Original Article

Comparison of the Impacts of Benson Relaxation Technique and Foot Reflexology Massage on Sleep Quality of Patients with Systolic Heart Failure: A Randomized Clinical Trial

Abstract

Background: Cardiovascular diseases can affect sleep quality. The use of non-pharmacological methods to improve the sleep quality of heart failure patients is essential. Therefore, this study compared the effects of the Benson relaxation technique and foot reflexology massage on sleep quality of those patients. **Materials and Methods:** In this clinical trial study, 93 patients with systolic heart failure referred to Javad Al-Aeme heart clinic in Torbat Heydarieh were selected with purposive sampling method and divided into the foot reflexology massage, Benson relaxation technique, and control groups using the balanced blocking randomization method. The Benson relaxation technique and the foot reflexology massage were performed for 20 and 30 minutes three days per week for four weeks, respectively. The control group only received routine care. Sleep quality was measured by the Pittsburgh sleep quality index and then compared among the groups before and after the intervention. The data were analyzed using ANOVA, Tukey's *post hoc* tests, paired *t* test, and Chi-square at the significant level of $p < 0.05$. **Results:** After interventions, the mean (SD) quality of sleep significantly increased in both intervention groups (Reflexology: pre-intervention 10.80 (3.40), post-intervention 6.60 (3.10), Benson relaxation: pre-intervention 15.50 (2.40) post-intervention 12 (2.60), compared to the control group (pre-intervention 10.50 (1.90) post-intervention 9.40(1.70) ($p < 0.001$). There was no significant difference between the two intervention groups ($p = 0.53$). **Conclusions:** The interventions improved the quality of sleep in patients with systolic heart failure. Therefore, these methods can be used as a suitable complementary treatment to improve the quality of sleep by nurses and midwives.

Keywords: *Heart failure, musculoskeletal manipulations, nursing, relaxation, sleep*

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Introduction

In each decade, the rate of heart failure doubles, and the cost of treatment for heart failure is twice the cost of treatment.[1] The disease leads to social isolation and depression. These are disturbing the lifestyle, performance, family, and social life of patients. Moreover, the disease outcomes can deprive the patient of desirable sleep.[2] The number of people with insomnia hospitalized is approximately twice higher that of people without a history of sleep disorders.[3] Undesirable sleep disrupts the quality of life and physical performance.[4] Sleep disorders can affect the quality of life, general health, physical, cognitive, psychological functions, and daily activities.[5] Lack of sleep increases blood pressure and heart rate, which consequently increases the risk of a heart attack.[6] Patients with heart failure have low sleep quality.[7]

Benzodiazepines are the most commonly used drugs to treat insomnia.[8] These drugs reduce the nervous system's function in people, so they may endanger their safety.[9] Therefore, non-pharmaceutical interventions are necessary to prevent dependency on drugs and improve the quality of sleep. One of the interventions introduced as a complementary and sometimes alternative treatment to medication is relaxation. When people are relaxed, their pulse, blood pressure, respiration rate, and muscle pressure decrease, which consequently reduce their attention to environmental stimuli.[10] The Benson Relaxation Technique (BRT) is a desirable method due to its easy learning and teaching to others.

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Using this method reduces the pulse rate, respiration, blood pressure, and the heart's workload.[11] This method can be applied in any place. As well, this technique needs no specialist or special tools, and it is teachable because of its applicability. A study showed that BRT has a positive effect on sleep quality in chronic heart diseases,[12] and some studies have shown that it was not completely effective.[13]

Acupressure like reflexology is one of the non-pharmacological methods of sleep disorders treatment that can use by nurses and patients. Based on researcher search many studies have been conducted on the impact of Foot Reflexology Massage (FRM) on controlling various diseases,[14-17] there are fewer studies on its impact on sleep.[18] Reflexologists believe that putting pressure on the plantar during illness improves blood flow throughout the body.[14] Such pressure on the plantar affects the individuals' psychological responses and then causes relaxation in various body organs,[15] which may lead to a desirable sleep.[19] Both BRT and FRT are among the most well-known methods to improve the quality of sleep. Due to controversial results of studies on the effects of those and the lack of comparison between BRT and FRT in the searches, and since in most studies BRT and FRT have an effect on the improvement of sleep quality, it was assumed that the effect of those methods may have to difference on the improvement of sleep quality. So to investigate this probability, this study was conducted to compare the effects of FRM and the BRT on sleep quality in patients with systolic heart diseases.

