Effect of a Program Based on the Orem Self-Care Model on Sleep Quality of Patients With Multiple Sclerosis

Haniyeh Dahmardeh,[1] Seyyed Abolfazl Vagharseyyedin,[2,*] Hossein Rahimi,[2] Hamed Amirifard,[3] Omolbanin Akbari,[4] and Gholamreza Sharifzadeh[5]

[1]Research Center of Community Health Nursing, Zahedan University of Medical Sciences, Zahedan, IR Iran
[2]Nursing and Midwifery College, Birjand University of Medical Sciences, Birjand, IR Iran
[3]Department of Neurology, Medicine College, Zahedan University of Medical Sciences, Zahedan, IR Iran
[4]Ali Ibn Abi Talib Hospital, Zahedan University of Medical Sciences, Zahedan, IR Iran
[5]College of Health, Birjand University of Medical Sciences, Birjand, IR Iran

[*]Corresponding author: Seyyed Abolfazl Vagharseyyedin, Nursing and Midwifery College, Birjand University of Medical Sciences, Ayatollah Ghaffari Avenue, P. O. Box: 9717853577, Birjand, IR Iran. Tel: +98-5632395000, Fax: +98-5632430076, E-mail: Waghars@bums.ac.ir

Abstract

Background: Many patients with multiple sclerosis (MS) have a type of sleep disorder.

Objectives: The current study aimed to investigate the effect of implementing a program based on the Orem self-care model on sleep quality of patients with MS.

Patients and Methods: Seventy eight patients referred to the multiple sclerosis association of Zahedan city, Iran, enrolled in the current randomized controlled trial conducted in 2015. The demographics form and Pittsburgh sleep quality index were completed by the patients. The selected patients were then randomly allocated into intervention and control groups (n = 39 for each group). An instructional program consisted of nine, 45 minutes sessions was performed in the intervention group. Afterwards, a three-month follow-up was performed after intervention. When the follow-up ended, the two groups completed the Pittsburgh sleep quality index again. Descriptive statistical tests, independent t-test, Chi-square test and paired t-test were used to analyze the data.

Results: Before the intervention, there was no significant difference between the two groups with regard to mean scores of sleep quality (P = 0.22). Both groups reported a significant improvement in sleep quality three months after intervention (P < 0.05). However, mean score changes of sleep quality before and three months after the intervention were significantly higher in the intervention group than the control group (P = 0.004), indicating a greater sleep quality improvement in the intervention than the control group.

Conclusions: The Orem-based self-care model program can be a useful tool to improve sleep quality of patients with MS. Future studies can be directed to investigate the effects of such interventions on other common problems of patients.

Keywords: Multiple Sclerosis, Sleep, Self-Care

1. Background

As the most common chronic disabling disease of the central nervous system among young adults, multiple sclerosis (MS) is characterized by inflammatory demyelination of the central nervous system (1, 2). Approximately, over 2.5 million people are affected by this disease worldwide. It is more prevalence in females than males (3-5).

There is a wide variation in the prevalence of MS in different geographic regions in Iran. In a systematic review conducted in 2013, researchers found that its total prevalence ranged from 5.3 to 74.28 per 100,000 people in Iran (6).

Although the MS course and severity among patients is not similar, it can lead to debilitating symptoms and a number of complications such as neurological disability (7). Visual disturbances, pain, paresthesia, ataxia and bladder (urinary sphincter) disturbances are among clinical findings which threaten the independence and ability of the patient for effective participation in family and social activities (8, 9). Moreover, sleep disorders are also common in patients with MS although they are often overlooked (10).

Research indicates that over half of the people diagnosed with MS have sleep disorders (11). An Iran-based study on sleep disorders of the people diagnosed with MS reported that over 87% of the subjects experienced a type of sleep disorder. Their most frequent problems included sleep-maintenance and sleep-onset insomnia (12). Sleep-related breathing disorder and restless leg syndrome are also among the most common sleep disorders experienced by patients with MS (10). Risk of developing conditions such as heart disease, obesity and diabetes can increase in

patients with a sleep disturbance. These conditions have a profound impact on long-term health (13, 14).

