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Enhancing Quality of Life in Multiple Sclerosis Patients through Personalized (Temperament-Based) Traditional Persian Medicine: An Investigation into the Efficacy of Lifestyle Education (Non-Randomized Pretest-Posttest Study)

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Abstract

Multiple sclerosis (MS) profoundly affects patients' well-being, causing physical and psychological challenges. While lifestyle factors are recognized as pivotal in MS management, research on traditional Persian (Iranian) medicine approaches remains scarce. This study aimed to assess the efficacy of temperament-based lifestyle education rooted in Persian medicine principles in ameliorating quality of life (QoL) among MS patients. Employing a pretest-posttest quasi-experimental design, we enrolled 30 female MS patients, randomly assigned to either an experimental group receiving tailored lifestyle interventions or a control group. QoL assessments were conducted pre-intervention, post-intervention, and at a one-month follow-up. The intervention spanned four weeks, focusing on individualized nutrition, exercise, sleep optimization, stress management, and socio-emotional well-being, aligned with each participant's temperament profile. The Covariance analysis exhibited significantly greater enhancements in post-intervention and follow-up QoL scores compared to controls, with effect sizes indicating substantial impact. Notably, these improvements were sustained at the one-month follow-up assessment. Our findings suggest that temperament-based lifestyle education grounded in Persian medicine holds promise as a beneficial and low-risk strategy for enhancing QoL in MS patients (from 51.93 to 72.86) . Further validation through larger randomized trials is warranted, yet this preliminary investigation underscores the potential of integrative approaches leveraging traditional medical paradigms.

Keywords: Healthy lifestyle; Persian medicine; Temperament; Multiple Sclerosis

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Introduction

Multiple sclerosis (MS) is a chronic and progressive neurological condition. MS significantly impairs sensory and motor function [1]. Although its cause is unknown, autoimmune system, environmental and industrial factors, genetics are important. Treatment is focused on symptoms and immunosuppression and relaxation. The mean age of diagnosis is 32 years. Females are twice as likely to live with MS as males, a total of 2.8 million people are estimated to live with MS worldwide (35.9 per 100,000 populations) [2].

Studies indicate that 67% of MS patients use complementary and alternative medicine (massage, meditation, nutritional therapy, medicinal plants, energy therapy, relaxation, and acupuncture) along with conventional medicine [3,4,5].

Other studies, such as Nayak et al. (2003) showed that 57% of 3140 patients used complementary and traditional medicine: medicinal plants and natural nutrition [6,7]. In the 3-year longitudinal study of Harcinus et al. (2003) therapeutic nutrition and the use of supplements as 60% of natural foods, 45% of herbal treatments, and 49% of supplements were reported [8,9]. In another review study, it has been reported that the most common methods are massage, acupuncture, therapeutic touch, medicinal plants [8].

Traditional Persian (Iranian) medicine (TPM) is a holistic medicine and treatment is based on personalized medicine with an emphasis on temperament (Mizaj). Some identifying lifestyle behaviors and physical characteristics help to determine one's temperament. Lifestyle behaviors are effective in health and disease. In TPM, lifestyle is related to sleep and wakefulness, nutrition, exercise and inactivity, the climate of the region, and emotional state. Emotional state is concerned with the relationship between mind, body and environment. *"Ibn Sina"* (Avicenna) has reported on the relationship between Mind and Body and lifestyle with illness [10,11]. "*Zakariyya Razi*" (Rhazes) emphasized the mind-body connection, and provided details of emotional state and lifestyle factors in treatment [12,13,14].

Lifestyle uses fixed behaviors to achieve its goals. It includes factors such as personality traits, nutrition, exercise, sleep, stress control, social support, and medication. Health requires changing the lifestyle. Lifestyle is also related to quality of life (QoL). But many people have an unhealthy lifestyle, which has led to an increase in chronic and metabolic diseases. Research results show that MS patients experience low QoL and an unhealthy lifestyle [15,16]. Therefore, there is a need to teach lifestyle modification to improve the QoL of MS patients. TPM interventions in lifestyle involve teachings based on packages provided by the TPM Office of the Ministry of Health. In this research, according to the temperament of each person, with the approach of TPM, lifestyle modification is taught and the results of the treatment are evaluated.

