

Original Article

Effect of lavender aromatherapy on the pain of arteriovenous fistula puncture in patients on hemodialysis

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ABSTRACT

Background & Aim: Arteriovenous fistula (AVF) is one of the inevitable elements in the take care of patients on hemodialysis. Pain of AVF puncture is a real problem for patients. The purpose of this study was to assess the effect of inhalation of lavender aromatherapy on pain intensity of arteriovenous fistula puncture in patients on hemodialysis.

Methods & Materials: In this before and after quasi-experimental clinical trial study, 40 patients on hemodialysis were selected using convenience sampling method. Pain intensity measured after needle insertion in AVF in two stages including without any intervention and after using lavender aromatherapy in the three consecutive hemodialysis sessions of each stage. Visual analogue scale was used to evaluate and determine pain. Repeated ANOVA test was used compare the pain before and after interventions.

Results: The pain scores in two stages of without any intervention and inhalation of lavender aromatherapy in the three consecutive hemodialysis sessions of each stage were 5.36 ± 2.08 , 5.69 ± 2.29 , 5.58 ± 2.15 and 4.00 ± 2.48 , 3.05 ± 1.94 , and 2.97 ± 2.27 , respectively. There was significant differences between the pain scores in first time before and first time after ($P = 0.003$) and first time before and second and third time after ($P < 0.001$) and second and third time before and first, second and third time after inhalation of lavender aromatherapy ($P < 0.001$).

Conclusion: The results of study showed inhalation of lavender aromatherapy is effective to decrease pain of AVF puncture in patients on hemodialysis. Therefore, lavender aromatherapy could be a suitable alternative complementary medicine for the pain of AVF puncture.

Introduction

Pain is an extremely prevalent symptom (1). It is the most common reason for seeking medical treatment in the United States and the second most common reason for ambulatory care visits (2). The economic burden of untreated pain in the United States is estimated to be more than \$100 billion per year (3). As a complex phenomenon described in terms of both sensory and emotional experiences,

pain is extremely variable even among members of a homogenous population (2). Pain as a symptom – now considered the fifth vital sign – accounts for approximately 80% of physician visits (4), most often in association with surgical procedures, medical conditions, or physical trauma (3). Pain caused by medical care is a major concern of patients. It is a permanent problem for patients undergoing hemodialysis. Arteriovenous fistula (AVF) is one of the inevitable elements in the take care of patients on hemodialysis. Pain of AVF puncture is a real problem for patients. AVF cannulation is the source of pain because of its repetition like act, two to three times per week, approximately 300 times per year

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by means of big needles gauge. This contributes to decreased patients' life quality (5). Alleviation of this pain might improve their acceptance of the procedure and thus, their quality of life (6). There are two types of pharmacological and non-pharmacological remedies for reducing pain (7). According to other studies, successful techniques to alleviate pain following needle insertion into a fistula include transcutaneous electrical nerve stimulations (8), application of prilocaine cream and lidocaine spray (6, 7), and cryotherapy (9, 10). Most of the non-pharmacological or complementary methods are safe and without any serious side effects. Many of these methods are branches of the complementary medicine (11). Aromatherapy is one of them, which has had considerable progress among many countries (12).

Aromatherapy is non-invasive and can be applied continuously to patients who do not have an aversion to the odours (13). In addition, it is the second most common method of complementary therapy accepted by nurses. This method can be applied as a complementary medicine on the clinic (11). Generally, aromatherapy triggers the limbic system which might help in reducing the pain (14). One of these essential oils which has a huge use in aromatherapy is the *Lavandula* oil (15). Lavender has a long history of medicinal use (16). Studies about benefits of lavender aroma showed that linalool and linalyl acetate existing in this plant can stimulate parasympathetic nervous system. In addition, linalyl acetate has narcotic effects and linalool acts as a sedative (11).

Considering the importance of decreasing pain in patient on hemodialysis and also undesirable side effects on their quality of life as well as nurses' ability to use the complementary medicine, this research aimed to evaluate the effects of inhalation aromatherapy on decreasing the pain intensity of AVF puncture in patients on hemodialysis.

Methods

This was a before and after quasi-experimental clinical trial study on 40 patients on hemodialysis in Imam Khomeini hospital, Miyaneh, Iran, in 2014. Patients were selected using convenience sampling method.

