PMR and reflexology on MS patients. In this study, a crossover design with a 4-week interval between the courses of treatment was used. Salivary cortisol levels, the state of anxiety inventory, systolic and diastolic blood pressure and heart rate were collected before and after weekly meetings. All selected indicators except three scales of the short form of 36 questions demonstrated significant changes. On the whole, positive effects of both treatments were reported at the end of the sessions and during the 6 weeks of treatment.[15] Also Kashani *et al.* believed that effects of massage therapy and relaxation on anxiety, stress and depression are the same.[23]

Rigikouteh *et al.* evaluated the effect of mental– physical relaxation (Dohsa-hou) for reducing depression, anxiety and stress in patients with MS. The results showed that mental – physical relaxation significantly decreased depression, anxiety and stress in the experimental group as compared to the control group.[7] Barzegarghazi *et al.* showed that applied relaxation caused significant reduction in the perceived stress level in the experimental group.[24]

In addition, Williamson *et al.* in a pre-post control study observed the effects of Reflexology on menopausal symptoms and showed significantly difference in anxiety in the experimental and placebo groups.[25]

Lee reported a significant reduction in stress after 6 weeks of reflexology.[26] Also, McVicara *et al.* concluded that reflexology may positively affect the treatment of State anxiety. They found that the effects of reflexology may have beneficial outcomes for patients.[27]

Regarding to the positive outcomes of these techniques in the present study, the consistency of the present findings with the results of some researchers, It can thus be concluded that the techniques of reflexology and relaxation can be combined with therapeutic routine treatments and offered as useful and economic complements to take care of and relieve patients from the signs and symptoms of MS by health care providers, especially nurses.

The limitations of this study include lake of placebo group and individual differences in mental status samples under study in response to intervention, the effect of environmental and cultural factors on the level of patient under acting the effect of relaxation technique on relief disease symptoms,

Differences in learning and lack of concentration and conduction the study on women. It is recommended to conduct other researches in this field and compare with other complementary medicine methods in all the patients with MS in both sexes with more samples and perform relaxation in compound technique (combination of the Jacobson and Benson relaxation).

CONCLUSION

In fact, the results showed that both interventions in relieving anxiety, stress and depression are effective in women with MS. Hence, these two methods as effective techniques can be recommended.

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Conflicts of interest

There are no conflicts of interest.

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