Materials and Methods

This randomized clinical trial study was performed from May to July 2018. The Clinical Trial Registration Code is IRCT20180528039882N1. This study was conducted on patients with systolic heart failure (mild and moderate grades) referred to Javad Al-Aeme heart clinic in Torbat Heydarieh. This study had two intervention groups and one control group. Random allocation to these three groups was proportional (with the random assignment ratio: 1.1.1). The inclusion criteria were as follows: the tendency to participate in the study, literacy for reading and writing, lack of history of any known mental disorder and neuropathy (such as schizophrenia, anxiety, depression, and dementia), lack of chronic diseases except for heart failure (such as diabetes, cancer, musculoskeletal disorders, and chronic kidney failure), ability to learn BRT, nonuse of sedative (like benzodiazepines), no history of injuries, open wounds, and surgery on the legs during the last two years that prevent FRM, confirmation of the diagnosis of systolic heart failure (mild to moderate) for at least six months by a cardiologist, and obtaining a 6–21 score (low sleep quality) from Pittsburgh Sleep Quality Index (PSQI). The exclusion criteria were as follows: death, the occurrence of any unforeseen complications during the intervention (such as arrhythmia, heart attack, bypass surgery, or angioplasty), and changing the patient's heart failure phase.

The sample size was calculated based on Akbarzadeh *et al*.'s study,[12] considering the statistical power of 80% and a confidence level of 95% among 28 people. A total of 31 people were estimated for each group (93 in total), considering a possible drop rate of 10%.). $(\overline{x_1} = 15.30, \overline{x_2} = 19.20, s_1 = 4.70, s_2 = 5.60, z_{1-\alpha/2} = 1.96, z_{1-\beta} = 0.85$ The study units were randomly assigned into three groups [Figure 1] using the balanced blocking randomization method with three permutation blocks. To do this, the letters A, B, and C were considered for the two intervention and control groups, respectively. Possible modes in the permutation block method are six modes that include (ACB, CBA, CAB, BCA, BAC, and ABC). Each mode wrote on a card and the cards assigned the number one to six. Then, a mode is selected by throwing the table of random numbers between one and six. Based on the selected mode, patients will be divided into three groups. This process will continue until the sample size is completed. The patients were selected through the purposive sampling method. Initially, 134 patients referred to a heart clinic were enrolled, and then, 93 patients based on inclusion criteria were selected. The corresponding author specified the random allocation sequence, and the first author enrolled the participants and assigned them to the intervention groups.

In the BRT group, the BRT was taught individually to the samples, and they were then asked to repeat the exercises. Thereafter, the relevant instructions were provided to the samples along with a CD on which the process of performing the exercises was recorded. The samples were asked to perform the exercises twice a day, firstly at 8 to 10 AM and secondly at 8 to 10 PM for 20 minutes during three days per week for four weeks (based on Akbarzadeh *et al*. study).[12] The researcher checked the exercises performed by the patients once a week on telephone calls. For the FRM group, the steps and duration of the program were described. Thereafter, this technique was performed three days per week for four weeks, and each session lasted for 30 minutes in a private room at the heart clinic (based on Farrokhian *et al*. study).[18] At the time of performing the intervention, the cardiologist monitored the samples for any possible complications. The FRM was performed by the trained researcher (first author). The control group only received routine care from comprehensive health centers for patients with systolic heart failure.

