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THE EFFECT OF PROGRESSİVE MUSCLE RELAXATİON (PMR) ON SLEEP QUALİTY İN PATİENTS WİTH CHRONİC HEART FAİLURE (CHF)

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ABSTRACT

Background and Objective: Sleep disturbance is a common complaint in patients with Chronic Heart Failure (CHF). Progressive Muscle Relaxation (PMR) is used as a non-pharmaceutical approach to ameliorate sleep quality. The aim of this research was to evaluate the effect of PMR on sleep quality in patients with CHF.
Materials and Methods: In this randomized controlled trial, 90 patients involved in CHF were selected and randomly put into the intervention (n=45) and control (n=45) groups. Patients in the intervention group received PMR training for 3 sessions, while the control group received routine nursing care. Before training at the end of the 4th week, the sleep qualities of the 2 groups were measured using the Pittsburgh Sleep Quality Index (PSQI).
Results: After 4 weeks, the scores of the PSQI decreased in the intervention group from 12.86±2.63 to 10.49±2.43 with a change of -2.3±1.40 and P<0.001, as well as in the control group from 12.34±2.43 to 11.70±2.78 with a change of -0.6±1.65 and P=0.015. There was only a statistically significant difference between the two groups regarding daytime dysfunction (P<0.001) and sleep medication use (P=0.026).
Conclusion: 4 weeks of PMR twice a day seemed to improve sleep quality in Heart Failure (HF) patients.

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Introduction

Sleep disturbance interferes with physical function and results in fatigue, depression, irritability, impaired cognitive function, decreased participation in the programs of key treatment recommendations, impaired self-care, worsening symptoms of underlying diseases [1-3] and reduced life quality [4-6]. Additionally, chronic sleep disturbance can cause the activation of pro-inflammatory pathways, lowered sympathetic activity, higher cortisol levels [7], and a risk factor for cardiovascular disease and stroke, all of which lead to morbidity and mortality [8].
Currently, sleep disturbance is treated through both pharmacological and non-pharmacological managements [9-12]. Regarding the role of the sympathetic nervous system in developing and exacerbating CHF signs and symptoms [5] and the

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effect of PMR as a non-invasive technique on the sympathetic nervous system regulation and sleep quality improvement, this study was conducted to determine PMR impact on CHF patients' sleep qualities.

Materials and Methods

In this randomized controlled trial, 90 hospitalized patients with CHF were randomly allocated to the intervention (n=45) and control (n=45) groups. The intervention group received PMR training for 3 sessions, while the control group received routine nursing care. The research was conducted in the Critical Care Unit (CCU) of a university hospital in north Iran between July and October of 2016. Since 8 and 1 subjects in the intervention and control groups did not complete the study, respectively, the research was conducted with 81 patients (Figure 1).

