Original Article

Reflexology versus Aromatherapy Massage for Relieving Anxiety and Depression in Hospitalized Older Women: A Randomized Clinical Trial

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Abstract

Background: One of the most common issues among older patients is anxiety and depression during hospitalization. Non-pharmacological methods can relieve anxiety and depression in older people, but comparison of the effects of various complementary methods needs further studies.

Aim: This study aimed to compare the effects of reflexology and aromatherapy massage on anxiety and depression in older women hospitalized in the cardiac care unit.

Methodology: In this randomized clinical trial, older women were randomly assigned to three groups as reflexology, aromatherapy massage, and control (n=45 in each group). The hospital anxiety and depression scale was used to assess anxiety and depression before and immediately after the interventions, and collected data was analysed using descriptive and inferential statistics.

Results: It was found that anxiety and depression significantly reduced after the interventions in both intervention groups (p= 0.001). However, reflexology had a better effect on the reduction of anxiety and depression in the older women.

Conclusions: While both reflexology and aromatherapy massage had positive effects on anxiety and depression, reflexology was more effective in alleviating psychological symptoms in older women hospitalized in the cardiac care unit.

Keywords: Aromatherapy, anxiety, complementary medicine, depression, older people, reflexology

Introduction

Older adults with coronary artery diseases (CAD) need high quality healthcare services and comfort during hospitalization (Davydow, Zivin & Langa, 2014). In addition to functional disability and disease-related mortality (Sheeran, Byers & Bruce, 2010), hospitalization can increase their anxiety and depression (Vulliez-Coady et al., 2013; Saraçl et al., 2015). Anxiety and depression are commonly reported in hospitalized older people with CAD (Pelletier et al.,2015; Knight & Durbin, 2015). They can reduce the quality of life of older people (Helvik, Skancke & Selbaek 2010) and increase the risk of further cardiovascular events, morbidity and mortality (Sanner, Frazier & Udtha, 2013; Hasin et al., 2005).

Anxiety and depression can significantly influence the therapeutic process and prognosis of CAD among older people (Meneghetti et al., 2017). Also, prescription of antidepressant or anxiolytic medicines can lead to further health-related complications and adverse events (De Jong-Watt & Arthur, 2004; Rejeh et al., 2015). A combination of medicines for the management of CAD along with the prescription of anxiolytics and antidepressants can lead to polypharmacy and enhances morbidity in older people (Shah & Hajjar,2012; Peeters et al., 2017). Therefore, complementary and alternative medicine have been suggested as a safe treatment modality (Astin et al., 2000) for the induction of relaxation (McFeeters et al., 2016) and reduction of anxiety and depression during hospitalization (Barnes et al., 2002).

Massage therapy as a complementary and alternative modality can increase the blood flow to the affected area (Barnes et al., 2002), through the stimulation of oxytocin production (Moyle et al., 2014). Massage along with essential oils such as lavender can be used for therapeutic purposes such as aromatherapy massage (Kyle et al., 2006). This technique can improve the blood circulation and sedate the parasympathetic nervous system (Bikmoradi et al., 2015; Sakamoto et al., 2012). Improvement of physiological responses, activation of the autonomic nervous system and release of hormones enhance the feeling of relaxation and comfort in individuals (Seyyed-Rasooli et al., 2016; Yang et al., 2015). According to a large multicenter randomized controlled trial, aromatherapy massage significantly improved anxiety and/or depression in patients suffering from cancer (Wilkinson et al., 2007). Another crossover randomized controlled trial showed improvements in patients' anxiety and health-related quality of life after massage therapy (Eguchi et al., 2016).