The inclusion criteria included 18 years of age or older, being conscious, having a good sense of

smell, no history of allergies to lavender, not smoking, having the ability to smell, no history of mental disorders, being able to read and write, not having chronic sinusitis, allergy or every kind of problem such as a broken nose and nose surgery that impaired sense of smell, being non-alcoholic and opioid-substances users. Exclusion criteria included concomitant use of an analgesic within the previous 24 hours, afflicting severe cold, patient's unwillingness to continue the study, and the patient death.

After obtaining permission from the Research Ethic Committee of Tehran University of Medical Sciences, subjects who had the inclusion criteria were given the descriptions about the aims and methods of the study. All the patients signed written informed consents. This study was registered at Iran Center of Clinical Trials under the no. of IRCT201403082226N13.

In this study, data-collection tool included a demographic questionnaire and the visual analog scale (VAS). Pain intensity was measured using VAS. VAS is a subjective tool for measuring the pain. It consists of a 10-cm line with two endpoints representing 'no pain' and 'worst imaginable pain'. Patients are asked to rate their pain by placing a mark on the line corresponding to their current level of pain. VAS has validity and reliability around the world and has been evaluated in many studies. The study of Williamson and Hoggart indicated that VAS is valid, reliable and appropriate for use in clinical practice. The repeatability of the VAS is good as can be seen by correlation coefficients ranging from 0.97 to 0.99 (17).

First intervention was conducted as assessment of baseline pain; venipuncture was performed without any intervention and pain score was assessed. The pain intensity was measured using VAS in study group after needle insertion in the three consecutive hemodialysis sessions. One week later, same patients received aromatherapy intervention.

Aromatherapy intervention was three drops of aromatherapy blend containing lavender essence 10% (Barij Essence Pharmaceutical Company, Iran) which poured on cotton in cast containers, and the patient was asked to inhale it before needle insertion for 5 minutes from a distance of 7-10 cm; and pain score was measured immediately after needle insertion using the VAS again. The intervention was repeated three times.

All the data were analyzed using the SPSS for Windows (version 16.0, SPSS Inc., Chicago, IL, United States). Repeated ANOVA test was used to compare the pain before and after. Bonferroni adjustment was used for pairwise comparisons. P-values less than 0.05 were considered as significant.

Results

A total of 40 eligible participants were recruited to the study. Of them, three patients were lost to follow up in the study due to AVF dysfunction, one patient was lost in the study group for died. Therefore, there were 36 members in the study analyzed as final eligible study participants.

Demographic findings showed that 66.7% of patients were men and 33.3% were women. Patients' mean (SD) age was 61.31 ± 14.75 . Hypertension along with diabetes (83.4%) was the most frequent cause of chronic renal failure. Demographic characteristics of the 36 patients on hemodialysis are presented in table 1.

Venipuncture pain scores, assessed via VAS are presented in and figure 1. The pain score in two stages of without any intervention and inhalation of lavender aromatherapy in the three consecutive hemodialysis sessions of each stage were 5.36 ± 2.08 , 5.69 ± 2.29 , 5.58 ± 2.15 and 4.00 ± 2.48 , 3.05 ± 1.94 , 2.97 ± 2.27 , respectively. The results of repeated ANOVA test showed significant differences between score of pain in first time before and first

time after ($P = 0.003$), first time before and second and third time after ($P < 0.001$) and second and third time before and first, second and third time after inhalation of lavender aromatherapy ($P < 0.001$). There also was significant difference between the score of pain in first time and third time after inhalation of lavender aromatherapy ($P = 0.037$).

Table 1. Demographic characteristics of patients on hemodialysis (n = 36)

Demographic characteristic	Number (%)
Gender	
Men	24 (66.7)
Women	12 (33.3)
Marital status	
Single	1 (2.8)
Married	35 (97.2)
Nephropathy etiology	
Unknown	2 (5.6)
Diabetic nephropathy	12 (30.6)
Hypertension	18 (52.8)
Glomerulonephritis	1 (2.8)
Polycystic-kidney disease	2 (5.6)
Obstructive nephropathy	1 (2.8)
	Mean (SD)
Age (Year)	61.31 (14.75)
Dialysis durations (Year)	2.62 (2.85)
Age of fistula (Year)	2.34 (2.28)

Discussion

The results of the study showed that aromatherapy considerably reduce pain of AVF puncture in patients on hemodialysis. Therefore, aromatherapy could be a suitable alternative complementary medicine for controlling AVF-puncture-related pain.