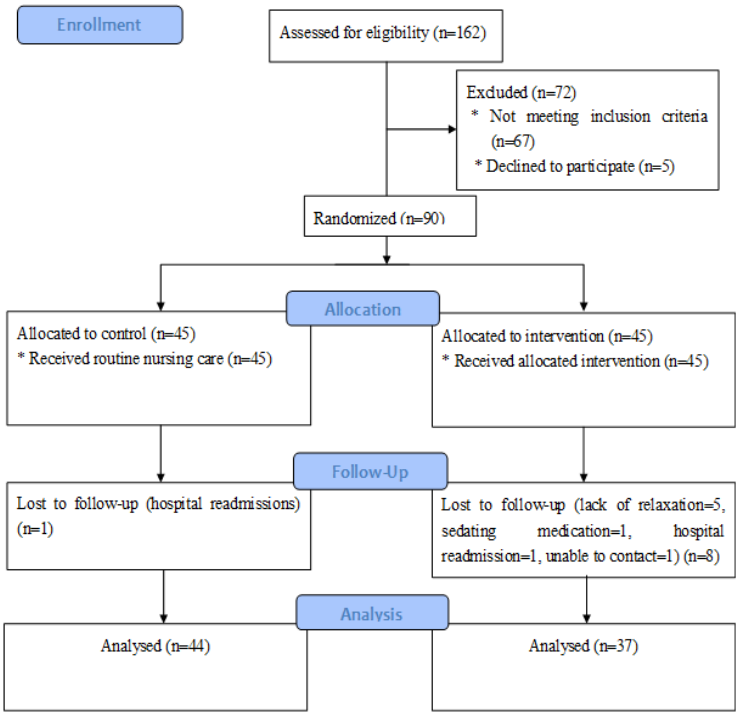

Figure 1. Summary of participant flow through study

The inclusion criteria included age≥18 years, PSQI>5 points, being involved HF of NYHA class II or III, no cigarette smoking, and no routine medication affecting sleep quality, and having at least 3 months of CHF history, established clinical signs, no serious cognitive impairment, reading and writing ability or a literate family member, and a mobile phone.
The exclusion criteria were defined as declined participation, sedative consumption, not doing more than 10% of relaxation tests (6 times) during the study, awaiting an invasive cardiovascular procedure, and physical or mental crises.
The PSQI used to evaluate the subjective sleep quality during the previous month consists of 19 self-rated questions, which are grouped into 7 component scores: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, sleep medication use, and daytime dysfunction. Each component score is equally weighted on a 0-3 scale. Worse sleep quality is indicated by a higher global PSQI score ranging from 0 to21. Scores >5 indicate poor sleep quality [6]. The validity and reliability of this scale has been confirmed in different studies. Its Cronbach's alpha has been determined to be between 0.80 and 0.85 [13]. In the current research, the total amount of Cronbach's alpha for the PSQI was 0.77.
Data collection was done using the PSQI and a questionnaire of individual information. The questionnaire included age, gender, marital status, education, income, location, BMI, ejection fraction, HF type, co-morbidities, and poly-pharmacy.
Prior to the test, the PSQI and the mentioned questionnaire were used for patients who had met the study criteria. The intervention group received PMR training during 3 sessions based on Jacobson's method, while the control group received routine nursing care only in the hospital. Each session of PMR training lasted approximately 15-30 min. The cognitive and physiological states of arousal interfering with sleep were reduced via PMR, which led to the whole body relaxation by systematically and continuously stretching and relaxing muscles. As a result, sleep was facilitated through reduction of the skeletal muscle tension and fatigue [14, 15]. Based on this technique, a patient could sit or lie on a bed in his/her quiet room. The procedure started with stretching 18 groups of muscles, including forehead, eyes, lips, tongue, neck, 2 movements of shoulders, right and left hands, chest, abdomen, hip, right and left thighs, right and left calves, right and left feet, and finally deep breathing for 5 seconds. In the meantime, the patient was told by the researcher to experience the different feeling

he/she might have when doing tenseness down through his/her thigh and then having a relaxed feeling for 30 seconds. The CD on the relaxation exercises developed by the researcher under the supervision of a clinical psychologist according to the literature was corroborated by the 10 members of the Academic Psychiatry in terms of validity.

In the 1st session, a general description of the relaxation purpose and patient's teaching of PMR implementation were introduced on the CD, which was to be listened afterwards, while the researcher supervised the patients doing the PMR training. PMR was performed by listening to the CD in the 2nd and 3rd sessions.

Any questions were answered by the principal researcher, who ensured mastering of the relaxation techniques by everyone in the PMR group. At the end of the sessions, the patients in the PMR group were requested to practice it at home by using the CD, which contained music and some directives with a pamphlet and checklist once in the morning and once before sleeping at night for 4 weeks. They were asked on the phone if they were doing PMR every week. After 4 weeks, both the intervention and control groups were asked to come to the heart clinic of the same hospital for their sleep quality assessments with the PSQI again. This study ethically complied with Helsinki's declaration presented in 1964. While explaining the study objectives and method, the researcher identified the eligible people and assured them of the data confidentiality after obtaining their informed consents.

The statistical analysis of the data was done using SPSS software version 13.0. To determine the difference between a patient's mean score obtained from sleep quality before and after the PMR program in each group, a paired t-test was applied. Nonparametric tests were used for the variables that were not normally distributed, i.e., demographic characteristics and sleep quality components. To find the relationship between sleep quality scale and its components, Spearman's correlation analysis was utilized. $P<0.05$was statistically considered to be significant.