The exact causes of poor sleep quality in patients with MS are not determined. However, factors such as anxiety, pain, depression, fatigue and adverse effects arising from immunotherapy and symptomatic medications are proposed as possible causes (15-17). Therefore, it seems that strategies designed to control each of these factors in turn can improve quality of sleep in patients with MS.

Previous studies showed that applying self-care programs can result in decreased fatigue, pain, depression and improved mental health (18, 19). Many of the side effects of drugs for MS can be managed with approaches such as lifestyle changes and minimal additional pharmacotherapies (20).

Therefore, it can be expected that using self-care model for patients with MS will be associated with an improvement in sleep quality.

A well-known model in nursing to help improve patients' self-care ability is the Orem self-care model (21).

Several studies show the effectiveness of this model on health outcomes such as enhanced physical and mental quality of life and decreased fatigue in patients with MS (3, 8, 22).

2. Objectives

The current study aimed to investigate the effect of applying the Orem self-care model on sleep quality among patients with MS.

3. Patients and Methods

3.1. Participants

In this randomized controlled trial, the population included all patients diagnosed with MS registered in the MS association in Zahedan, Iran, from 2014 to 2015. In this association, about 350 patients with MS are registered. Building on previous research (23) and considering the 15% attrition rate, the sample size was calculated as 44 subjects per group, a total of 88 for both groups (control and intervention). The subjects were selected using convenience sampling method with respect to inclusion and exclusion criteria.

The inclusion criteria were lack of: a) wheelchair dependence, b) acute phase of the disease, c) addiction to drugs, d) hearing and speech impairment and e) constant use of drugs influencing sleep, as well as having literacy, age between 20 - 50 years, acute or chronic disorders such as severe depression and finally, obtaining a total Pittsburgh sleep quality index (PSQI) score of 5 or above.

Exclusion criteria included development of serious physical and psychological problems and failure to attend at least two intervention sessions. Afterwards, the selected subjects were randomly allocated to either the intervention or the control group.

It is noteworthy that five subjects in the intervention group were excluded because they failed to attend in more than two sessions. Similarly, five patients failed to complete the questionnaires. Therefore, the final statistical analysis was performed on 78 patients.

3.2. Measurements

The data were collected using demographics form, a need assessment form, self-report checklists and PSQI.

The demographics form collected information such as age, gender, education level, marital status and length of disease duration.

The needs assessment form was designed to evaluate patients' common problems and included items such as ataxia, muscular spasm, fatigue, constipation, fecal and urinary incontinence, muscular weakness and memory problem. In addition, a blank space was provided to write other possible problems. These forms were merely used to select issues presented in the instructional sessions.

The subjects expressed whether they had either of the above-mentioned problems.

This needs assessment form was developed based on the literature on MS. It was subsequently approved by six faculty members from the nursing and midwifery college at Birjand University of Medical Sciences.

The self-report checklists were given to the patients after the last instructional session. The subjects were asked to review the checklists on a daily basis and mark each self-care activity which they followed. Checklists were the same for all patients. The checklists were reviewed and marked by the subjects during the three months following the intervention.

Sleep quality was measured using PSQI (24). This self-rated index includes 19 self-rated questions comprising seven equally weighted components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction, each of which ranges 0-3 points. In all cases, a score of 0 indicates no difficulty, while a score of 3 indicates severe difficulty. The seven component scores are added to yield one global sleep quality index score ranging from 0 to 21 where greater scores indicate poorer sleep quality. The reliability and validity of the Persian version of PSQI have been well established (25). In the present study, Cronbach's alpha for total score of PSQI was found to be 0.78.

3.3. Intervention

On the basis of inclusion criteria, the potential subjects of the MS association were selected. The purpose and procedures of the study were explained to them and upon their agreement they signed an informed written consent prior to conducting the study. The demographic form and PSQI were completed by the subjects. Afterwards, they were randomly allocated into intervention and control groups. Then the intervention group completed the need assessment form.

The Orem self-care deficit theory as one of the theories of Orem model acted as a guiding framework for the intervention. Based on the needs assessment form, an instructional program was designed and offered merely for the intervention group subjects and a family member of theirs. This program represented an educative-supportive nursing system designed to improve self-care abilities and self-care practices. The program consisted of nine 45 minutes sessions offered twice a week by the author. In addition to lecture, group discussion together with role play was used in the instructional sessions to promote subjects' active involvement.

