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The Effect of Progressive Muscle Relaxation on Sleep Quality of Patients Undergoing Hemodialysis

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Abstract

Purposeof the Study: Sleep disorder is common among patients with renal disease in its last phase. Progressive muscle relaxation is a method which has been designed to reduce tension and anxiety. The present study was carried out to determine the effect of progressive muscle relaxation on sleep quality of patients undergoing hemodialysis.

Method: This is a quasi-experimental study with one-group, before and after design. Using purposive sampling method, 42 patients were selected. These patients were being treated with maintenance hemodialysis in hospitals affiliated with Shahid Beheshti University of Medical Sciences in 2010. Sleep quality of samples was assessed by Pittsburgh Sleep Quality Index (PSQI). Progressive muscle relaxation was trained to patients in three sessions. They were also asked to do relaxation practice for a month, twice a day (once during the day and once before going to bed at night), and fill in the relaxation form after each practice. Afterwards, sleep quality of patients before and after relaxation were compared. To analyze the statistical data, paired t-test and wilcoxon test were used.

Findings: Seven samples were excluded and finally the data gained from 35 samples were analyzed. The mean of samples' sleep quality total score after relaxation was significantly lower than before relaxation ($P<0.001$). The score of each sleep quality dimension (except for use of sleep medications) were significantly lower than before relaxation.

Conclusion: According to the results of this study, progressive muscle relaxation has a favorable impact on sleep quality in patients undergoing hemodialysis and can be applied and trained as a useful method to improve sleep quality of patients in hemodialysis wards.

Keywords: Progressive muscle relaxation, Patients undergoing hemodialysis, Sleep quality

Introduction

Sleep disorders is common among patients with renal disease in its last phase. Some studies have reported its incidence to be over 80% [1]. The disorders often involve delay in falling asleep, frequent waking up, daytime sleepiness, sleep apnea, restless leg syndrome, and periodic motion impairment of a limb [2, 3]. Recent studies have stated that there is a correlation between sleep deprivations, lack of sleep and generally sleep disorders with a reduction in quality of life and an increase in deaths of hemodialysis patients [4].

One of the best nurses' responsibilities is to make sure that patients have enough rest and sleep. Nurses should identify causes ofpatients' discomfort and sleep disturbance and resolve them [5]. Different methods are used to treat insomnia including the use of tranquilizers or sleep medications which are very effective in short-term treatment of insomnia [6]. Some studies also found out that use of cognitive-behavioral therapies to improve the quality and quantity of sleep in primary insomnia are effective [7]. The main methods of cognitive-behavioral therapy including relaxation practice, stimulus control, sleep restriction and sleep hygiene [8]. Many of the studies done about the effect of cognitive-behavioral therapies have focused on the primary insomnia; however, it is still not clear whether these methods can successfully be applied to cure secondary insomnia caused by medical and psychological disorders [9].

Progressive muscle relaxation is a method that is designed to reduce stress and anxiety [10]. The purpose of implementing this method is to create awareness of the tension, relax muscles, and train a way to relax all the muscles [11]. Muscle relaxation means muscle loosening[30].Progressive muscle relaxation is derived from the theory that indicates a psychic-biological state named nervous muscle pressure increase is a basis for emotional negative states and psychosomatic diseases. Jacobson stated that muscle relaxation causes peace of mind because an emotional state will not happen in the presence of complete relaxation of the

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body limbs.In other words, relaxation prevents creation of negative thoughts and emotions such as anxiety, and tension and neutralizes the effects of muscle pressure increase on the body [31]. Progressive muscle relaxation is a noninvasive, low-costtechnique without complications that can be done independently by patients themselves.The present study seeks to investigate the effect of progressive muscle relaxation on the sleep quality of hemodialysis patients to reduce their problems, improve their quality of life, and cause their satisfaction.

Methods

This is a quasi-experimental study with one-group, before and after design. 39 patients undergoing maintenance hemodialysis in hemodialysis centers of hospitals affiliated with Shahid Beheshti University of Medical Sciences participated in this study. Four patients were excluded from the study (two of them because of incomplete filling of relaxation form, one due to hospitalization and not doing enough relaxation practice, and one for being moved to another hemodialysis center). Finally, 35 patients' data were analyzed.