Methods

This study was Pretest-Posttest with a control group and a one-month follow-up. A total of 30 participants were selected from Mashhad MS patients. Fifteen participants were included in the experimental group, and 15 in the control group. The inclusion criteria were a minimum education of Diploma, age range of 20 to 40 years, and confirmation of mild-degree MS with the approval of a neurologist and MRI findings. The exclusion criteria were lacking education diploma, who did not attend more than two sessions of the intervention, change in medications, and severity of the disease.

The code of ethics was received from Mashhad University of Medical Sciences (IR.MUMS.MEDICAL.REC.1400.020). The study goals were explained to the participants and principles of confidentiality were maintained. They also signed the informed consent form. Patients were randomly entered into two experimental (15 people) and control (15 people) groups.

All participants completed a "Temperament" and "quality of life" questionnaire in the initial session. The experimental group engaged in training sessions, acquainting themselves with the disease and lifestyle change interventions outlined in table 1. The control group attended educational sessions focusing on disease knowledge for four weeks, with two 45-minute sessions per week. Education was person-centered according to the type of temperament. Training is based on the book published by the Ministry of Health and Medicine. Adherence of Patients' was evaluated according to the number of educational sessions held. Absence in two sessions was considered as withdrawal from the study. The evaluation of the training given was based on the amount of activities performed. Patients of both groups received the standard medicine for the treatment of their disease.

Post-intervention, both groups underwent a second measurement (posttest). A subsequent one-month follow-up period was implemented. Data analysis utilized SPSS (Version 17) and after verifying necessary assumptions like score distribution normality and variance homogeneity, the effectiveness of interventions was assessed through analysis of covariance. Standard temperament and QoL questionnaires were used in the study, completed by the researcher.

Quality of life measurement

This questionnaire assesses 12 dimensions, with scores ranging from 0 to 100, higher scores indicating better QoL. The dimensions cover physical health (movement issues, physical health, pain, energy, health perception, and sexual performance) and mental health

(limitations due to mental problems, mental vitality, social functioning, health-related loss, and life satisfaction). Developed by Barbara Vickery for MS patients, its content validity is confirmed in domestic and international studies, with a reliability coefficient of 0.86 [17].

Temperament determination

The Mojahedi Temperament ten-question questionnaire, a pioneering tool in TPM, has successfully undergone all validation stages, with reported parameters including sensitivity and specificity detailed in its dedicated article. Scores from the first eight questions, focusing on heat and cold (equal to or below 14 indicating cold, 15-18 denoting moderate, and 19 or above indicating heat), and the cumulative scores from the last two questions, addressing wetness and dryness (equal to or below 3 as wet, 4 considered moderate, and 5 or above signaling dryness), collectively provide a comprehensive assessment of an individual's temperament [18].

Results

Based on demographic characteristics, all participants in experimental and control groups were female, the age was between 20 and 40 years. 60% were married and the rest were unmarried. Two groups of temperament and dystemperament no significant difference. Predominant symptoms were weakness and fatigue. The temperaments of the patients were diverse: Mostly cold and dry, the least hot and wetting.

There was no significant relationship between QoL and marital status and age in the two groups. Normality by Kolmogorov-Smirnov test and homogeneity of variances by Levine's test was determined. Non-parametric Kolmogorov-Smirnov test showed that the variable of QoL in pretest, posttest and follow-up was not significant in two groups ($P<0.05$).

The Pearson correlation test showed that there is a negative statistical relationship between the severity of disability and physical health, with the QoL. Therefore, as the level of disability of patients increases, the QoL of patients will decrease. These results were consistent with the study of Haresabadi et al. (2008).