Results

As aforementioned, 8 and 1 subjects out of 90 patients in the intervention and control groups did not complete the study, respectively. 55.6% (n45) of the remaining 81 participants were females. The majority of the two groups were married and urban with an under-diploma education degree. The most common co-morbidity among them was hypertension. The patients' mean ages in the intervention and control groups were 64.49±12.44 and 67.59±14.65, respectively. Mann Whitney U-test and Chi-square test showed no significant differences in the demographic and medical characteristics between the groups ($P >0.05$).

Table 1. Baseline characteristics of study participants.

Characteristics	Control n=44	Intervention n=37	p-value
Demographicfactors			
Age, mean±SD	67.59±14.65	64.49±12.44	0.316
Gender, n (%)			
Female	25(56.8%)	20(54.%)	0.490
Marital Status, n (%)			
Marride	29(65/9%)	31(83.8%)	0.057
Widow	15(34/1%)	6(16.2)	
Educational Status, n (%)			
Under diploma	39(88.6%)	34(91.9%)	0.655
Under Baccalaureate	5(11.4%)	2(5.4%)	
Baccalaureate	0	1(2.7%)	
Level of Income, n (%)			
Less than expenditure	19(43.2%)	21(56.8%)	0.261
Balance with expenditure	21(47.7%)	13(35.1%)	
More than expenditure	4(9.1%)	3(8.1%)	
Location, n (%)			
Urban	25(56.8%)	21(56.8%)	0.586
Rural	19(43.2%)	16(43.2%)	
Clinical factors			
EF, mean±SD	26.25±10.79	23.59±9.05	0.239
NYHA Class, n (%)			
II	19(43.2%0	16(43.2%)	0.586

III	25(56.8%)	21(56.8%)	
Type of Heart Failure, n (%)			
Systolic	29(65.9%)	30(81.1%)	1
Diastolic	15(34.%)	7(18.9%)	
Co-morbidities, n (%)			
Hypertension	24(54.1%)	20(54.1%)	0.535
Diabetes	22(50.%)	20(54.1%)	0.371
Ischemic heart disease	23(52.2%)	16(47.1%)	0.331
Number of Medications, n (%)			
0-4 Drugs	14(31.8%)	14(37.8%)	0.369
≥5 Drugs	30(68.2%)	23(62.2%)	
BMI, mean±SD	26.43±4.47	26.52±3.84	0.928

After 4 weeks, the PSQI scores significantly reduced in the intervention and control groups from 12.86±2.63 to 10.49±2.43 with a change of -2.3±1.40 and P<0.001 and from 12.34±2.43 to 11.70±2.78 with a change of -0.6±1.65 and P=0.015 respectively.

The differences in the mean scores of the baseline and those after 4 weeks for all the components of sleep quality in the intervention group were better than those of the control group. There was only a statistically significant difference between the two groups regarding the daytime dysfunction (P<0.001) and sleep medication use (P=0.026).

Table 2: Sleep quality changes in the intervention group. Higher scores indicate worse sleep quality

PSQI	Intervention (n=37) (Mean ± SD)		
	Baseline n=45	Week 4 n=37	Change n=37
Subjective sleep quality (range 0-3)	1.59±0.68	1.24±0.54	-0.35±0.63
Sleep latency (range 0-3)	2.16±0.89	1.81±0.84	-0.35±0.48
Sleep duration (range 0-3)	2.65±0.63	2.43±0.55	-0.21±0.53
Habitual sleep efficiency (range 0-3)	2.57±0.86	2.49±0.76	-0.08±0.59
Sleep disturbances (range 0-3)	2.16±0.50	1.54±0.50	-0.62±0.59
Use of sleep medication (range 0-3)	0.00±0.00	0.30±0.57	0.30±0.57
Daytime dysfunction (range 0-3)	1.73±0.99	0.65±0.71	-1.80±0.75
Global score (range 0-21)	12.86±2.63	10.49±2.43	-2.37±1.40