The samples were selected through purposive sampling. Typical specifications included the following: being at least 18 and up to 65 years old, having a history of hemodialysis for at least six months, having undergone hemodialysis two or three times, having full awareness, having acceptable listening and speaking ability to learn relaxation method, not suffering from known mental diseases including deep anxiety and depression, having normal blood calcium levels during the study (between 8.5 to 10 mg/dl), being basically educated, and having the opportunity to use educational CDs.

Data collection instrument in this study included demographic information questionnaire, Pittsburgh Sleep Quality Index (PSQI), and relaxation form. Samples' quality of sleep was measured before and after relaxation using PSQI which is a standard questionnaire for determining the quality of sleep [12 – 14].This questionnaire, designed by Buyssue et al in 1989, is a self-report questionnaire which measures the sleep quality during the past month and includes nineteen questions in seven dimensions (subjective quality of sleep, delay in falling asleep, sleep adequacy, sleep duration, sleep disturbances, use of sleep medications, and daily dysfunction). The total score in this questionnaire is between zero to 21 and higher scores indicate poorer quality of sleep. Score five or more shows that the person has a sleep problem [15, 16]. This questionnaire has been used in many studies to measure sleep quality and determine sleep disorders. It contains high validity and reliability. Previous studies have shown a reasonable match between the results of this questionnaire and laboratory examinations on sleep using polysomnography. Psychometric properties of this questionnaire have been approved for the Iranian population [17]. In order to be used in this study, content validity of this index was assessed through asking eleven experts. Similarly, its reliability was assessed by internal consistency and test-retest. In the test-retest method, the questionnaire was given to fifteen hemodialysis patients two times at a two-week interval and then the Pearson correlation coefficient was calculated to assess reliability. The reliability of this questionnaire using test-retest method was 78% and using internal consistency (Cronbach's alpha) was calculated as 85%.

In this study, a relaxation form was used to investigate the process of relaxation and its quality by samples and also to calculate the index of relaxation acceptance. The form was completed by samples in a month after practicing relaxation. In this form, samples reported the time and date of relaxation practice, relaxation practice duration, use of sleep medications, and level of created calmness which was scored between zero and 10 through self-assessment; zero shows lack of calmness and 10 indicates maximum created calmness. This form was also used in other similar research[18].

After obtaining written authorization from the authorities of Shahid Beheshti University of Medical Sciences, the researcher went to the selected hospitals and obtained the written consent from the authorities of the related

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centers. Afterwards, he went to the hemodialysis centers of the selected hospitals. Having introducedhimself and stated the purpose of the study, the researcher identifiedthe qualified hemodialysis patients. After obtaining informed consent from patients, he asked them to fill in the demographic questionnaire and Pittsburgh Sleep Quality Index. The researcher then taught progressive muscle relaxation to them in three sessions of half an hour. Training relaxation method was done in a separate room dedicated to hemodialysis patients' rest with previous coordination with the head of the department. In this study, to perform progressive muscle relaxation, the patientswere asked to focus on each group of muscles from in feet in order, for five to 10 seconds, mildly contract them and then relax them for ten to fifteen seconds, and focus on feelings they experience at any stage after relaxing the muscle. This procedure is usually performed for 15 to 20minutes.

practice twice a day (once during the day and once at night before going to bed) for a month, and fill in the relaxation form after each practice. After one month, once again the Pittsburgh Sleep Quality Index was given to the sample. Finally, patients' sleep quality was compared with that of before relaxation.

To analyze the data, SPSS16 statistical software was used. To report demographic properties of the data, descriptive statistics were utilized. In order to determine the effect of relaxation on the overall score of sleep quality and its dimensions, due to the dependency of both populations before and after, paired t-test (for data with normal distribution) and Wilcoxon test (for data with abnormal distribution) were used. To determine correlation between the overall score of sleep quality and demographic variables of the samples, statistical tests of Pearson, Spearman and independent twere used.