Reflexology as another type of massage can stimulate internal organs through pressing specific reflex points on the foot (Ernst, 2009). It opens blocked nerve pathways and increases the blood flow through breaking calcium crystals and uric acid (Moghimi-Hanjani, Mehdizadeh-Tourzani & Shoghi, 2015). It is believed that reflexology is a helpful method for the management of adverse psychological symptoms including anxiety and depression (Bahrami et al., 2017; Molavi Vardanjani et al., 2013; Choi & Lee, 2015). A randomized clinical trial on the psychological symptoms of women with multiple sclerosis found a significant reduction in the severity of anxiety, stress and depression after reflexology (Soheili et al, 2017). Another recent single-blinded randomized controlled trial showed the reduction of the mean score of anxiety after reflexology in patients undergoing coronary angiography (Mobini-Bidgoli et al., 2017).

It has been suggested that therapeutic massage in older people can help with the improvement of their health condition (Weinrich, Haddock & Robinson, 1999), but there is a lack of evidenced-based knowledge on the effects of such treatment modalities in hospitalized older patients suffering from CAD. Additionally, a few studies have compared the effects of reflexology and aromatherapy massage in older people. Therefore, this study aimed to compare the effects of reflexology and aromatherapy massage on anxiety and depression among older women hospitalized in the cardiac care unit (CCU).

Materials and Methods

Design and subjects: This randomized-controlled clinical trial was carried out on female older patients, that were recruited from a cardiac care unit (CCU) of a high-turnover teaching hospital in an urban area of Iran from July 2017 to December 2018. To prevent the effect of gender bias on

anxiety and depression levels, only female patients were recruited. Inclusion criteria were: female gender, diagnosed with CAD, age ≥ 60 years, no use of anxiolytics and sedative medicines at least 4 hours before the intervention, no use of alternative and complementary services 48 hours before the intervention, absence of foot lesions, no history of drug addiction, asthma, eczema and allergy, and ability to pass the olfactory test and the abbreviated mental test (score ≥ 7). Female older patients with severe hemodynamic instabilities and unwilling to take part in the study were excluded. The study process based on the CONSORT flow diagram was presented in Figure 1.

Sampling: A standard statistical formula (Molavi Vardanjani et al., 2013) using the parameters of α=0.05 and β= 80 were used to estimate the sample size as follows:

N= (z σ⁄ 2) + (zβ) ^2*σ^2*2)/(μ1-μ2^2), N= (1.96=0.85) ^2* σ^2*2/ (2.40-1.90) ^2=43.56≈44

Given 5% probability of samples' attrition (1 person per group), the sample size was estimated 135 persons (each group = 45).

After obtaining permissions from the ethics committee affiliated with the university in which the second author (NR) worked, the head nurse of the CCU was requested to use the inclusion criteria and help with the recognition of eligible participants. The older women were selected using a convenience sample method, but they were allocated to the reflexology, aromatherapy massage and control groups randomly. The system of sealed envelopes was used with each envelope assigned to a specific group. To avoid selection bias, the second author (NR) created the random allocation process and the main researcher (TB) assigned the participants to the groups. The nature of reflexology and aromatherapy massage interventions and lavender smell made it impossible to blind the participants to the group assignment. However, the data analyst was unaware of the group assignment process.

Interventions: A short description of reflexology and aromatherapy massage was provided to the older women. Next, the interventions were performed for one session in the morning work shifts, because the participants would be more collaborative and the interruption would be less. The first author (TB) received required training and education on reflexology and aromatherapy massage before conducting the interventions.

Routine care by nursing staff in the CCU was delivered to the older women in the control group.

Reflexology was accomplished based on the method suggested by Ingham (Byers, Dwight & Jean, 1983). The first author (TB) requested the older women to take the supine position on their bed. Next, she provided effleurage movements, moderate circular pressing movements around the ankle and toes using 10 drops of almond oil to facilitate massage. Reflex zones of anxiety and depression were stimulated using firm and stretching pressures for 5-10 seconds. The total reflexology time in each foot was 10 minutes.