Topic of the sessions included basic information about MS, its symptoms and complications, common MS medications, major sleep disorders, identification and control of factors that reduce sleep quality (e.g. curtailing daytime napping and decreasing time spent in bed), strategies to manage emotional and psychological symptoms (e.g. relaxation exercises for 10 - 20 minutes, spending at least 30 minutes with friends or family members discussing feelings and concerns about living with MS) and the ways to reduce or prevent physical MS symptoms including fatigue (e.g. having alternate periods of rest during physical activity, stopping exercise or activity just before fatigue), muscle spasticity, immobility, weakness, and ataxia (e.g. power exercise, strengthening exercise and balance exercise), urinary incontinence (e.g. performing timed voiding, decreasing fluid intake about 2 - 3 hours before going to bed and decreasing consuming the caffeinated products and spicy foods), and constipation and bowel incontinence (e.g. abdominal massage, establishing a regular toileting habit and taking a meal or tea 30 minutes before the specified time to stimulate gastrocolic reflex, consuming high fiber diets and drinking at least 2 - 3 liters of drinks per day). The prepared content was confirmed by two neurologists.

In the last session, the contents presented in previous sessions were reviewed and the subjects' questions and ambiguities were addressed. The subjects in the intervention group were followed up for three months after the intervention for guidance, helping, and support by the author. They completed the self-report checklists on a daily basis during the follow-up period. Every week, subjects in the intervention group reported completed checklists to the author via phone calls. Furthermore, the author attended the MS association once a week where she guided and helped the subjects. The control group received the routine care. After three months from the intervention, both groups completed the PSQI.

3.4. Ethical Considerations

The proposal of this study was approved by research and ethical committees of Birjand University of Medical Sciences. The potential participants were informed of the purpose of the study and assured of confidentiality. The subjects were recruited only if they agreed and signed a written informed consent form. They were also informed that they may withdraw from the research project at any phase. At the end of the study period, the content of the instructional sessions presented to the intervention group were prepared in the form of pamphlets and given to the control group members.

3.5. Statistical Analysis

Data analysis was carried out using SPSS version 16. Independent t-test was used to compare the mean scores of sleep quality between the two groups before and after the intervention. The same test was used to compare the mean score changes of sleep quality after the intervention between the two groups. Chi-square test was used to determine whether there was a significant difference between the groups in terms of categorical variables such as marital status, level of education and age. Sleep quality mean scores before and after the intervention were compared in each group using paired t-test. The significance level was set at $P < 0.05$.

4. Results

The age means in the intervention and control groups were 34.1 ± 8.2 and 35.6 ± 8.4 years, respectively. The independent t-test indicated that there was no significant difference between the two groups in terms of age ($P = 0.43$). The mean lengths of disease duration were 5.72 ± 4.92 and 4.81 ± 3.58 years in the intervention and control groups respectively, but the difference was not significant ($P = 0.35$).

The other demographic data are presented in Table 1. According to this table, there was no significant difference between the two groups concerning gender, age, level of education and marital status.

As displayed in Table 2, sleep quality mean scores of the two groups were not different before the intervention ($P =$

Table 1. Demographic Characteristics of Subjects (N = 78)[a]

Variable	Group		P Value
	Intervention	Control	
Gender			0.5
Male	13 (33.3)	14 (35.9)	
Female	26 (66.7)	25 (64.1)	
Level of education			0.53
Elementary	8 (20.5)	7 (17.9)	
Secondary	35.9 (33.3)	11 (28.2)	
Associate or above	17 (43.6)	53 (8)	
Marital status			0.41
Single	12 (30.8)	10 (25.6)	
Married	27 (69.2)	29 (74.4)	
Age, y			0.77
20 - 30	16 (41)	11 (28.2)	
31 - 40	12 (30.8)	12 (30.8)	
41 - 50	11 (28.2)	16 (41)	

[a]Values are expressed as No. (%).

0.22). Similarly, the difference was not significant after the intervention (P = 0.76).

The paired t-test showed that sleep quality mean score of the intervention group decreased significantly after the intervention (P = 0.001). In other words, the subjects' sleep quality significantly improved after the intervention.