Table 2 shows the results of the QoL questionnaire in the pretest, posttest and follow-up stages of the two groups. The average QoL of the experimental group was 51.93, 72.86, and 72.60 in the pretest, posttest, and follow-up stages, and in the control group, it was 55.53, 56.00, and 55.93. According to this table, the average QoL of the experimental group in the posttest was higher and better than the control group.

Table 3 presents a posttest analysis comparing the QoL between the experimental group and the control group, considering the pretest effects. The results reveal that 79% of pretest scores exhibit a significant improvement in the QoL for subjects who received lifestyle interventions. Statistical test 1 demonstrates high precision and an adequate sample size. The effect size of 0.82 indicates that the intervention resulted in a substantial 0.82-unit change in the QoL ($P < 0.001$), highlighting its significant impact.

In order to check the results of the follow-up period (one month) based on the stability of the effectiveness of the interventions, the analysis of covariance test was used and the average score of the QoL of the subjects of the experimental group was compared in the two stages of pretest and follow-up.

Table 4 shows mean and standard deviation of QoL scores in 12 variables. In this table, the mean and standard deviation of the physical problems variable has the lowest score. T-test showed that there is no significant relationship between QoL and marital status. Although Pearson's correlation test showed a negative correlation between age and QoL of patients, this correlation was not significant. Weakness and fatigue were the most annoying symptoms reported.

Table 5 shows the comparison of the follow-up of the QoL in the experimental group with the control of the pretest effect. As can be seen, the results obtained from the comparison of the follow-up of the QoL with the relationship of 80% of the pretest scores, indicate that the interventions were sustainable for one month. The power of statistical test 1 also indicates the high accuracy of this test and the sufficient sample size. The effect size shows that the desired intervention was sustained after one month.

Discussion

The role of lifestyle education was explored in several studies. This study is pretest-posttest interventional focusing on the efficacy of personalized TPM, temperament-based lifestyle education, in enhancing the QoL for patients MS. The average level of QoL of the patients in this study was 51.93 in the test group and 55.53 in the control group at the beginning of the study. When comparing the QoL of MS in Iran, QoL are considerably lower in studies as Masoudi (44.8) and Hazrati (48.5) [19,20]. These results show that it is necessary to study and pay attention to the QoL in MS patients.

Several studies found a significant association between the severity and number of symptoms and the low level of QoL in MS .Physical problems had the lowest score, but having a good social and mental function had the highest impact on the QoL. Body pain in study was the next important effective factor on the QoL since pain causes physical disability [21,22,23].

A study highlighted the association of QoL in MS patients with depressive symptoms and physical disability [24,25]. Another study emphasized the impact of physical factors such as the severity and duration of

Table 1. Summary of lifestyle training sessions based on personalized Traditional Persian Medicine (temperament) presented to the experimental group by a PhD candidate of traditional Persian medicine

Meeting number	The content of the session	Goals
First meeting	Introduction and orientation	Getting to know the training course, introducing the participants, completing the questionnaires
Second meeting	Temperament Survey	Recognizing temperament, familiarity with temperament classification and analyzing the results of temperament questionnaires
Third meeting	Nutrition	Familiarity with nutrition, the role of temperament-based nutrition in health, using the principles of wellness and healthy eating - without adding any special food
Fourth meeting	Sleep and wakefulness	Familiarity with the process of sleep and wakefulness, its effect on health and the amount of sleep needed based on mood and setting a calm and effective sleep pattern
Fifth meeting	Motion and stillness	Acquaintance with the process of exercise, the effect of rest and movement on health and the need for exercise based on temperament and adjusting its pattern with the consultation of the relevant expert
Sixth meeting	Emotional symptoms	Getting to know the types of emotions and how to deal with the disease from diagnosis to accepting and managing it, expressing feelings and thoughts
Seventh meeting	Social and spiritual health	Knowing the dimensions of health and support resources and giving meaning to life and making it purposeful, improving personal and social relationships with the consultation of a medical psychiatric specialist
Eighth	Course evaluation	Training course feedback, questionnaire completion, coordination for follow-up

Table 2. Descriptive Variables for quality-of-life assessment.

