Comparing the Effects of Lavender Oil and Olive Oil Massage on Pain due to Muscular Cramp during Hemodialysis

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Abstract

Pain due to muscular cramp during hemodialysis is one of the most common problems experienced by patients undergoing hemodialysis, and is associated with poor outcomes of patients. The main aim of this study was to compare the effects of lavender oil and olive oil massage on pain due to muscular cramp during hemodialysis.

In this randomized clinical trial, 60 hemodialysis patients were selected randomly and the samples were randomly divided into two groups of 30.. The intervention included flora massage on the lower leg muscles so that the first group received lavender oil massage (10 drops) and the second group received olive oil massage (10 drops) for four weeks. Massage duration was 5 minutes and three times within hemodialysis sessions. The collected data was analyzed in SPSS (v.22) using repeated measure ANOVA.

Pain due to muscular cramp in the lavender group was significantly less than that of the olive oil group in the 2nd ($p<0.001$), 3rd ($p<0.001$), and 4th ($P<0.001$) weeks of intervention.

Pain due to muscular cramp in hemodialysis patients can be attenuated with lower leg massage using olive oil and lavender oil. Lavender oil was more effective than olive oil.

Keywords: Massage, Hemodialysis, Lavender oil, Olive oil, Pain

Introduction

More than 80 per cent of patients with chronic kidney disease use hemodialysis for treatment [1]. In patients, pain due to muscular cramp during hemodialysis is one of the debilitating and common symptoms with a prevalence rate of 50%–60% [2]. The chronic and debilitating nature of cramp pain decreases self-care measures and increases dependence on health care for daily activities [3]. Literature review showed that limb ischemia is the common cause of muscular cramp pain [4]. Muscular cramp pain control in hemodialysis patients includes pharmacological and non-pharmacological approaches. Since, the majority of methods are pharmacological and the majority of pharmacological metabolites are discharged by the kidneys, these methods are featured with risk of kidney intoxication [5]. Therefore, popularity of complementary and none-pharmaceutical treatments has been increased in health systems [6]. One of the non-pharmacological methods of preventing and alleviating pain is massaging that attenuates pain through lowering muscle sensitivity and tone and improving blood flow that leads to attenuation of pain and relaxation [7]. Although

there are some previous studies about the effect of massage with olive oil or lavender oil on outcomes of patients in different diseases [8-10], but there is no earlier study on comparing the effects of lavender oil and olive oil massage on pain due to muscular cramp in hemodialysis patients. There is lavender contains linalool, ketone alcohol, asters, and aldehyde. Ketones in lavender are effective in alleviating pain and inflammation. Asters prevent muscle spasm and lower tension [11]. On the other hand, olive contains antioxidants that improves cells' resistance to oxidation and in return increases perfusion and lowers pain and fatigue [12].

The main aim of this study was to compare the effects of lavender oil and olive oil massage on pain due to muscular cramp during hemodialysis.

Methodology

Study design and participants

This study was a clinical trial with two groups. 60 patients were selected using random allocation software. After justifying the patients to participate in the study and obtain written informed consent; the samples were randomly divided into two groups of 30.

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First group, Massage with lavender oil, Lavender oil massage was used with 10 drops of 1/5% lavender oil. The second group, was used with 10 drops of olive oil.

Prior to the intervention, the baseline assessment was performed for two weeks and during this phase, the demographic information questionnaire as well as the pain severity and frequency of cramps were recorded. The research setting is the dialysis wards of Lordegan and Borujen hospitals (Affiliated to Shahrekord University of Medical Sciences, Shahrekord, Iran). In this study, the participants in the study (patients), nurses working in the hemodialysis departments and the statistical advisor (data analyst) were kept blind.

The sample size at 95% confidence level and 80% test power was calculated 54 patients according to below formula, considering probability of attrition of the samples, the maximum sample size was 60 cases in total and 30 in each group.

$\sigma_1^2 = \sigma_2^2 = 3.8$

$\delta = \mu 2 - \mu 1 = 2.5$

n=Total 60 and 30 in each group

$$\sigma_A^2 = \sigma_B^2 = \sigma^2$$

$$n = \frac{(\sigma^2 + \sigma^2)(z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{\delta^2}$$

$$n = \frac{2\sigma^2(z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{\delta^2}$$

$$\varphi = 1$$

Three participants left the study due to immigration (one patient), reluctance to continue the study (one patient), and traveling (one patients). (fig.1)

Inclusion and exclusion criteria

Inclusion criteria: 1. chronic kidney failure with at least one year of hemodialysis history 2. Age range between 30 and 60 years 3. Having physical and mental ability   4. Lack of cutaneous lesions, scarring and limb redness