The paired t-test indicated that sleep quality in the control group also improved after three months from the intervention (Table 2). The independent t-test showed no significant difference between the two groups in terms of sleep quality mean score before and three months after the intervention (Table 2).

However, the independent t-test indicated a significant difference between the two groups in terms of sleep quality mean score changes before and three months after the intervention (P = 0.002) (Table 2).

5. Discussion

Poor sleep is among the frequent complaints of patients with MS and has the potential to negatively impact the overall health and quality of life in the patients (16, 26). Therefore, finding strategies to improve sleep quality is a pivotal element that should not be overlooked in nursing care of these patients. The present study was conducted to evaluate the effect of a program based on the Orem self-care model on sleep quality among patients with MS. Statistical analysis showed no significant difference between

the sleep quality mean scores of the control and intervention groups before the intervention. Therefore, the groups were homogeneous and comparable in terms of baseline characteristics. Three months after the intervention, the subjects in the intervention group reported a significant improvement in sleep quality. Interestingly, sleep quality was also significantly enhanced among the control group patients. This can be partly attributed to programs and services provided for patients by MS association in Zahedan. Thus, in order to evaluate the effect of the applied program on the intervention group, the differences of sleep quality mean scores between the groups were compared before and after intervention.

A significant difference was observed between the two groups in terms of the difference of sleep quality mean scores before and three months after the intervention. Regarding this finding, it can be said that the program implemented in the current study was successful in improving the patients' sleep quality. This finding can be explained from a variety of perspectives. First, the sleep quality improvement in the intervention group can be attributed to some components of the implemented program in the study. Relaxation techniques were among the pivotal self-care practices in the present study. Previous research has linked self-relaxation training with improved sleep quality (27).

Second, effective management of MS common symptoms (e.g. pain, spasticity and neurogenic bladder) and psychological impacts have the potential to enhance sleep quality (19, 28, 29). Emotional well-being and life satisfaction in patients with MS were improved using the Orem self-care model (19). On the other hand, urinary tract symptom and muscle weakness and spasm were among the issues included in the instructional sessions in the current study. Hence, improvement of subjects' sleep quality in the current study can be partly attributed to possible positive influence of the intervention on the above-mentioned factors.

Third, and more directly, subjects' enhanced sleep quality could have resulted from sleep-specific aspects of the allied program. This part of the program highlighted sleep disturbances as one of the common symptoms of MS and provided several tips to help subjects to enhance their self-care ability.

No study was found to have applied the Orem self-care model on sleep quality. However, a recent study revealed that chronic disease self-management program (CDSMP) can improve sleep over a six-month period. This program is designed to empower patients with chronic conditions to deal with related symptoms such as pain, sleep problems and fatigue. CDSMP includes 150 minutes sessions (30).

Another study which was similar to the present study

Table 2. Comparison of Sleep Quality Mean Scores Changes in the Control and Intervention Groups[a]

Sleep Quality	Intervention		Paired T-Test Result	Difference
	Before	After		
Control group	11.25 ± 3.63	10.1 ± 4.59	P = 0.001	- 0.78 ± 0.23
Intervention group	12.58 ± 5.77	10.38 ± 3.7	P < 0.001	- 2.48 ± 3.06
Independent t-test result	P = 0.22	P = 0.76	-	P = 0.004

[a]Values are expressed as mean $\pm$ SD.

in terms of having a one-month follow-up period after the intervention, application of the continuous care model (CCM) containing four stages (orientation, sensitization, control and evaluation) significantly enhanced sleep quality in patients undergoing hemodialysis [31].

Review of literature shows that most studies conducted on the quality of sleep in patients with MS are descriptive rather than interventional. There is a scarcity of studies on specific strategies that may be effective in enhancing sleep quality in patients with MS. Non-pharmacological interventions with a reasonable cost and effectiveness are needed to raise sleep quality of patients with MS.

To the authors' best knowledge, the current study was the first to investigate the effect of a program based on the Orem self-care model on sleep quality of patients with MS. Nevertheless, there were some limitations that should be acknowledged. Using self-report to assess sleep quality may have resulted in recall bias. Also, the subjects' quality of sleep was reassessed only three months after the intervention. Future studies can be directed to assess longer-term effects of similar interventions. Moreover, it can be recommended to investigate the effects of programs devised on the basis of the Orem self-care model on other common problems of patients or the influencing factors on the course of MS.