Group	Number	Pretest		Posttest		Follow up		P-value	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Inter-group	Intra-group
Experiment	15	51.93	7.77	72.86	8.47	72.60	8/10	0.001	0.005
Control	15	55.53	11.90	56.00	12.62	55.93	1.82	0.004	

Table 3. The results of covariance analysis of the effect of lifestyle interventions on the quality of life of the experimental group

Sources	Sum of squares	Degrees of freedom	Mean square	F	The significance level	Effect size	Statistical power
Pre-exam	2573/29	1	29/2573	104/88	0/001	0/79	1
Examination group	2987/52	1	2987/52	121/6	0/001	0/82	1

the disease on the QoL of people with multiple sclerosis [26,27]. Additionally, a study in the Journal of Patient-Reported Outcomes revealed that mental health influences health-related QoL more than physical health in individuals with MS [28].

The majority of patients (61.5%) in this study had an unfavorable level of lifestyle in the nutritional axis. This finding aligns with previous studies. Masoodi et al., highlighted that the role of diet in MS complication was significant. This research underscores that dietary modifications were capable to reduce complications, including constipation, weight gain, urinary tract infections, swallowing difficulties, malnutrition, pressure ulcers, and fatigue. The findings from eight qualifying studies, involving a total of 515 patients, indicated that dietary interventions showed a promising trend toward reducing fatigue and enhancing QoL in MS. Although no significant effect on disability was observed, the absence of severe adverse events suggests a favorable risk-benefit for dietary interventions in MS [29,30,31].

In this study the majority of patients (71.5%) had an

Table 4. Mean and standard deviation of quality of life variables

Quality of life	mean±standard deviation
Physical health	28.4± 52.2
Physical problems	39.7±39.6
Psychological problems	43.1±40.9
Physical pain	61.8±21.9
Vitality	53.1 ±16.5
Energy level	45.6±16.2
Perception of health	56.4 ±21.1
Social performance	68.6 ± 20.1
Mental function	68.7 ± 22.7
Deficiency in health	43.8 ± 22.8
Sexual function	50.3 ± 30.2
Life satisfaction	50.5 ± 27.5

unfavorable level of lifestyle in the exercise axis. This observation is consistent with findings from previous studies. Motl et al.'s study in 2008 highlighted the close association between low physical activity and the exacerbation of symptoms in the specified disease. Addressing this issue positively impacts the enhancement of the QoL for individuals affected by the condition [32]. Also, studies indicates that individuals with MS often have lower levels of physical activity compared to the general population; while there is a growing body of evidence supporting the benefits of exercise for individuals with MS. Studies shown that exercise training can lead to improvements in balance, gait, strength, fatigue, QoL, and overall physical functioning in MS patients. Despite the potential benefits of exercise for individuals with MS, there may still be barriers to engaging in regular physical activity. These barriers can include fatigue, mobility issues, fear of exacerbating symptoms, lack of motivation, and limited access to appropriate exercise programs or facilities.

Conversely, a substantial majority (93%) of the subjects under scrutiny demonstrated a favorable lifestyle in relation to smoking. Heidari's study in 2004 emphasized the public health implications of smoking, indicating that smokers may experience symptoms earlier than their association between smoking and the early onset of symptoms [33].