Table 3: Sleep quality changes in the control group. Higher scores indicate worse sleep quality

PSQI	Control (n=45) **(**Mean ± SD)			*p-value of change
	Baseline n=45	Week 4 n=37	Change n=37	
Subjective sleep quality (range 0-3)	1.50±0.62	1.27±0.54	-0.22±0.60	0.432
Sleep latency (range 0-3)	2.02±0.67	1..86±0.56	-.016±0.61	0.114
Sleep duration (range 0-3)	2.45±0.69	2.36±0.65	-0.9±0.52	0.286
Habitual sleep efficiency (range 0-3)	2.52±0.79	2.57±0.69	-0.04±0.68	0.403
Sleep disturbances (range 0-3)	2.16±0.60	1.77±0.52	-0.38±0.53	0.095
Use of sleep medication (range 0-3)	0.00±0.00	0.68±0.85	0.68±0.85	0.026
Daytime dysfunction (range 0-3)	1.68±0.88	1.20±0.93	-0.47±0.82	<0.001
Global score (range 0-21)	12.34±2.43	11.7±2.78	-0.63±1.65	<0.001

*p-value of changes between the two (intervention and control) groups

Among the demographic variables, a higher score of sleep quality was found for age with a positive significant correlation (P P<0.001) (R-squared value=0.77).

Discussion

The results of this study revealed that PMR improves CHF patients' sleep qualities and quantities. This finding was similar to the results of other studies [12, 15-17]. The general hypothesis in PMR is to enable individuals to intelligently learn how to intentionally inhibit their muscular tension and consequently lower their levels of anxiety. Convenience, cost efficacy, and independency of practice are among the major advantages of this technique used for the reduction and management of anxiety. CHF symptoms, such as orthopnea and Paroxysmal Nocturnal Dyspnea (PND) may be stressful and play a role in anxiety. In addition, PMR has some regulatory effects on the sympathetic nervous system and may lead to the suppression of pro-inflammatory pathways and mitigate cortisol levels.

Both groups had lower post-test scores of sleep quality compared to the pre-test scores; however, the patients who received PMR training displayed a significantly greater improvement in their sleep qualities. This could be due to PMR training at the baseline measurement. The sleep quality scores of the control group were >5 indicating a poor sleep experience during the previous month. The first evaluation at the time of hospitalization in CCU and second evaluation at home demonstrated sleep quality improvement over time after the patients were discharged from the hospital and cared by their family members. This could justify the influencing factor of sleep quality changes.

The sleep quality scores among the intervention group were not proper after relaxation (>5). This finding indicated that sleep quality had not reached a normal level although relaxation had improved it. It might be due to low ejection fractions and old ages. This was consistent with the results of one study [7].

The results of the current research showed the PMR group's better mean scores of all the PSQI components compared to the control group; yet, a statistically significant difference was found between the two groups only in terms of daytime dysfunction and sleep medication use. This finding was in contrast with other studies. For example, the PSQI had revealed a statistically significant difference between the two groups based on one component (subjective sleep quality) in one study [12], 3 components (subjective sleep quality, sleep latency, sleep disturbance) in another study [6], and all the components in two other studies [15, 16]. This might be justified by the conditions of HF patients regarding low ejection fraction, orthopnea, PND, and consumption of diuretics. To improve all sleep aspects, doing a long time PMR seemed necessary. In addition, the natures of diseases and intervention designs in the above studies had been different for the patients, who had not been discharged so soon. Also, PMR duration had been longer than that of the present study (6 weeks vs. 4 weeks).

In our research, there was a significant relationship between age and higher sleep scores among the demographic variables. This finding was in contrast with the study conducted by Suna et al. [6] The patients' mean ages were higher in the present study; however, in their study, the patients of class IV and females had had poor sleep qualities. In our study, the numbers of males and females were equal and the patients of class IV were excluded due to having unstable conditions.

The outcomes of this research were influenced by some limitations. First, the reasons for the patients' sleep disorders were different. Second, this was an unblinding study. The significant limitation of this research was the lack of a separate room for doing PMR in the hospital.