The data were collected using a demographic questionnaire and the PSQI. The demographic questionnaire included age, gender, educational level, and occupation. The demographic questionnaire was completed for the three groups before performing the intervention. As well, the PSQI was completed by three groups on the first day before and at the end of interventions. PSQI was designed

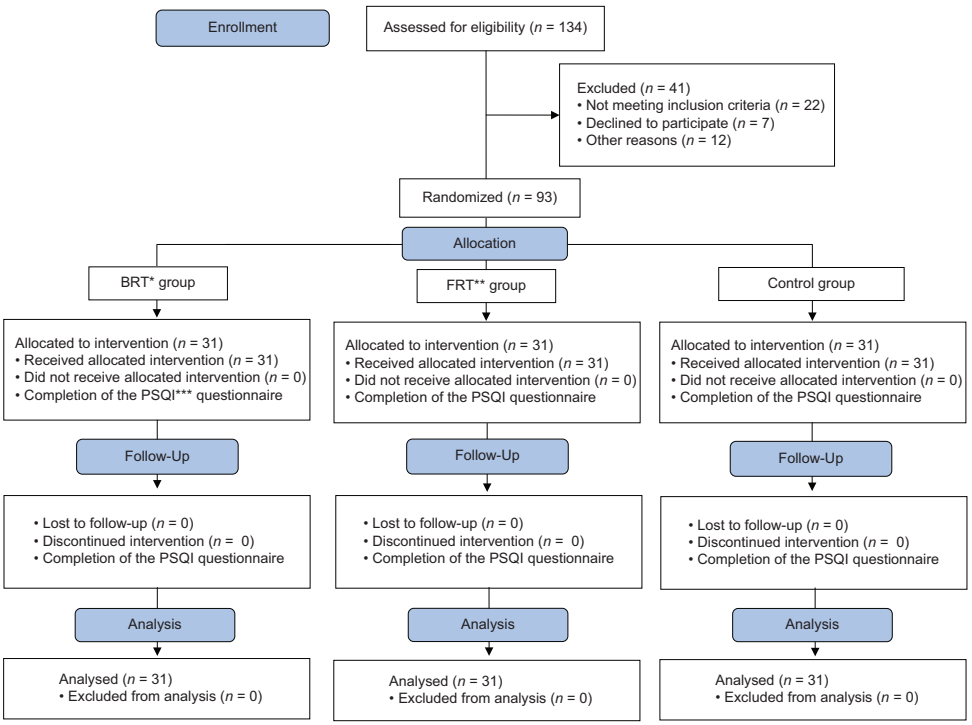

Figure 1: Flowchart of the randomized intervention-control trial, *Benson Relaxation Technique, Foot Reflexology Massage,***Pittsburgh Sleep Quality Index**

by Buysse (1988).[20] Moreover, Farrahi's study has confirmed the validity of this questionnaire for the Iranian population. As a result, they reported 100% sensitivity and 93% specificity at a cutoff of 7/8, and Cronbach's alpha as 0.89 for the Persian version of PSQI.[21] This is a self-report scale examining the quality of sleep in seven areas (subjective quality sleep, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, daily performance, and use of sleeping medication). Thereafter, the score range is from 0 to 21. The higher the score, the worse the quality of sleep.[20] The data were analyzed using IBM (International Business Machines Corporation) SPSS version 21. The data were analyzed using the Kolmogorov–Smirnov test (for normality) ANOVA and Tukey's *post hoc* tests for comparing the sleep quality of three groups before and after interventions, paired *t* test for comparing sleep quality within the three groups before and after the interventions, Chi-square for comparing components of sleep quality includes subjective quality sleep, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleeping medication and daily performance in the three groups before and after the intervention. The data were analyzed at a significant level of 5%.

Ethical considerations

This study was approved by the Ethics Committee of Gonabad University of Medical Sciences (IR.GMU.RESEARCH.REC.1396.122). In the present study, informed consent forms were obtained from the samples.

Results

The study units were randomly assigned into three groups [Figure 1] using the balanced blocking randomization method with three permutation blocks.

The mean (SD) age of the study groups was FRM 50.91 (8.42), BRT 56.43 (3.21), and control 53.00 (5.22), respectively. The study groups were homogenous in terms of age, level of education, occupation, and gender ($p > 0.05$) [Table 1].