Aromatherapy massage included massage using lavender essential oil consisting of linalool (27·11%) and linalyl acetate (23·33%) that was formulated in the ratio of 3:3:2:2 ml in 100 ml of coconut carrier oil. After consultation with pharmacognosy experts affiliated with the university in which the second author worked, lavender essential oil was chosen. The participants received aromatherapy massage based on the same protocol used in the reflexology group in which 10 drops lavender essential oil in each foot were used for 20 minutes. No side effects or risk factors with regards to the interventions were reported (Molavi Vardanjani et al., 2013).

Measures

Demographic data was collected regarding the participants' age, marital status, employment status, education level, living status, and history of hospitalization. Also, those older women with cognitive disorders were identified using the Abbreviated Mental Test (AMT). It helped with the identification of any change in their cognitive function and score 1 was given to each correct answer. Accordingly, score 0-3 suggested severe impairment, 4–7 moderate impairment, and score ≥ 8 normal cognitive function (Faraji, Fallahi & Khankeh, 2013). The Cronbach's alpha coefficient of the AMT was reported 0.76 (Bakhtiyari et al., 2014).

The hospital depression and anxiety scale (HADS) was used to assess anxiety and depression levels as emotional stress in the participants. It is consisted of 14 items with seven items on anxiety (HADS-A) and seven others on depression (HADS-D). Each

item has a score from 0 to 3 with a higher score indicating more symptoms. The score of both subscales ranges from 0 to 21, that is categorized as normal (0-7), borderline (8-10) and abnormal (11-21). Therefore, a higher score shows a higher level of anxiety or depression. Scores 11 or above on the anxiety or depression subscales indicates the probability of either anxiety or depression disorders (Zigmond & Snaith, 1983). Associations between the two subscales were reported 0.41-0.76 ($p<0.01$). Also, the Cronbach's alpha coefficient for the HADS-A has been reported 0.68-0.93 with a mean of 0.83, but for the HADS-D is 0.67-0.90 with a mean score of 0.82 (Bjelland et al., 2002). Reliability and validity of the Farsi version of the HADS has been reported acceptable (Montazeri et al., 1999) and is suitable for data collection in patients with CAD (Barth & Martin, 2005)

The frequency of data collection using the HADS was the same in all groups as before and immediately after the intervention.

Ethical considerations

The ethical approval was granted by the committee affiliated with the university in which the second author (NR) worked (decree code: No. 41-228111). The study's aim and method was explained to the participants. The informed consent form was read by their relatives or families. As one part of the informed consent process, they understood of allocation to one of the three groups. Also, they were asked to add their finger prints to the form, if they were willing to take part in this study. Codes instead of names were used to de-identify the participants and ensure their confidentiality and anonymity. Also, they could withdraw from the study at any time without any negative effect on their care in the CCU.

Data analysis: Descriptive statistics (frequency, percentage, mean and standard deviation), and inferential statistics (one-way ANOVA, paired sample t-test and $\chi 2$ test) were used for data analysis via the SPSS software (SPSS Inc., Chicago, IL, USA). To assess the presence of any statistically significant differences in anxiety and depression levels between the groups, the one-way ANOVA test was used. Also, the one-way ANOVA test and $\chi 2$ test helped with the assessment of between-group differences in terms of demographic characteristics. The Cohen's test helped with the estimation of the effect size of the intervention on anxiety and depression. The normal distribution of data was assessed using the Kolmogorov–Smirnov test. Also, $p < 0.05$ denoted statistical significance.

Results

The characteristic of the subjects in the groups: In this study, 135 older women were randomly assigned to three groups (n=45 per group). No statistically significant differences were found between the groups in terms of demographic characteristics at the beginning of the study (Table 1).