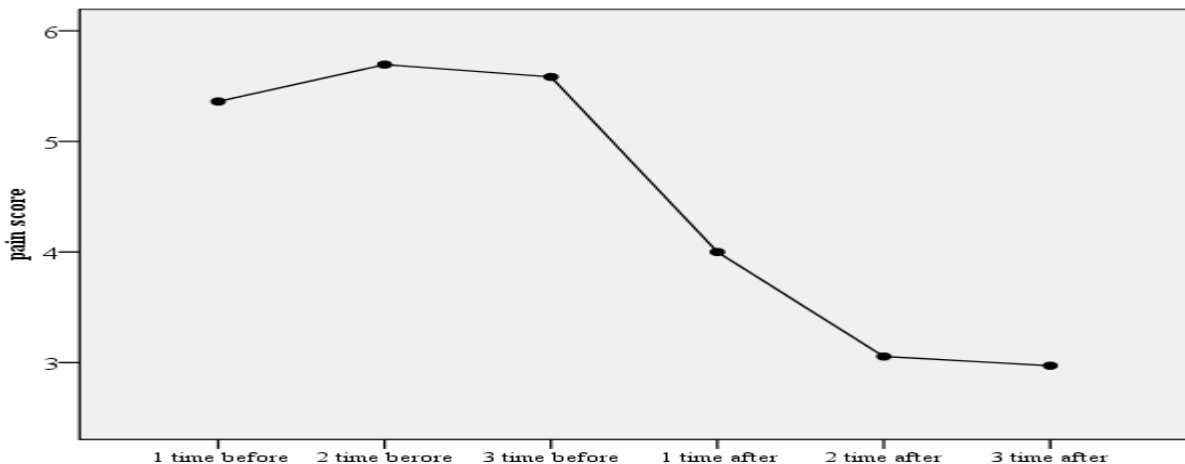


Figure 1. Pain scores in different times before and after intervention

The score of pain intensity before intervention was comparable to that of Sabitha et al. study (9). The results of the both studies showed that pain intensity before intervention was a moderate. Kadou Kaza et al. had reported the prevalence of pain which occurs during AVF puncture as 60.9%. The study of Valdovinos et al. about the use of topical anesthesia during interavenous catheter insertion in adults showed that the mean score of pain intensity in using placebo was 4.67 (18). It was in accordance with the present study.

The results of our study showed significant difference between pain score before and after inhalation of lavender aromatherapy. Saeki et al. showed that aromatherapy by lavender is not effective in relieving pricking pain that is not in consistent with the findings of the present study (19). Kim et al. found that the pain intensity of needle insertion was significantly decreased after lavender aromatherapy compared with controls ($P < 0.001$) (20), which was in accordance with the results of this study. Hijazi et al. showed that aromatherapy by using lavender essence is effective in reducing pain after cesarean section (21) that is consistent with our results.

In a recent study, Aghajanloo et al. investigated the effect of cryotherapy on reducing the pain of AVF cannulation among patients on hemodialysis lavender aromatherapy (10). According to the results, this non-pharmacological method could effectively reduce AVF-cannulation-related pain in the patients. Due to the epidermal barrier, topically administered pain medications are slowly absorbed and frequent use of them can cause skin rashes or allergic reactions.

The available data suggests that short-term therapy with lavender is relatively safe. Lavender should be also used cautiously or avoided in patients with known allergy to lavender (22).

The limitations of this study were the patients' previous experiences and mental status during AVF puncture. These limitations may have affected pain intensity.

In conclusion, the findings of the current study showed that inhalation of lavender aromatherapy is effective to decrease pain of AVF puncture in patients on hemodialysis. In addition, the results showed that repeated utilization of lavender aromatherapy lead to increased effect. Therefore, lavender

aromatherapy could be effective to manage chronic pain. Aromatherapy by lavender is easy to apply, fast acting, inexpensive, and noninvasive and can be used in independent nursing interventions. Therefore, aromatherapy could be a suitable alternative complementary medicine for pain of AVF puncture. Besides, we recommend that nurses use this complementary pain relief method instead of pharmaceutical methods. Thus, nurses can provide a better care to improve quality of life in these patients.

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Conflict of interest

The authors declare no conflict of interest.

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