The comparison of sleep quality before intervention indicated that the mean (SD) total score of sleep quality was significant in three groups ($F_{2,90} = 35.75$, $p < 0.001$). The comparison of sleep quality after the intervention was significant between the three groups ($F_{2,90} = 35.35$, $p < 0.001$). Also, the comparison of sleep quality within the groups before and after the intervention was significant ($p < 0.001$) [Table 2]. For this reason, the sleep quality mean (SD) differences before and after the intervention were compared in order to determine the interventions' effect. The improvement in total sleep quality score was compared in the three groups. The results showed that these groups were different in this regard ($F_{2,90} = 13.43$, $p < 0.001$) [Table 2]. Tukey's *post hoc* test showed that the FRM and the BRT groups were significantly different from the control group ($p < 0.001$), but there was no significant difference between the FRM and the BRT groups ($p = 0.53$).

The sleep quality components were also compared. The results showed that all components of sleep quality except sleep latency improved in the intervention

Table 1: Baseline characteristics of the samples

	G1* (*n*=31) *n* (%)	G2** (*n*=31) *n* (%)	Control (*n*=31) *n* (%)	*p*
Level of educational				
Illitrace	21 (70)	21 (70)	22 (73.33)	0.97***
Middle school	4 (13.33)	4 (13.33)	5 (16.67)	
High school	3 (10)	3 (10)	2 (6.67)	
Collegiate	2 (6.67)	2 (6.67)	1 (3.33)	
Occupation				
Employed	3 (10)	4 (13.33)	7 (23.33)	0.06****
Unemployed	21 (70)	22 (73.34)	12 (40)	
Retired	6 (20)	4 (13.33)	11 (36.67)	0.13****
Gender				
Male	16 (53)	17 (56.66)	18 (60)	
Female	14 (47)	13 (44.34)	12 (40)	

*=Reflexology; **=Benson relaxation; ***Kruskal-Wallis test; **** Chi-square test

Table 2: Comparison of the mean (SD) sleep quality and mean (SD) difference before and after intervention in the three groups

Sleep quality	G1* (*n*=31) Mean (SD)	G2** (*n*=31) Mean (SD)	Control (*n*=31) Mean (SD)	*F*	df	*p*
Before intervention	10.81 (3.42)	15.56 (2.41)	10.54 (1.91)	35.75	2,90	< 0.001***
After intervention	6.63 (3.12)	12 (2.63)	9.47 (1.73)	35.35	2,90	< 0.001***
t test	−10.44	−6.47	−3.35			
df	30	30	30			
p	< 0.001****	< 0.001****	0.004****			
Mean (SD) difference before and after intervention	− 4.18 (2.21)	− 3.56 (3.00)	− 1.07 (1.92)	13.43	2,90	< 0.001***

*=Reflexology; **=Benson relaxation; ***ANOVA test; **** Paired *t* test

groups ($p < 0.05$). However, there was no statistically significant difference in the control group before and after the interventions ($p > 0.05$) [Tables 3 and 4].