Conclusion

In this investigation, PMR improved the sleep qualities of CHF patients. Therefore, it is suggested that PMR be used as an adjuvant therapy in hospitals. Nurses can teach PMR to these patients as a routine care in order to decrease the frequencies and severities of sleep problems.

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Conflict of interest: None

References

1. Garcia, S., Alosco M.L., Spitznagel M..B., Cohen R., Raz N., Sweet L *et al.* Poor sleep quality and reduced cognitive function in persons with heart failure. Int J Cardiol., 2012;156(2): 248-249.
2. Izawa, K.P., Watanabe S., Oka, K., Hiraki K, Morio Y. Kasahara Y,.*et al,*. Relation between sleep quality and physical activity in chronic heart failure patients. Recent. Pat. Cardiovasc Drug Discov., 2011; 6(3): 161-167.
3. Parish, J.M.,. Sleep-related problems in common medical conditions. Chest., 2009;135(2): 563-572.

4. Chen, H.M.,. Clark A.P,. Tsai L.M ,. Chao Y.F,. Self-reported sleep disturbance of patients with heart failure in Taiwan. Nurs Res 2009; 58(1): 63-71.
5. 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.
6. Suna, J.M., Mudge A., Stewart I.,. Marquart L. O'Rourke , P., Scott A.,. The effect of a supervised exercise training programme on sleep quality in recently discharged heart failure patients. Eur .J Cardiovasc Nurs., 2015; 14(3): 198-205.
7. Knutson, K.L., K. Spiegel, P. Penev and E. Van Cauter, 2007. The metabolic consequences of sleep deprivation. Sleep Med Rev., 11(3): 163-178.
8. Westerlund, A., Bellocco R., Sundstrom J., Adami H.O., Akerstedt T., Trolle Lagerros Y., Sleep characteristics and cardiovascular events in a large Swedish cohort. Eur J Epidemiol., 2013.; 28(6):463-473.
9. McCaffrey, R., Music listening: its effects in creating a healing environment. J Psychosoc Nurs Ment Health Serv 2008; 46(10): 39-44.
10. Akinci, A.C., Olgun N. The effectiveness of nurse-led, home-based pulmonary rehabilitation in patients with COPD in Turkey. Rehab Nurs 2011; 36(4): 159-165.
11. Ghanem, M., Elaal, E.A. Mehany M., Tolba K. Home-based pulmonary rehabilitation program: Effect on exercise tolerance and quality of life in chronic obstructive pulmonary disease patients. Ann Thorac Med 2010; 5(1): 18-25.
12. Demiralp, M., Oflaz F., Komurcu, S. Effects of relaxation training on sleep quality and fatigue in patients with breast cancer undergoing adjuvant chemotherapy. J Clin Nurs., 2010; 19(7-8): 1073-1083.
13. Akbarzadeh, R., koushan M., Rakhshani M ., HashemiNik S.M. Effect of the Benson relaxation technique on quality of sleep in patients with chronic heart disease. J Sabzevar Univ Med Sci. 2014; 21(3): 492-499[Persian].
14. Alexandru, B.V., Róbert B., Viorel L., Vasile, B. Treating primary insomnia: A comparative study of self-help methods and progressive muscle relaxation. J Evid Based Psychother 2009; 9(1): 67.
15. Akgun Sahin, Z., Dayapoglu N. Effect of progressive relaxation exercises on fatigue and sleep quality in patients with chronic obstructive lung disease (COPD). Complement Ther Clin Pract 2015; 21(4): 277-281.
16. Dayapoglu, N.,. Tan, M . Evaluation of the effect of progressive relaxation exercises on fatigue and sleep quality in patients with multiple sclerosis. J Altern Complement Med 2012.; 18(10): 983-987.
17. Saeedi, M., Ashktorab T.,. Saatchi K, Zayeri F., Akbari, S. A..A. The effect of progressive muscle relaxation on sleep quality of patients undergoing hemodialysis. Iran J Crit Care Nurs (IJCCN). 2012; 5(1): 23-28[persian].