Exclusion criteria: 1. catabolic diseases such as cancer 2. Diabetic neuropathy 3. Use of pain relieve medicines, hypnotics, narcotic and psychotropic drugs 4. Lower limb skeletal disorders, neuromuscular disorders and arthritis 5. Alcohol abuse 6. Allergy to lavender or olive oils.
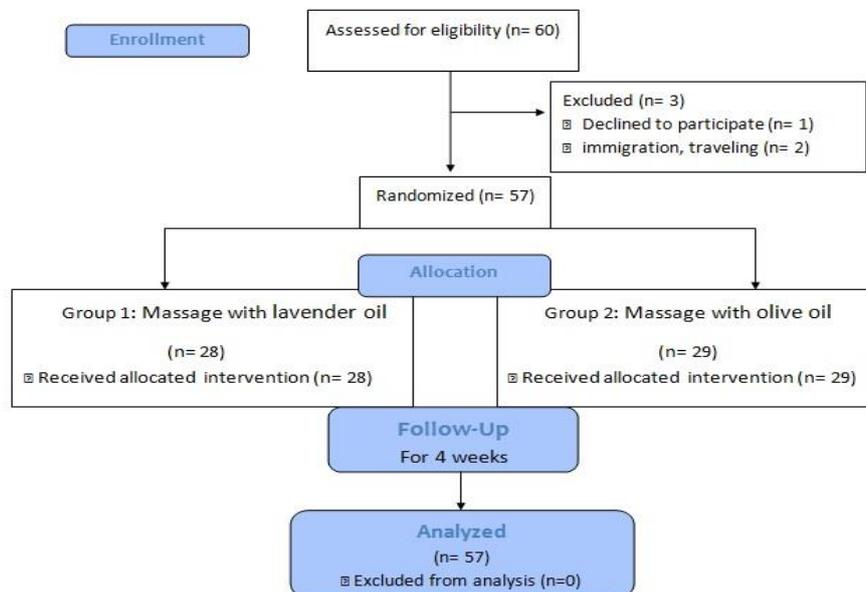

Figure. A flow diagram of the protocol

Intervention

Flora massage was performed on the lower leg muscles so that the first group received lavender oil massage (10 drops) and the second group received olive oil massage (10 drops) daily. They are popular, accessible and commonly used among Iranian populations, but probable allergy to lavender oil or olive oil was checked by using them on the subjects 'arm. The subjects were checked for any skin allergy after two weeks. None of the subjects demonstrated skin allergy symptoms.

The intervention continued for four weeks and during each hemodialysis sessions.

Massage duration was 5 minutes and three times: one hour after dialysis, two hours after dialysis, and half an hour to the end of dialysis-Most cramps occur at this time-(15 minutes total). In this study, all patients need hemodialysis session 2 or 3 times weekly that distributed into groups randomly. We used a female colleague to massage female participants due to cultural restrictions. Therefore, male and female participants received massage by different individuals. To compensate, the assistants practiced the massage on a model to made the massages as identical as possible.

The Visual Analog Scale for Pain (VAS Pain) would be filled out for each patient at the end of every week.

The massaging method was flora massage so that the nurses' fingers would cover the lime by articulating a C shape and perform the massage. Since the most common pain in dialysis patients happens on the back of legs, this spot was selected for performing the massage [13].

Instruments

Data gathering tool including a demographics form and the VAS Pain were distributed among the participants. The demographics form included age, gender, marital status, education, history of hospitalization, and hemodialysis treatment duration.

The VAS Pain consists of a straight line from 0-10 with the endpoints defining extreme limits such as zero score or 'no pain' and ten score or 'worse pain'[14].

This tool is scored by patients and the level of pain is interpreted as following, 0-3 score means 'mild pain', 4-7 score means 'moderate pain' and 8-10 score means 'sever pain'. This VAS pain is valid and reliable test; simple use and accessibility are the main specifics of it [15].

The collected data was analyzed in SPSS (v.22) and after ensuring consistency of the inserted data with the collected data, descriptive statistics (mean, SD, frequency, and percentage) and repeated measure

ANOVA, were used to analyze the data. Normal distribution of the data was checked using Kolmogorov Smirnov (KS) test (P=0.05).

Ethical considerations

This study was approved by ethics committee from Shahrekord University of Medical Sciences, Shahrekord, Iran with an ethical code (IR.SSU.MEDEINE.REC.1395.103). A written informed consent which was prepared based on Declaration of Helsinki was obtained from all participants. This study was registered in the Iranian Registry of Clinical Trials (IRCT20190528043741N1).