Discussion

The main purpose of the present study was to compare the effects of BRT and FRM on the sleep quality of patients with systolic heart failure. The results of this study showed the quality of sleep after performing the interventions significantly increased in both intervention groups compared to the control group. Numerous studies have previously confirmed the effects of BRT and FRM on the quality of sleep.[11,12,15-19] A study evaluated the effect of FRM on the sleep quality of hemodialysis patients.[18] The results showed an increase in sleep quality in the experimental group and a trend of improvement over time, which is consistent with the results of the present study. The results of two studies indicated that reflexology improves sleep quality but the impact of FRM on other variables such as fatigue, anxiety, and pain was varied.[15,16] Also, the results of a meta-analysis showed that this intervention was a safe and effective intervention for insomnia.[19] Accordingly, the results of these studies are consistent with the current research. In another study, there was no convincing evidence for the effectiveness of reflexology in sleep treatment.[17] The results of that study do not match the results of the present study. This may be due to the intervention period's length because improving sleep efficiency requires a longer time of intervention. The use of this method due to its low cost and ease of use is recommended to improve sleep in these patients.[22] To justify the results of the present study, it can be said that the FRM reduces anxiety, stress, and pain, and as a result, improves sleep quality.[23,24] FRM probably increases the secretion of endorphins, which are endogenous opioids like morphine known as a natural relaxation that makes the person sleep faster and more efficiently.[25] There is a relationship between sleep latency and daily stress.[26] The more stress people have, the later they fall asleep. Consequently, they have longer sleep latency. In this regard, FRM and BRT by reducing stress and anxiety could ultimately improve the sleep latency phase due to their sedating and relaxing properties.[10] Increasing blood circulation in the body and reducing anxiety and stress are the gentle and profound effects of reflexology.[10] They help the body in regaining its strength, so as a result, there is a feeling of a greater satisfaction from sleep after it. Reflexology could cause relaxation in some areas of the body as well as stimulation in the passive part of the body, which can cause body balance and peace. In addition, it can regulate the physical mechanisms that make the body to be relaxed and improve sleep quality.[15,24] Although most studies, including systematic review and meta-analysis, indicate positive effects of reflexology and relaxation on

Table 3: Frequency distribution of the samples according to sleep quality components (the first four components) before and after the intervention in the three groups

Level variable	G1* *n* (%)	G2** *n* (%)	Control *n* (%)	χ^2	df	*p****
Subjective quality sleep before						
Very good	3 (9.68)	0 (0.00)	5 (16.14)	6.57	6	0.36
Fairly good	8 (25.80)	7 (22.58)	4 (12.90)			
Relatively bad	12 (38.72)	15 (48.39)	14 (45.16)			
Very bad	8 (25.80)	9 (29.03)	8 (25.80)			
Subjective quality sleep after						
Very good	8 (25.80)	0 (0.00)	2 (6.45)	13.58	6	0.03
Fairly good	10 (32.25)	11 (35.48)	12 (38.72)			
Relatively bad	11 (35.49)	18 (58.07)	13 (41.93)			
Very bad	2 (6.46)	2 (6.45)	4 (12.90)			
Sleep latency before						
Less than 15 min	5 (16.14)	0 (0.00)	2 (6.45)	17.19	6	0.009
16 to 30 min	2 (6.45)	2 (6.45)	3 (9.67)			
31 to 60 min	13 (41.93)	3 (9.67)	11 (35.48)			
More than 60 min	11 (35.48)	26 (83.88)	15 (48.40)			
Sleep latency after						
Less than 15 min	10 (32.25)	2 (6.45)	0 (0.00)	40.64	6	<0.001
16 to 30 min	14 (45.18)	5 (16.12)	5 (16.12)			
31 to 60 min	3 (9.67)	6 (19.35)	17 (54.83)			
More than 60 min	4 (12.90)	18 (58.08)	9 (29.05)			
Sleep duration before						
More than 7 hours	2 (6.47)	0 (0.00)	0 (0.00)	7.05	6	0.31
6 to 7 hours	3 (9.67)	4 (12.90)	6 (19.35)			
5 to 6 hours	13 (41.93)	8 (25.80)	12 (38.72)			
Less than 5 hours	13 (41.93)	19 (61.30)	13 (41.93)			
Sleep duration after						
More than 7 hours	5 (16.13)	0 (0.00)	0 (0.00)	19.31	6	0.004
6 to 7 hours	13 (41.94)	12 (38.71)	8 (25.80)			
5 to 6 hours	12 (38.71)	10 (32.26)	15 (48.40)			
Less than 5 hours	1 (3.22)	9 (29.03)	8 (25.80)			
Sleep efficiency before						
Higher than 85%	7 (22.58)	0 (0.00)	7 (22.58)	75.29	6	<0.001
75 to 84%	16 (51.62)	0 (0.00)	13 (41.90)			
65 to 74%	7 (22.58)	1 (3.20)	9 (29.05)			
Less than 65%	1 (3.22)	30 (96.80)	2 (6.67)			
Sleep efficiency after						
Higher than 85%	16 (51.61)	0 (0.00)	6 (19.35)	87.42	6	<0.001
75 to 84%	11 (35.49)	2 (6.45)	18 (58.08)			
65 to 74%	4 (12.90)	0 (0.00)	6 (19.35)			
Less than 65%	0 (0.00)	29 (93.55)	1 (3.22)			