Table 1: Effect of progressive muscle relaxation on descriptive statistics of the total score of the studied samples' sleep quality

Total score of sleep quality	Mean (standard deviation)	Lowest	Highest	P (Paired t test)
Before relaxation	12.9 (4.15)	5	20	<0.001
After relaxation	7.77 (3.60)	2	15	<0.001

Table 2: Effect of progressive muscle relaxation on descriptive statistics of score of sleep quality dimensions of the studied samples

Sleep quality dimensions	Time	Mean (standard deviation)	P (Wilcoxon test)
Subjective quality of sleep	Before relaxation After relaxation	1.86 (0.73) 0.9 (0.65)	<0.001
Delay in sleep	Before relaxation After relaxation	2.26 (0.74) 1.14 (0.81)	<0.001
Sleep duration	Before relaxation After relaxation	2.14 (0.91) 1.43 (0.85)	<0.001
Sleep adequacy	Before relaxation After relaxation	2.11 (1.05) 1 (0.90)	<0.001
Sleep disorders	Before relaxation After relaxation	1.51 (0.50) 1.03 (0.16)	<0.001
Use of sleep medications	Before relaxation After relaxation	1.111 (1.47) 1.09 (1.44)	0.31
Daily dysfunction	Before relaxation After relaxation	1.91 (0.78) 1.23 (0.80)	<0.001

After training relaxation method and gaining a proper outcome, a training progressive muscle relaxation CD, an educational pamphlet, and relaxation form were given to the samples. They were asked to do the

Findings

For this study 39 patients undergoing maintenance hemodialysis were chosen. Data analysis showed that the majority of samples were females (54.5%), married (60%) and

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housewife (54.2%). The mean of participants' age was42.83 ± 12.85. The mean of men's age was 40.56 ± 12.94 and the mean of women's age was 74.44 ± 12.80. The mean of history of renal disease and history of hemodialysis treatmentin samples were8.54 ± 7.43 and 4.97 ± 4.54 years respectively. Most of the samples underwent hemodialysis in the morning (71.4%) and three times a week (97.1%). The highestsample frequency (40%) had high school education. Most of samples had an average daily activity (57.1%) and did not use sleep medications (71.4%). Mostsamples (68.7) had another diseasein addition to renal disease at the time of data collection.

Data analysis showed that there was a significant differencebetween the mean score of sleep quality of samples before and after relaxation ($p<0.001$) (Table 1);the mean score of sleep quality after relaxation was less than before relaxation (7.77 ± 3.6 compared with 12.89 ± 4.5). Moreover, the score of each of the dimensions of sleep quality (other than use of sleep medications) significantly was less than before relaxation ($p<0.001$) (Table 2). Lower scores represent better sleep quality.

To investigate normal distribution of the studied variables (total score of sleep quality and score of each sleep quality dimension), kolmogorov-smirnov test was used. Using this test, the total score of sleep quality had a normal distribution and the score of sleep quality dimensions had an abnormal distribution.

Furthermore, there was a significant correlation between the change in the total score of sleep quality and relaxation index ($p<0.05$, $r=0.34$). Relaxation acceptance index was calculated using relaxation form and a formula: [18]created calmness level * relaxation practice duration = relaxation index.

Among the demographic variables, older age ($P<0.001$, $r=0.34$), little daily activity ($P<0.001$), other diseases ($p=0.02$), and use of sleep medications ($p=0.003$) had a significant correlationwith higher scores of sleep quality before and after relaxation.

Discussion

In this study, the effect of one part of cognitive-therapeutic treatment named progressive muscle relaxation on the sleep quality of hemodialysis patients has been investigated. To reach the purpose of this study, the effect of progressive muscle relaxation on the total score of sleep quality and each of its dimensions has been assessed. Progressive muscle relaxation improved total score of sleep quality and its dimensions in hemodialysis patients.This finding is similar to the results of other research done about the effect of cognitive – behavioral treatments including relaxation on sleep quality [19 – 22]. In this study, progressive muscle relaxation created a significant improvement in all dimensions of sleep quality; except for use of sleep medications which is consistent with the results of other research. There was no significant change in the used amount of sleep medications by samples after applying cognitive – behavioral treatments such as muscle relaxation [23]. This finding is acceptable because patients need some time to stop using their sleep medications and also they have to be sure about the efficacy of relaxation method.

The mean of sleep quality total score after relaxation suggests low sleep quality. (Sleep quality total score>5); this showed that although relaxation improved patients' sleep quality, it could not bring the average sleep quality to a normal level. This is justified due to severely impaired quality of sleep in these patients.