Results

Mean age of the patients participating in this study was 48.56 ± 5.66 years and mean duration of dialysis treatment was 5.45 ± 3.11 years. The majority of participants were men (n=31; 54.4%) and 26 participants were women (45.6%). The majority of participants were married (n=52; 91.2%). There is normal distribution about demographic data between two groups (p>0.05). (Table1)

Repeated measure test showed that pain score was significantly lower in the 2nd, 3rd, and 4th weeks in the lavender oil group compared to the olive oil group. Also, there is a significant difference in VAS pain score before and after the intervention between two groups. (Tables 2)

Table 1. The demographic data for participants.

Variable	Detail of Variable	No (%)	Mean±standard deviation
Gender	Male	31(54.4%)	
	Female	26 (45.6%)	
Marital Status	Single	5 (8.8%)	
	Married	52 (91.2%)	
Age	≤40 year	15 (26.64%)	
	>40 year	42 (73.68%)	48.56 ± 5.66
Duration of dialysis treatment	<5 year	34 (45.33)	
	5-10 year	16 (28.07)	5.45 ± 3.11
	> 10 year	7 (26.6)	
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	> 10 year	7 (26.6)	

Table 2. Mean score of pain in the two groups of intervention at different times

variable	Group	Before intervention	First week	Second week	Third week	Fourth week	After intervention
Pain	Massage with Lavender oil	5.31 ± 0.83	4.81± 0.9	4.35± 0.81	3.96± 0.7	3.65± 0.69	3.94±0.59
	Massage with Olive oil	5.35±0.88	4.98±0.86	4.61±0.82	4.4±0.86	4.28± 0.8	4.56±23
P value		0.76	0.125	0.024	0.002	0.019	<0.0001

Repeated measure ANOVA test. F= 133.07, DF= 4

Discussion

Whereas the majority of hemodialysis cases occur following to chronic conditions, so patients with ages more than 50 years reported in different studies [16-18], also in the present study results showed that the mean age of participant were 48.56 ± 5.66 year.

In our study, the lower leg massage using olive oil and lavender oil decreased pain in the subjects; this result is consistent with different studies.

Some studies examined the effect of complementary therapies on pain in hemodialysis patients. A study showed that menthol and rosemary can alleviate severity and frequency of recurrence of musculoskeletal pain in hemodialysis patients [5]. In a systematic review and meta-analysis showed that aromatherapy with the use of complementary oils absorbed through the skin or olfactory system can successfully treat pain when combined with conventional treatments [19]. A randomized control trial concluded that lavender aromatherapy significantly reduced pain and anxiety in hemodialysis patients [10]. Olive oil can be used as effective complementary oil in the treatment of pain due to constipation in patients undergoing hemodialysis [20].

Massage with two oils appeared effective because through lowering sensitivity and rigidness of muscles, improves perfusion and alleviation of pain. Also, the increase in blood flow in the massaged spot improves circulation and remove of wastes like acid lactic, which results in energy discharge, alleviation of pain, and removal muscles spasm [13]. Although massage lead to muscular pain relief but several factors such as the age of patients and their underlying disorders, the duration and method of massage, patient's psychological conditions, or the amount of oil used might be contributed to controversies on the effects of lavender or olive oil. For instance, Fismer and Pilkington [21] only used one drop of lavender for one night or in Hashemi et al [9] study, massage followed for three weeks.

However, our intervention was repeated frequently with 10 drops within each hemodialysis sessions and continued for four weeks. Also, these two oils are accessible and popular in Iranian population.

Accordingly, examining the main hypothesis of our study results showed that pain in the 2nd, 3rd, and 4th weeks in the lavender oil group was less than that in the olive oil group. Lavender is a safe herb and no toxicity has been reported and it seems that lavender contains linalyl acetat and linalool with sedative effects [21]. On the other hand, lavender stimulates the limbic system and releases neurotransmitters such as enkephalin, endorphins, serotonin, and in addition to creating a sense of calm and reducing anxiety, also reduces pain perception [22]. This comparison between lavender oil and olive oil was done for the first time in the present study. Literature review shows that there is no previous study in earlier research, for confirmation of this finding; future studies are suggested with increased sample sizes and longer interventional duration.

Another study showed that postoperative lavender oil aromatherapy did not significantly affect pain score [23]. The findings of mentioned study are inconsistent with our study. It is necessary to note that massage duration and cycle in this study only short term at 5, 30, and 60 minutes postoperatively.

Conclusion

Pain due to muscular cramp in hemodialysis patients can be attenuated with lower leg massage using olive oil and lavender oil. In the present study, results showed that there is a significant difference between the two groups, and pain score in the lavender oil group was significantly lower than olive group. Therefore, this economic, safe, and simple procedure is recommended as a complementary therapeutic approach.

Limitation

One of the limitations in the present study was the necessity of asking a female colleague to massage female participant due to cultural restrictions. And also one of the strengths of the study was the novelty approach in controlling pain in hemodialysis patients without any complications.

Acknowledgment

Conflict of Interest

None declared

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