*Reflexology; **Benson relaxation; ***Chi-square test

sleep quality,[15,19,27] it is not clear which of the two methods has a better effect on sleep quality. Therefore, it is suggested that more studies be done to determine the best and most effective methods to improve sleep quality.

A comparison of sleep quality before and after the intervention in each group showed that the sleep quality in both groups (BRT and FRM) was significantly different. The results showed that the sleep quality of the FRM group was lower than those of the BRT group but it was not significant. The results of a study showed that BRT has a positive impact on sleep quality in chronic heart patients.[12] Therefore, it can be used as a complementary treatment to improve these patients' sleep quality. The BRT due to its low cost, safety, and simplicity could be used as a complementary treatment, in order to reduce fatigue in hemodialysis patients.[28] The results of the above two studies are consistent with those of the present study. A study compared the impacts of reflexology and foot bath on the quality of sleep among the elderly.[29] The results showed that the mean (SD) scores of sleep quality decreased after the intervention in the foot bath and reflection therapy in both groups.

Table 4: Frequency distribution of the samples according to sleep quality components (the next three components) before and after the intervention in the three groups

	G1* *n* (%)	G2** *n* (%)	Control *n* (%)	χ^2	df	*p****
Sleep disturbances before						
Not in the last month	5 (16.13)	0 (0.00)	6 (19.36)	9.10	6	0.16
Less than once a week	10 (32.26)	9 (29.05)	7 (22.58)			
Once or twice a week	13 (41.93)	14 (45.15)	13 (41.93)			
Three or more times a week	3 (9.68)	8 (25.80)	5 (16.13)			
Sleep disturbances after						
Not in the last month	7 (22.58)	0 (0.00)	5 (16.13)	1.48	6	0.07
Less than once a week	15 (48.39)	16 (51.61)	11 (35.48)			
Once or twice a week	9 (29.03)	14 (45.16)	13 (41.94)			
Three or more times a week	0 (0.00)	1 (3.22)	2 (6.45)			
Use of sleeping medication before						
Not in the last month	10 (32.27)	10 (32.27)	12 (38.70)	2.62	6	<0.001
Less than once a week	9 (29.03)	2 (6.45)	10 (32.27)			
Once or twice a week	11 (35.48)	4 (12.90)	9 (29.03)			
Three or more times a week	1 (3.22)	15 (48.38)	0 (0.00)			
Use of sleeping medication after						
Not in the last month	14 (45.16)	17 (54.85)	14 (45.16)	23.86	6	0.001
Less than once a week	13 (41.94)	3 (9.67)	12 (38.70)			
Once or twice a week	4 (12.90)	2 (6.45)	5 (16.14)			
Three or more times a week	0 (0.00)	9 (29.03)	0 (0.00)			
Daily performance before						
Not in the last month	6 (19.36)	9 (29.03)	20 (64.52)	25.23	6	<0.001
Less than once a week	10 (32.26)	4 (12.90)	6 (19.35)			
Once or twice a week	14 (45.16)	11 (35.48)	5 (16.13)			
Three or more times a week	1 (3.22)	7 (22.59)	0 (0.00)			
Daily performance after						
Not in the last month	10 (32.26)	19 (61.30)	18 (58.08)	19.66	6	0.003
Less than once a week	17 (54.84)	3 (9.68)	12 (38.70)			
Once or twice a week	4 (12.90)	8 (25.80)	1 (3.22)			
Three or more times a week	0 (0.00)	1 (3.22)	0 (0.00)			

*Reflexology; **Benson Relaxation; ***Chi-square test

The comparison of sleep quality components of three groups after the intervention showed a significant difference between the two groups of FRM and BRT, which were significantly different from the control group. Interventions were effective in improving certain subscales of sleep quality in patients with heart failure, which are consistent with the study of Chegeni *et al*.[13] However, no statistically significant difference was found in any of the components and the total score between the two groups of FRM and foot bath,[24] so these results are similar to those of the present study.