In the present study, in order to increase the ability to extend the results of relaxation, correlation between the changes in patients' sleep quality total score after practicing relaxation and relaxation acceptance index were evaluated. The existence of correlation between these two variables suggests that improvein sleep quality is correlated with relaxation practice.

In order to determine if the intervening factors on patients' sleep quality, each of the demographic variables correlation was evaluated with samples' sleep quality total score. Among the demographic variables, samples with higher age, low levels of daily

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activity, other diseases, and sleep medicationssignificantly correlated with poor sleep quality before and after relaxation. This finding is consistent with other research results [2, 4, 24 - 26]. In other research, the history of hemodialysis of more than 12 months (Sabatiny et al, 2002), lower education [27], and females [28], were correlated with poor sleep qualitywhich this study did not show it.

One of the limitations of this study was that people's attitudes toward relaxation were different.Their attitudesare related to cultural factors and educational level [29]. The researcher was not able to control the level of knowledge and attitudes of the studied samples;however, educational level of the studied samples was asked in a question in the questionnaire and the answerswere classified. Another notable limitation is that physical, psychological crises can influence sleep quality. For this purpose, people who experienced severe physical crises (acute illness, hospitalization, extensive surgery) or psychological crises (bereavement, divorce) in the past six months and also during the study were excluded.

Conclusion

According to the results of this study, progressive muscle relaxationhas a favorable effect on the sleep quality of hemodialysis patients. Progressive muscle relaxation helped improvedimensions of sleep quality. Due to the favorable effects of progressive muscle relaxation, this method could be taught as a useful method to improve the sleep quality of patients in the hemodialysis wards. For further research, it is suggested that the effect of other cognitive-therapeutic methodsincluding stimulus control,sleep restrictions, mental imagery, and music therapy on the sleep quality of these patients is investigated.

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References

1. Tatomir PG, Boisteanu D, Seica A, Buga C, Covic A. Sleep disorder: a systematic review of an emerging major clinical issue in renal patients. Int Urol Nephrol. 2007;39(4):1217-26.
2. Iliescu EA, Coo H, McMurray MH, Meer CL, Quinn MM, Singer MA, et al. Quality of sleep and health related quality of life in haemodialysis patients. Nephro Dial Transplant. 2003;18(1):126-32.
3. Parker KP . Sleep disturbances in dialysis patients. Sleep Med. 2003;7(2):131-43.
4. Baraz Sh, Mohammadi E, Broomand B. Relationship of sleep quality, quality of life and blood factors in preservative hemodialysis patients. J Shahrekord Med Sci Univ. 2007;9(4):74-67. [Persian]
5. Faculty members of Shahid Beheshti Nursing and Midwifery school in translation of. Principles of patient care: a comprehensive approach on nursing. Dugas B (author); 1st edition. Tehran: Golban Publication; 2003. [Persian]
6. Montgomery P, Dennis J. A systematic review of nonpharmacological therapies for sleep problems in later life. Sleep Med Rev. 2004;8(1):47-62.
7. Joshi S. Nonpharmalogic therapy for insomnia in elderly. Clin Geriatr Med. 2008;24(1):107-19.
8. Harsora P, Kessmann J. Nonpharmacologic management of chronic insomnia. Am Fam Physician. 2009;79(2):125-30.
9. Smith MT, Huang MI, Manber R. Cognitive behavior therapy for chronic insomnia occurring within the context of medical and psychiatric disorder. Clin Psychol Rev. 2005;25(5):559-92.
10. Hamidizadeh S, Ahmadi F, Asghari M. Effect of relaxation techniques on anxiety and stress in elderly patients with hypertension. J Shahrekord Med Sci Univ. 2006;8(2):51-45. [Persian]
11. Seyyed Gorgany N. Overcomes your stress, before it overcome to you. Schtainmetz J (author). 1st edition. Tehran: Hezaran publications; 1997. [Persian]
12. Memarian R. Application of nursing concepts and theory. First edition. Tehran. Publication of Tarbiat Modarres University. 1999. [Persian]
13. Conrad A, Roth W. Muscle relaxation therapy for anxiety disorders: It works but how? Journal of Anxiety Disorders. 2007;21(3):243-64.
14. Buysse DJ, Reynolds CF, Monk TH, Hoch CC, Yeager AL, Kupfer DJ. Quantification of subjective sleep quality in healthy elderly men and women using the Pittsburgh Sleep Quality Index. Sleep. 1991;14(1):331-8.
15. Smyth C. The Pittsburgh Sleep Quality Index (PSQI). [monograph on the Internet]. The Hartford Institute for Geriatric Nursing, New York University, College of Nursing. Jan 2007. [cited 20