In this investigation, a predominant portion (65%) of the examined subjects displayed an unfavorable lifestyle concerning sleeping and waking patterns, aligning with findings from previous researches. For instance, Habibi's study in 2006 revealed that 37.7% of the research participants experienced sleep disorders [34]. Numerous individuals with MS express dissatisfaction with their nightly sleep. This dissatisfaction can stem from various factors, including muscle spasticity, pain, tingling sensations, difficulty in finding a comfortable sleeping position, frequent awakenings to use the bathroom, and disruptions in sleep patterns due to symptoms such as anxiety and fatigue (35). Among the sleep disturbances commonly reported by MS patients are insomnia, sleep-disordered breathing, and restless legs syndrome, all of which can significantly diminish their QoL and contribute to debilitating fatigue [35]. Studies have suggested a correlation between more severe insomnia, poorer sleep quality, and increased fatigue, as well as lower overall QoL in individuals living with MS [36,37].

The study revealed that a significant portion (55.5%) of the subjects exhibited lifestyle patterns indicative of ineffective stress coping mechanisms. This finding aligns with the crucial role of stress in the onset and exacerbation of MS attacks [38]. The impact of psychological stress on health extends beyond MS, affecting various physiological systems. Chronic stress can disrupt the immune system, increasing susceptibility to respiratory infections and exacerbating conditions such as bronchial asthma, rheumatoid arthritis, and allergies. Prolonged stress activates the locus coeruleus-norepinephrine system (LC-NE) axis and hypothalamic-pituitary-adrenal (HPA) axis, leading to persistent physiological changes in the brain, cardiovascular system, and immune system.

Furthermore, the outcomes of our study align with

Table 5. Results of covariance analysis of quality of life follow-up scores

Sources	Sum of squares	Degrees of freedom	Mean square	F	Significance level	Effect size	Statistical power
Pre-exam	40.2308	1	40.2308	10.110	0.001	0.80	1
Examination group	30.2876	1	30.2876	18.137	0.001	0.83	1

Nejat and colleagues' research in 2006 on the QoL of MS patients [39]. However, both in their study and similar investigations, the category of temperament and patients' familiarity with it has not been extensively explored. Our study contributes innovatively to this field by demonstrating that combining education on temperament with interventions in nutrition and psychology yields positive effects. Notably, there has been an increased inclination among patients towards TPM and complementary medicine. Research findings indicate that at least 65% of patients incorporate this form of medicine alongside conventional treatments.

Several interventional studies have explored the impact complementary medicine modalities on the QoL among patients with MS. These modalities encompass a range of approaches, including abdominal massage [40], reflexology [41], naturopathic medicine [42] , low-frequency transcutaneous electrical nerve stimulation (TENS) [43], supplementation with fish oil [44], adoption of a low-fat diet [45], and utilization of secure web-based messaging, and self-management techniques for MS symptoms [46].

Nonetheless, there is currently no interventional study investigating the impact of TPM on the QoL among individuals with MS. This underscores the significance of the present study in elucidating the potential role of traditional medicines in enhancing the QoL for these patients.

Limitations

This study is subject to several limitations that should be discussed. Firstly, the relatively small sample size of 30 participants, all female, may restrict the generalizability of the findings to the broader MS population, which encompasses both genders. A larger, more diverse sample is imperative to enhance the representativeness of the results.

Secondly, the study was conducted at a single center in Mashhad, with participants exclusively recruited from local hospitals; thus, limiting the socio-economic and cultural diversity reflected in the sample. Future research should consider recruiting participants from multiple centers across diverse regions to account for inter-regional variations.

Thirdly, the follow-up duration was confined to one month, which is insufficient for evaluating the long-term sustainability of effects, particularly given the chronic nature of MS. Longer follow-up periods, ideally spanning 3-6 months or more, are essential to assess the durability of interventions.

Fourthly, the reliance on self-reported assessments introduces potential reporting biases. Employing more objective measures, such as clinical evaluations, would enhance the validity of outcome assessments.

Fifthly, the study did not analyze medication usage or symptom management through pharmacological interventions, which could influence outcomes. Documenting and controlling for any changes in medication during the study period are imperative.