One of the advantages of this study is helping to solve one of the serious problems of heart failure patients. Another advantage of this study is having two intervention groups and a control group that helps to better analyze the results.

One of the limitations of this study was that some patients probably did not perform fully BRT, because the BRT was performed by the samples and the FRM was performed by the researcher, and it can be assumed that the BRT was not performed correctly in some cases. The careful monitoring of it was beyond the researcher's reach. Since the BRT was performed by the samples, despite telephone monitoring by the researcher, it was likely that in some cases it was not performed correctly, so this can be considered as one of the limitations of this study.

Conclusion

The results of the present study show that both FRM and BRT can be used as an intervention to improve sleep quality in patients with heart failure. Therefore, it is recommended that these methods can be used as a suitable complementary treatment to improve the quality of sleep by nurses and midwifes.

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Conflicts of interest

Nothing to declare.

References

1. Zipes DP, Libby P, Bonow RO, Mann DL, Tomaselli GF. Braunwald's Heart Disease E-Book: A Textbook of Cardiovascular Medicine. Elsevier Health Sciences, WB Saunders Company; 2018.
2. Ponikowski P, Anker SD, AlHabib KF, Cowie MR, Force TL, Hu S, *et al*. Heart failure: Preventing disease and death worldwide. ESC Heart Fail 2014;1:4–25.
3. Buxo Pirla MJ, Minguell Roig ME, Batalla Mesado N, Peregrina Fernández E, Pérez Miravet S. Prevalencia e implicaciones pronósticas de los trastornos del sueño en la insuficiencia cardiaca crónica. Rev Rol Enferm 2018;41:38–42.
4. Al-Rawashdeh SY, Lennie TA, Chung ML. The association of sleep disturbances with quality of life in heart failure patient-caregiver dyads. West J Nurs Res 2017;39:492–506.
5. Uchmanowicz I, Markiewicz K, Uchmanowicz B, Kołtuniuk A, Rosińczuk J. The relationship between sleep disturbances and quality of life in elderly patients with hypertension. Clin Interv Aging 2019;14:155–65.
6. Lao XQ, Liu X, Deng HB, Chan TC, Ho KF, Wang F, *et al*. Sleep quality, sleep duration, and the risk of coronary heart disease: A prospective cohort study with 60,586 adults. J Clin Sleep Med 2018;14:109–17.
7. Türoff A, Thiem U, Fox H, Spießhöfer J, Bitter T, Tamisier R, *et al*. Sleep duration and quality in heart failure patients. Sleep Breath 2017;21:919–27.
8. Maust DT, Lin LA, Blow FC. Benzodiazepine use and misuse among adults in the United States. Psychiatr Serv 2019;70:97–106.
9. Seldenrijk A, Vis R, Henstra M, van Grootheest D, Salomons T, Overmeire F, *et al*. Systematic review of the side effects of benzodiazepines. Ned Tijdschr Geneeskund 2017;161:D1052.
10. Belchamber C. The state of relaxation. Payne's Handbook of Relaxation Techniques E-Book: A Practical Handbook for the Health Care Professional. 5th ed. Elsevier Health Sciences; 2021.
11. Teimouri F, Pishgooie SA, Malmir M, Rajai N. The effect of Benson Relaxation on physiological criteria in patients undergoing coronary artery bypass graft surgery. Complementary Medicine Journal 2019;9:3812–23.
12. Akbarzadeh R, Hashemi Nike SM, Kushan M, Rakhshani MH. Effect of Benson Relaxation on quality of sleep in chronic heart disease. Q J Sabzevar Univ Med Sci 2014;21:492–500.