Anxiety and depression: Statistically significant differences in the anxiety level was reported between the groups ($F = 7.70$, $p=0.001$). The pair-wise comparison between the groups showed the reductions of anxiety levels in the intervention groups ($p<0.05$). According to the Cohen's test, a larger effect of reflexology on anxiety reduction was shown ($d=0.82$), and aromatherapy massage had a medium effect (Table 2). Statistically significant differences were observed between the groups in terms of depression levels ($F=7.97$, $p=0.001$). The groups' pair-wise comparison revealed that reflexology and aromatherapy massage reduced depression levels ($p<0.05$). According to the Cohen's test, reflexology had a larger effect on the reduction of the depression level ($d=0.80$), and aromatherapy massage showed a medium effect (Table 2).

Discussion

The effects of reflexology and aromatherapy massage on anxiety and depression levels in hospitalized female older patients were investigated in this study. The older women with anxiety and depression showed significant psychological improvements compared to the control group after the interventions. Reflexology had a large effect on the reduction of anxiety and depression as it increased the blood supply, improved healing responses in the body and relieved tensions through inducing relaxant effects on the autonomic nervous system (Quinn, Baxter & Hughes, 2008; Gunnarsdottir & Jonsdottir, 2010; Williamson et al., 2002). Similarly, previous studies identified the effectiveness of reflexology in the reduction of anxiety in different groups of patients (Bahrami et al., 2017; McVicar et al., 2007)

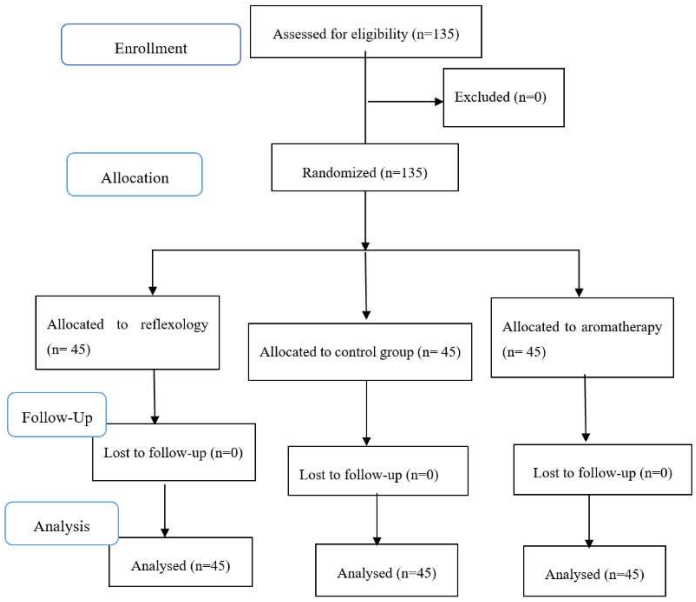

Figure 1. Process of the study according to the CONSORT flow diagram

Table 1. Baseline characteristics of the participants in the groups

Characteristics (Mean ± SD)	Control (n=45)	Reflexology (n=45)	Aromatherapy (n=45)	Statistical test/P value
Age (year)	72.62 ± 7.93	72.86 ± 7.98	73.97 ± 7.69	*F(2.134)=0.37 ,P=0.68
Characteristics	*N (%)*	*N (%)*	*N (%)*	
Education level				
Illiterate	30(22.2)	38(28.1)	36(26.7)	**χ2 (2)=4.35, P=0.11
From elementary to diploma	15(11.1)	7(5.2)	9(6.7)	
Marital status	15(11.1)	12(8.9)	11(8.1)	**χ2 (2)=0.95, P=0.62
Married	30(22.2)	33(24.4)	34(25.2)	
Widow	19(14.1)	23(17.1)	19(14.1)	
Single				
Living condition				
With spouse	15(11.1)	11(8.1)	11(8.1)	**χ2 (4)=2.25, P=0.68
With child	11(8.1)	11(8.1)	15(11.1)	
Hospitalization history	32(23.7)	37(27.4)	28(20.7)	**χ2 (2)=4.46, P=0.10
Yes	13(9.6)	8(5.9)	17(12.6)	
No				

P-values indicated statistically significance differences between the interventions and control groups using the one-way ANOVA by considering the equality of variance. ** P-value was calculated using the Chi-square test.