Lastly, the absence of a randomized controlled design, considered the gold standard in research, detracts from the rigor of the study. Implementing a randomized trial would mitigate potential biases and better ascertain the efficacy of the intervention. Furthermore, including an active control group receiving an alternative intervention would bolster the robustness of the findings. Addressing these limitations through well-designed randomized controlled trials is necessary to substantiate the efficacy of temperament-based lifestyle interventions for MS patients before definitive conclusions can be drawn.

Conclusion

This article focuses on QoL in MS patients. The non-randomized pretest-posttest study delves into the potential benefits of temperament-aligned lifestyle interventions, drawing from TPM principles, to enhance the QoL among individuals with MS. Initial findings indicate significant improvements in physical and psychological factor well-being immediately post-intervention and at a one-month follow-up. However, the study's limitations, including its small and homogenous sample size comprising solely female participants from a single institution, restrict the generalizability of its conclusions. Future investigations should aim for larger, randomized controlled trials encompassing a more diverse demographic and extending observation periods. It is crucial to incorporate both objective clinical metrics and subjective evaluations to validate and substantiate the observed outcomes. Understanding the physiological mechanisms underlying these lifestyle modifications, such as inflammation reduction and enhanced neuroplasticity, is imperative for establishing efficacy. This study advocates for the integration of complementary and conventional modalities in MS management, with temperament-aligned lifestyle education presenting a promising, low-risk adjunct. Further research is essential to firmly establish the efficacy and inform clinical guidelines, but this study marks a significant stride towards understanding the potential of integrative medicine in optimizing the care and well-being of individuals with MS.

Conflict of Interests

None.