13. Chegeni PS, Gholami M, Azargoon A, Pour AH, Birjandi M, Norollahi H. The effect of progressive muscle relaxation on the management of fatigue and quality of sleep in patients with chronic obstructive pulmonary disease: A randomized controlled clinical trial. Complement Ther Clin Pract 2018;31:64–70.
14. Naeeni MK, Fakhrzade H. Effect of foot reflexology on the severity of constipation of elderly women residing in Kahrizak Geriatric Nursing Home. Nurs Midwifery J 2016;13:825–34.
15. Khalili N, Eyvanbagha R, Nazari N, Savadpoor M, Soleymanifard P, Khalili Z. Physiological and therapeutic effects of reflexology in Iran: A systematic review. Depiction of Health 2016;7:49–61.
16. Wang WL, Hung HY, Chen YR, Chen KH, Yang SN, Chu CM, *et al*. Effect of foot reflexology intervention on depression, anxiety, and sleep quality in adults: A meta-analysis and metaregression of randomized controlled trials. Evid Based Complement Alternat Med 2020;2020:2654353.
17. Fazlollah A, Darzi HB, Heidaranlu E, Moradian ST. The effect of foot reflexology massage on delirium and sleep quality following cardiac surgery: A randomized clinical trial. Complement Ther Med 2021;60:102738.
18. Farrokhian R, Soleimani MA, Sheikhi MR, Alipour M. Effect of foot reflexology massage on sleep quality in hemodialysis patients: A randomized control trial. Sci J Hamadan Nurs Midwifery Fac 2016;24:213–20.
19. Huang HC, Chen KH, Kuo SF, Chen IH. Can foot reflexology be a complementary therapy for sleep disturbances? Evidence appraisal through a meta-analysis of randomized controlled trials. J Adv Nurs 2021;77:1683–97.
20. Buysse DJ, Reynolds CF III, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193–213.
21. Farrahi J, Nakhaee N, Sheibani V, Garrusi B, Amirkafi A. Psychometric properties of the Persian version of the Pittsburgh Sleep Quality Index addendum for PTSD (PSQI-A). Sleep Breath 2009;13:259–62.
22. Oshvandi Kh, Abdi S, Karampourian A, Moghimbaghi A, Homayonfar SH. The effect of foot massage on quality of sleep in ischemic heart disease patients hospitalized in CCU: Iran J Crit Care Nurs 2014;7:66–73.
23. Kapıkıran G, Özkan M. The effect of foot reflexology on pain, comfort and beta endorphin levels in patients with liver transplantation: A randomized control trial. Eur J Integr Med 2021;45:101344.
24. Khazaei T, Rezaei Mohabbati SH, Sebzari AR, Hosseini M. [The effect of foot reflexology massage on the stress and neuropathic pain caused by chemotherapy in women with breast cancer and genitalia]. J Birjand Univ Med Sci 2019;26:4–12.
25. Kapıkıran G, Özkan M. The effect of foot reflexology on pain, comfort and beta endorphin levels in patients with liver transplantation: A randomized control trial. Eur J Integr Med 2021;45:101344.
26. Hu Y, Wang Y, Sun Y, Arteta-Garcia J, Purol S. Diary study: The protective role of self-compassion on stress-related poor sleep quality. Mindfulness 2018;9:1931–40.
27. Cahyanti L, Sujianto U, Rejeki S. Effect of progressive muscle relaxation (PMR) interventions on sleep quality of HIV/aids patients: A meta-analysis. J Crit Rev 2020;7:1663–6.
28. Koushan M, Rakhshani MH, Mohsenpour M, Heshmatifar N. The effect of Benson Relaxation response on hemodialysis patients' fatigue. Q J Sabzevar Univ Med Sci 2014;20:757–65.
29. Nasiri K, Jafari M, Eyvanbaga R, Savadpoor M, Seyyedrasooli A. Comparing the effects of reflexology and foot bath on sleep quality. Complementary Medicine Journal 2015;5:1077–90.