5.1. Conclusion

The Orem model-based self-care program implemented in the current study as a simple and cost-effective approach, along with the routine nursing care, can be used to improve the sleep quality in patients with MS.

Acknowledgments

Footnotes

References

1. Tsang BK, Macdonell R. Multiple sclerosis- diagnosis, management and prognosis. *Aust Fam Physician.* 2011;**40**(12):948–55. [PubMed: 22146321].
2. Farjam M, Zhang GX, Ciric B, Rostami A. Emerging immunopharmacological targets in multiple sclerosis. *J Neurol Sci.* 2015;**358**(1-2):22–30. doi: 10.1016/j.jns.2015.09.346. [PubMed: 26440421].
3. Masoudi R, Mohammadi I, Ahmadi F, Hasanpour-Dehkordi A. The effect of self-care program education based on Orem's theory on mental aspect of quality of life in multiple sclerosis patients. *IJN.* 2009;**22**(60):53–64.
4. Ahlgren C, Oden A, Lycke J. High nationwide prevalence of multiple sclerosis in Sweden. *Mult Scler.* 2011;**17**(8):901–8. doi: 10.1177/1352458511403794. [PubMed: 21459810].
5. Compston A, Coles A. Multiple sclerosis. *Lancet.* 2002;**359**(9313):1221–31. doi: 10.1016/S0140-6736(02)08220-X. [PubMed: 11955556].
6. Etemadifar M, Sajjadi S, Nasr Z, Firoozeei TS, Abtahi SH, Akbari M, et al. Epidemiology of multiple sclerosis in Iran: a systematic review. *Eur Neurol.* 2013;**70**(5-6):356–63. doi: 10.1159/000355140. [PubMed: 24192707].
7. Noyes K, Weinstock-Guttman B. Impact of diagnosis and early treatment on the course of multiple sclerosis. *Am J Manag Care.* 2013;**19**(17 Suppl):s321–31. [PubMed: 24494633].
8. Hauser SL, Goodwin DS. Multiple sclerosis and other demyelinating diseases. In: Fauci AS, Braunwald E, Kasper DL, Hauser SL, editors. Harrison's principles of internal medicine. 17 ed. New York: McGraw-Hill Medical; 2008. pp. 2611–21.

9. Hamidizadeh S, Masoodi R, Ahmadi F, Mohammadi E. Evaluation of the effect of self- care program based on the Orem framework on the physical quality of life in multiple sclerosis patients. *JSSU.* 2009;**17**(2):153–62.

10. Veauthier C. Sleep disorders in multiple sclerosis. Review. *Curr Neurol Neurosci Rep.* 2015;**15**(5):21. doi: 10.1007/s11910-015-0546-0. [PubMed: 25773000].

11. Bamer AM, Johnson KL, Amtmann D, Kraft GH. Prevalence of sleep problems in individuals with multiple sclerosis. *Mult Scler.* 2008;**14**(8):1127–30. doi: 10.1177/1352458508092807. [PubMed: 18632776].

12. Razazian N, Najafi F, Mahdavi P, Aghaei A. Prevalence of sleep disorders in patients with multiple sclerosis. *J Mazandaran Univ Med Sci.* 2014;**23**(110):219–24.

13. Attarian H. Importance of sleep in the quality of life of multiple sclerosis patients: a long under-recognized issue. *Sleep Med.* 2009;**10**(1):7–8. doi: 10.1016/j.sleep.2008.02.002. [PubMed: 18482864].

14. Kaminska M, Kimoff RJ, Benedetti A, Robinson A, Bar-Or A, Lapierre Y, et al. Obstructive sleep apnea is associated with fatigue in multiple sclerosis. *Mult Scler.* 2012;**18**(8):1159–69. doi: 10.1177/1352458511432328. [PubMed: 22183937].

15. Brass SD, Duquette P, Proulx-Therrien J, Auerbach S. Sleep disorders in patients with multiple sclerosis. *Sleep Med Rev.* 2010;**14**(2):121–9. doi: 10.1016/j.smrv.2009.07.005. [PubMed: 19879170].