[Downloaded from jccnursing.com on 2026-10-15]

Tibetan Yoga intervention in patients with lymphoma. Cancer. 2004;100(10):2253-60.
24. Simeit R, Deck R, Marx BC. Sleep management training for cancer patients with insomnia. Sup Car Can. 2004;12(3) :176-83.
25. Soeffing JP, Lichstein KL, Nau SD , McCrae ChS, Wilson NM, Aguillard RN, et al. Psychological treatment of insomnia in hypnotic-dependant older adults. Sleep Med. 2008;9(2):165-71.
26. Eryavuz N, Yuksel S, Acarturk G, Uslan I, Demir S, Demir M, et al. Comparison of sleep quality between hemodialysis and peritoneal dialysis patients. Int Urol Nephrol. 2008;40(3):785-79.
27. Merlino G ,Piani A, Dolso P, Adorati M, Cancelli I, Valente M, et al. Sleep disorders in patients with end-stage renal disease undergoing dialysis therapy. Nephro Dial Transplant. 2006;21(6):184-90.
28. Williams SW, Tell GS, Zheng B, Shumaker S, Rocco MV, Sevick MA. Correlates of sleep behavior among haemodialysis patients: The Kidney Outcomes Prediction and Evaluation (KOPE) Study. Am J Nephrol. 2002;22(1):18-28.
29. Eryilmaz MM, Ozdemir C, Yurtman F, Cilli A, Karaman T. Quality of sleep and quality of life in renal transplantation patients. Transplant Proc. 2005;37(5):2072-6.
30. Elder SJ, Pisoni RL, Akizawa T, Fissell R, Andreucci VE, Fukuhara Sh, et al. Sleep quality predicts quality of life and mortality risk in haemodialysis patients: Results from the Dialysis Outcomes and Practice Patterns Study (DOPPS). Nephro Dial Transplant. 2008;23(3):998-1004.
31. Atashzadeh Shorideh F. Effect of relaxation on hypertension of patients with primary hypertension referred to cardiovascular clinics of academic hospitals in 1994. Thesis in nursing. [Dissertation] Shahid Beheshti Nursing and Midwifery School. 1994. [Persian]

dec2009]. Available from: http://consultgerirn.org/uploads/File/trythis/try_this_6_1.pdf.
16. Beck SL, Schwartz AL, Towsley G, Dudley W, Barsevick A. Psychometric evaluation of the Pittsburgh Sleep Quality Index in cancer patients. J Pain Symptom Manag. 2004;27(2):140-8.
17. 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.
18. Backhaus J, Junghanns K, Broocks A, Riemann D, Hohagen F. Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. J Psychosom Res. 2002;53(3):737-40.
19. Farhadi Nasab A, Azimi H. Study of patterns and subjective quality of sleep and their correlation with personality traits among medical students of Hamadan University of Medical Sciences. Sci J Hamedan Med Sci Univ. 2008.1(15):11-5. [Persian]
20. Means MK, Lichstein KL, Epperson MT, Johnson ChT. Relaxation therapy for insomnia: Nighttime and daytime effects. Behavior Research and Therapy. 2000;38(7):665-78.
21. Berger AM, Kuhn BR, Farr LA, Lynch JC, Agrawal S, Chamberlain J, et al. Behavioral therapy intervention trial to improve sleep quality and cancer-related fatigue. Psychooncology. 2009;18(6):634-46.
22. Chen HY, Lim PS, Wu WCh, Chiu HCh, Chen CH, Kuo HY, et al. Cognitive-behavioral Therapy for sleep disturbance in patients undergoing peritoneal dialysis: A pilot randomized controlled trial. Am J Kidney Dis. 2008;52(2):314-23.
23. Cohen L, Warneke C, Fouladi RT, Rodriguez MA, Chaoul-Reich A. Psychological adjustment and sleep quality in a randomized trial of the effects of a

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