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References

[1] McCabe M. A longitudinal study of coping strategies and quality

of life among people with multiple sclerosis. J Clin Psychol Med Settings 2006;13:367-377.
[2] Walton C, King R, Rechtman L, Kaye W, Leray E, et al. Rising prevalence of multiple sclerosis worldwide: Insights from the Atlas of MS, third edition. Mult Scler 2020 Dec;26:1816-1821.
[3] Kamińska J, Koper OM, Piechal K, Kemona H. Multiple sclerosis - etiology and diagnostic potential. Postepy Hig Med Dosw 2017;71:551-563.
[4] Armstrong MJ, Okun MS. Diagnosis and treatment of Parkinson disease: a review. Jama 2020;323:548-560.
[5] Payamani F, Nazari A, Noktehdan H, Ghadiriyan F, Karami K. Complementary therapy in patients with multiple sclerosis. Iran J Nurs 2012;25:12-20.
[6] Nayak S, Matheis RJ, Schoenberger NE, Shiflett SC. Use of unconventional therapies by individuals with multiple sclerosis. Clin Rehabil 2003;17:181-191.
[7] Stuifbergen AK, Harrison TC. Complementary and alternative therapy use in persons with multiple sclerosis. Rehabil Nurs 2003;28:141-147.
[8] Shirbeigi L, Zarei A, Naghizadeh A, Alizadeh Vaghasloo M. The concept of temperaments in traditional persian medicine. Trad Integr Med 2017;2:143-156.
[9] Goli F, Zanjani HA. Development of Psychosomatic Medicine in Iran. In: Fritzsche K, McDaniel SH, Wirsching M, editors. Psychosomatic Medicine: An International Guide for the Primary Care Setting. Cham: Springer International Publishing. 2020; pp 315-322.
[10] Esmonde L, Long AF. Complementary therapy use by persons with multiple sclerosis: benefits and research priorities. Complement Ther Clin Pract 2008;14:176-184.
[11] Feizi A, Hosseini R, Ghiasvand R, Rabiei K. Study of relationship between stress and different lifestyle dimensionswith quality of life in Isfahan's inhabitant aged 19 years and over an application of latent class regression on latent factor predictors. J Health Syst Res 2011;7:1189-1202.
[12] Rodriguez Añez CR, Reis RS, Petroski EL. Brazilian version of a lifestyle questionnaire: translation and validation for young adults. Arq Bras Cardiol 2008;91:102-109.
[13] Saffari M, Amini N, Eftekhar Ardebili H, Mahmoudi M, Sanaeinasab H. Evaluation of an educational intervention based on PRECEDE PROCEED model toward lifestyle improvement among adolescents. Daneshvar Med 2012;20:59-68.
[14] Hekmatpou D, Shamsi M, Zamani M. The effect of healthy lifestyle education programs on promotion of physical activity in elderly of Arak. Daneshvar Med 2012;20:33-42.
[15] Kilani H, Al-Hazzaa H, Waly MI, Musaiger A. Lifestyle habits: Diet, physical activity and sleep duration among Omani adolescents. Sultan Qaboos Uni Med J 2013;13:510.
[16] Fayaz-Bakhsh A, Khajeh-Kazemi R, Rahimi F, Jahangiri L, Shams M. The internet using and health: students' knowledge, attitude and lifestyle related to the internet. Hakim Res J 2011;14:96-105.
[17] Maheri AB, Bahrami M-N, Sadeghi R. The situation of health-promoting lifestyle among the students living in dormitories of Tehran University of Medical Sciences, Iran. Health Dev J 2013;1:275-286.
[18] Mojahedi M, Naseri M, Majdzadeh R, Keshavarz M, Ebadini M, et al. Reliability and validity assessment of mizaj questionnaire: a novel self-report scale in iranian traditional medicine. Iran Red Crescent Med J 2014;16:e15924.
[19] Masoudi R, Mohammadi I, Nabavi S, Ahmadi F. The effect of Orem based self-care program on physical quality of life in multiple sclerosis patients. J Shahrekord Uni Med Sci 2008;10:21-29.
[20] Hazrati M, Zahmatkeshan N, Dezh Bakhsh T, Nikseresht A, Zeyghami B. The effect of rehabilitation process on the quality of life in multiple sclerosis patients. Armaghane Danesh 2005;10:53-65.
[21] Turpin K, Carroll L, Cassidy J, Hader W. Deterioration in the health-related quality of life of persons with multiple sclerosis: the possible warning signs. Mult Scler J 2007;13:1038-1045.
[22] Merkelbach S, Sittinger H, Koenig J. Is there a differential impact of fatigue and physical disability on quality of life in multiple sclerosis? J Nerv Ment Dis 2002;190:388-393.
[23] Roohafza H, Akochakian S, Sadeghi M, Fardmoosavi A, Khairabadi G, et al. Investigating the relation between lifestyle and chronic obstructive pulmonary disease. J Guilan Uni Med Sci 2006;15:32-37.
[24] Benedict RH, Wahlig E, Bakshi R, Fishman I, Munschauer F, et al. Predicting quality of life in multiple sclerosis: accounting for physical disability, fatigue, cognition, mood disorder, personality, and behavior change. J Neurol Sci 2005;231:29-34.
[25] Faraclas E, Lynn J, Lau JD, Merlo A. Health-related quality of life in people with multiple sclerosis: how does this population compare to population-based norms in different health domains? J Patient-Report Outcomes. 2022;6(1):12.
[26] Janardhan V, Bakshi R. Quality of life in patients with multiple sclerosis: the impact of fatigue and depression. J Neurol Sci 2002;205:51-58.
[27] Nortvedt MW, Riise T, Myhr KM, Nyland HI. Quality of life in multiple sclerosis: measuring the disease effects more broadly. Neurology 1999;53:1098-1103.
[28] Beiske A, Naess H, Aarseth J, Andersen O, Elovaara I, et al. Health-related quality of life in secondary progressive multiple sclerosis. Mult Scler J2007;13(3):386-92.
[29] Hosseini Z, Homayuni A, Etemadifar M. Barriers to quality of life in patients with multiple sclerosis: a qualitative study. BMC Neurol 2022;22:174.
[30] Guerrero Aznar MD, Villanueva Guerrero MD, Cordero Ramos J, Eichau Madueño S, Morales Bravo M, et al. Efficacy of diet on fatigue, quality of life and disability status in multiple sclerosis patients: rapid review and meta-analysis of randomized controlled trials. BMC Neurol 2022;22:388.
[31] Gil-González I, Martín-Rodríguez A, Conrad R, et alQuality of life in adults with multiple sclerosis: a systematic review. BMJ Open 2020;10:e041249.
[32] Motl RW, Arnett P, Smith M, Barwick F, Ahlstrom B, et al. Worsening of symptoms is associated with lower physical activity levels in individuals with multiple sclerosis. Mult Scler J 2008;14:140-142.
[33] Heidari T, Josie M, editors. The effect of smoking in causing MS illness. Abstract book of 3th International Iranian Congress on Multiple Sclerosis; 2004.
[34] Habibi F. Study sleep disorder and relationship with some characteristic patients with MS. Nursing MSc, Thesis, Islamic Azad University, Tehran Medical Science. 2006:1.
[35] Pokryszko-Dragan A, Bilińska M, Gruszka E, Biel Ł, Kamińska K, et al. Sleep disturbances in patients with multiple sclerosis. Neurol Sci 2013;34:1291-1296.
[36] Braley TJ, Chervin RD. A practical approach to the diagnosis