Table 2. The comparison of anxiety levels in the groups before and after the interventions

Group (n=45) (Mean ± Sd)	**Before the intervention**	**After the intervention**	****P-value**
Anxiety			
Control	11.66± 4.24	11.06± 3.19	t=1.16, d=44, P=0.25
Reflexology	13.77± 4.39	8.53± 3.70	t=5.51, d=44, p=0.001 Cohen's d=0.82
Aromatherapy	12.31± 5.22	8.04± 4.71	t=5.32, d=44, P=0.001 Cohen's d=0.79
* P-value	F=2.44, d=134, P=0.09	F=7.70, d=134, P=0.001 Cohen's d=0.66	
Depression Control	11.71± 4.29	11.11± 3.42	t=1.07, d=44, P=0.28
Reflexology	13.66±4.64	8.42± 3.62	t =5.41, d=44, P=0.001 Cohen's d=0.80
Aromatherapy	12.51± 5.40	9.20± 4.41	t=4.26, d=44, P=0.001 Cohen's d=0.63
* P-value	F=1.88, d=134, P=0.15	F=7.97, d=134, P=0.001 Cohen's d=0.66	

P-values indicated statistically significance differences between the interventions and control groups using the one-way ANOVA test by considering the equality of variance.

** P-value was calculated by the paired sample t-test for between group comparisons.

It is believed that the elimination of calcium, lactate or uric acid crystals, and generation of reflex influence on corresponding nerves and can improve wellbeing in patients after such interventions (Oleson & Flocco, 1993; Botting, 1997). A systematic review of healthy individuals recommended reflexology as an effective technique for alleviating depression (Song et al.,2015). Similarly, a randomized trial without blindness on whether reflexology was inferior to aromatherapy massage to ameliorate self-selected problems or concerns (Dyer, Thomas & Sandsund, 2013) found that reflexology and aromatherapy massage had relatively similar effects on psychological symptoms.

This study also supported the effect of aromatherapy massage on alleviating anxiety. Similarly, Graham et al. found that the administration of aromatherapy oil reduced anxiety via massage greater than inhalation (Graham et al.,2003). Essential oils can stimulate the olfactory system and promote relaxation (Kong, Evans & Guevara, 2009; Forrester et al., 2014; Kheirkhah et al., 2014) and lead to sedative effects. It has been reported that aromatherapy

massage using lavender oil significantly reduces the anxiety level (Domingos Tda & Braga, 2015). However, another study reported that aromatherapy massage could not significantly improve clinical anxiety and depression (Seyyed-Rasooli et al., 2016). The discrepancies in the studies' results could be attributed to the sampling process and variations in intervention processes.

In this study, aromatherapy massage improved older women's depression. Various constituents of essential oils such as lavender can have sedative effects on the nerve cells' function and alleviate depression (Chen & Chen, 2015; Edge, 2003; Okamoto et al., 2005). Similarly, in a study on patients in an oncological palliative care setting, aromatherapy massage reduced patients' anxiety and depression (Wu et al., 2014)

Conclusions: According to this study, reflexology and aromatherapy massage had positive effects on anxiety and depression among female older women hospitalized in the CCU. However, reflexology had larger effects on the alleviation of psychological symptoms in female older people. Future studies should assess the advantages of aromatherapy and reflexology for relieving anxiety and depression among older patients in comparison with other pharmacologic and non-pharmacologic measures. No adverse events due to the interventions were reported in this study; therefore, the safety of reflexology and aromatherapy massage in female older patients is confirmed.

This study was conducted only in one hospital. Therefore, generalizability of our findings to other settings needs studies with larger sample sizes. Also, the interventions were only performed in one session and on female older people. Therefore, longitudinal studies are needed to describe the full impact of the interventions with the consideration of gender differences affecting anxiety and depression levels.

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