16. Boe Lunde HM, Aae TF, Indrevag W, Aarseth J, Bjorvatn B, Myhr KM, et al. Poor sleep in patients with multiple sclerosis. *PLoS One.* 2012;**7**(11):eee49996. doi: 10.1371/journal.pone.0049996. [PubMed: 23166808].

17. Vitkova M, Gdovinova Z, Rosenberger J, Szilasiova J, Nagyova I, Mikula P, et al. Factors associated with poor sleep quality in patients with multiple sclerosis differ by disease duration. *Disabil Health J.* 2014;**7**(4):466–71. doi: 10.1016/j.dhjo.2014.05.004. [PubMed: 25224987].

18. Navipour H, Madani H, Mohebbi MR, Navipour R, Roozbayani P, Paydar A. Improved fatigue in individuals with multiple sclerosis after participating in a short-term self-care programme. *NeuroRehabilitation.* 2006;**21**(1):37–41. [PubMed: 16720936].

19. Sahebalzamani M, Zamiri M, Rashvand F. The effects of self-care training on quality of life in patients with multiple sclerosis. *Iran J Nurs Midwifery Res.* 2012;**17**(1):7–11. [PubMed: 23493483].

20. Langer-Gould A, Moses HH, Murray TJ. Strategies for managing the side effects of treatments for multiple sclerosis. *Neurology.* 2004;**63**(11 Suppl 5):S35–41. [PubMed: 15596735].

21. Orem D. Nursing: Concepts of practice. 5 ed. St. Louis: Mosby; 2001.

22. Masoudi R, Kheiri F, Ahmadi F, Mohammadi I. The effect of self-care program base on the Orem frame work on fatigue and activity of daily living in multiple sclerosis patients. *J Rehabil.* 2009;**10**(3):43–52.

23. Agha-Bagheri H, Mohammad-Khani P, Emrani S, Farahmand V. The efficacy of mindfulness-based cognitive therapy group on the increase of subjective well-being and hope in patients with multiple sclerosis. *J Clin Psychol.* 2012;**4**(1):23–31.

24. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;**28**(2):193–213. [PubMed: 2748771].

25. Moradi M, Mehrdad N, Nikpour S, Haghani H, Aalaa M, Sanjari M, et al. Sleep quality and associated factors among patients with chronic heart failure in Iran. *Med J Islam Repub Iran.* 2014;**28**:149. [PubMed: 25695007].

26. Veauthier C, Radbruch H, Gaede G, Pfueller CF, Dorr J, Bellmann-Strobl J, et al. Fatigue in multiple sclerosis is closely related to sleep disorders: a polysomnographic cross-sectional study. *Mult Scler.* 2011;**17**(5):613–22. doi: 10.1177/1352458510393772. [PubMed: 21278050].

27. Sun J, Kang J, Wang P, Zeng H. Self-relaxation training can improve sleep quality and cognitive functions in the older: a one-year randomised controlled trial. *J Clin Nurs.* 2013;**22**(9-10):1270–80. doi: 10.1111/jocn.12096. [PubMed: 23574290].

28. Mitchell AJ, Benito-Leon J, Gonzalez JM, Rivera-Navarro J. Quality of life and its assessment in multiple sclerosis: integrating physical and psychological components of wellbeing. *Lancet Neurol.* 2005;**4**(9):556–66. doi: 10.1016/S1474-4422(05)70166-6. [PubMed: 16109362].

29. Stanton BR, Barnes F, Silber E. Sleep and fatigue in multiple sclerosis. *Mult Scler.* 2006;**12**(4):481–6. [PubMed: 16900762].

30. Ory MG, Ahn S, Jiang L, Lorig K, Ritter P, Laurent DD, et al. National study of chronic disease self-management: six-month outcome findings. *J Aging Health.* 2013;**25**(7):1258–74. doi: 10.1177/0898264313502531. [PubMed: 24029414].

31. Sadeghi H, Azizzadeh Foruzi M, Haghdoost AA, Alizade SM. Effect of implementing continuous care model on sleep quality of hemodialysis patients. *Iranian J Crit Care Nurs.* 2010;**3**(1):5–6.