and management of sleep disorders in patients with multiple sclerosis. Ther Adv Neurol Disord 2015;8:294-310.
[37] Aljundi NA, Kelly M, Zeineddine S, Salloum A, Pandya N, et al. Sleep disorders, daytime symptoms, and quality of life in veterans with multiple sclerosis: preliminary findings. SLEEP Adv 2022;3:zpac012.
[38] Kirov II, Tal A. The potential clinical impact of multiparametric quantitative mr spectroscopy in neurological disorders: a review and analysis. 2019;83:22-44.
[39] Nejat S, Montazeri A, Mohammadi K, Majdzadeh R, Nejat F, et al. Quality of life patients with multiple MS compare with healthy people in Tehran. Iran J Epidemiol 2006;1:19-24.
[40] McClurg D, Hagen S, Hawkins S, Lowe-Strong A. Abdominal massage for the alleviation of constipation symptoms in people with multiple sclerosis: a randomized controlled feasibility study. Mult Scler J 2011;17:223-233.
[41] Hughes CM, Smyth S, Lowe-Strong AS. Reflexology for the treatment of pain in people with multiple sclerosis: a double-blind randomised sham-controlled clinical trial. Mult Scler J 2009;15:1329-1238.
[42] Shinto L, Calabrese C, Morris C, Yadav V, Griffith D, et al. A randomized pilot study of naturopathic medicine in multiple sclerosis. J Altern Complement Med 2008;14:489-496.
[43] Warke K, Al-Smadi J, Baxter D, Walsh DM, Lowe-Strong AS. Efficacy of transcutaneous electrical nerve stimulation (tens) for chronic low-back pain in a multiple sclerosis population: a randomized, placebo-controlled clinical trial. Clin J Pain 2006;22:812-819.
[44] Weinstock-Guttman B, Baier M, Park Y, Feichter J, Lee-Kwen P, et al. Low fat dietary intervention with ω-3 fatty acid supplementation in multiple sclerosis patients. Prostaglandins Leukot Essent Fatty Acids 2005;73:397-404.
[45] Al-Smadi J, Warke K, Wilson I, Cramp A, Noble G, et al. A pilot investigation of the hypoalgesic effects of transcutaneous electrical nerve stimulation upon low back pain in people with multiple sclerosis. Clin Rehabil 2003;17:742-749.
[46] Miller DM, Moore SM, Fox RJ, Atreja A, Fu AZ, et al. Web-based self-management for patients with multiple sclerosis: a practical, randomized trial. Telemed E Health 2011;17:5-13.