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Comparing the effects of relaxation technique and inhalation aromatherapy on fatigue in patients undergoing hemodialysis

Mohammadali Hassanzadeh [a], Fatemeh Kiani [b, *], Salehoddin Bouya [c], Mohammad Zarei [d]

[a] Nursing and Midwifery School, Zahedan University of Medical Sciences, Zahedan, Iran
[b] Community Nursing Research Center, Zahedan University of Medical Sciences, Zahedan, Iran
[c] Assistant Professor of Internal Medicine and Nephrology, Clinical Immunology Research Center, Ali-Ebne Abitaleb Hospital, Zahedan University of Medical Sciences, Iran
[d] Research Center of Natural Products and Medicinal Plants, Nursing Department, Shirvan Center of Higher Health Education, North Khorasan University of Medical Sciences, Bojnurd, Iran

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ABSTRACT

This study aimed to compare the effects of relaxation techniques on fatigue in hemodialysis patients. This clinical trial study was conducted on 105 hemodialysis patients. The subjects were categorized into three groups as: relaxation, aromatherapy and control. In the relaxation group, Benson muscle relaxation techniques were employed; in the aromatherapy group, the inhalation of two drops of 5% lavender essential oil used and the control group only received regular healthcare actions. Data collected by using brief fatigue inventory, before and after the intervention. Results of the current study indicated significant differences in the mean of changes in fatigue scores before and after the intervention between the relaxation and aromatherapy groups, but the difference was insignificant in the control group. Aromatherapy with lavender essential oil can decrease the level of fatigue in the patients undergoing hemodialysis compared to Benson relaxation techniques.

1. Background

Chronic renal failure (CRF) is a progressive and nonreversible disorder which eliminates the ability of body to preserve electrolytes and body liquids and leads to uremia and/or azotemia [1,2]. The annual prevalence of end-stage renal disease (ESRD) is reported as 350 cases per one million in the world. Based on the reports in 2014 [3], 22000 patients in Iran undergo hemodialysis, with a 20% annual increase [4], while according to the world health organization (WHO) this rate should be 5%–10% [5,6]. Hemodialysis is the most common therapeutic method for the patients with CRF [2,7], which in addition to plenty of social and psychological problems, causes mental disorders in the patients and imposes economic crippling burden to the community [8,9]. Specialists believe that due to chronic stress derived from economic burden of the disease, the physical or nutritional-diet limitations, comorbid diseases and adverse side effects of drugs, etc., such patients are more prone to emotional difficulties [7,9] which affect their quality of life [10–12] Based on the conducted studies, fatigue [13,14] and anxiety are on the top of these emotional problems [15,16].

The prevalence of reported fatigue among the patients undergoing chronic hemodialysis is 60%–97% [17–19], which is caused by physical and behavioral factors, related treatments, and personal features [20]. Drug-based and non-drug-based treatments are the methods to control fatigue in such patients [21,22]. Using regular treatment methods including chemical drugs in order to control hemodialysis complications is not the responsibility of nurses and, on the other hand, such drugs also caused emotional problems in the patients [23]. These factors led to conduct more researches on non-drug-treatment measures or complementary and alternative medicinal methods during the recent years. These methods are mostly associated with less side-effects and threats and can be used separately or in association with other available methods [24–26]. The muscle relaxation [27–29] and aromatherapy by *lavender* essential oil are among the most effective methods to reduce the level of fatigue in patients undergoing hemodialysis [30,31].

Relaxation is one of the nursing interventions. It has a long-term

* Corresponding author. Mashahir Sq, Nursing and Midwifery School, Zahedan, Iran.
E-mail address: hresearchh@gmail.com (F. Kiani).

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positive impact on issues, such as stress, anxiety, and sleep quality [7]. There are different relaxation methods, but the Herbert Benson relaxation method, introduced in 1970, is more common, due to its easy learning and training [6,28]. The Benson muscle relaxation method reduces muscular stresses and undesirable physiological effects through making a balance between posterior and anterior hypothalamus, reducing the activity of sympathetic nervous system and secretion of catecholamines [6,7,26]. When a patient makes all his muscles relax and expand during Benson relaxation technique, it can easily make whole body relaxed and reduces anxiety and stress. When relaxation is complete, the stress response is broken [28]. Stress plays an important role in stimulating increased prevalence of hemodialysis complications, and worsening symptoms causing fatigue [6,31]. The effectiveness of Benson relaxation method on reducing the level of fatigue [27] and anxiety [29], increasing sleeping quality [28], and more was evaluated in different studies. Dialysis patients who had a very slight headache at the start of a study and were treated with this method, in some cases, had their headache resolved in 1–2 days [31].

Aromatherapy is considered to treat physical and mental disorders by herbal essences [32]. *Lavender* essential oil is also one of the most common volatile oils used in aromatherapy that can have sedative analgesic and antispasmodic effects through the neurological system [33]. The combination of active ingredients in this plant contains linalool and lynalyl acetate [33]. Linalool with its effect on Gama-Aminobutyric acid (GABA) receptors in the central nervous system, acts as a sedative. Lynalyl acetate is also narcotic properties [33]. The effectiveness of aromatherapy by *lavender* essential oil on reducing the level of fatigue [30,34] and anxiety [6,35], the quality of sleep [30,36,37], relief of itching [38], and other issues also has been evaluated in different studies on patients undergoing hemodialysis. According to literature, lavender may cause a very mild allergic reaction or smell intolerance in hemodialysis patients [6].

Although different studies have emphasized the effectiveness of these two methods on reducing the level of fatigue, there are limited and somewhat contradictory or different results regarding the effectiveness of *lavender* essential oil inhalation [34]. In a study on the effect of aromatherapy by *lavender* essential oil on the level of fatigue in patients undergoing hemodialysis, the effectiveness of this aroma was not confirmed [36] But in other study on the effect of aromatherapy massage on the fatigue severity in women with multiple sclerosis, results shown the mean score of fatigue severity before intervention was 49، which turned to be 29.37 after intervention and The statistical analysis indicated that there was a significant difference between fatigue severity scores before and after intervention [40]; the results of two other studies on evaluating the effect of *lavender* essential oil inhalation on reducing the level of anxiety did not support the hypothesis [31,37].

The aim of this study is to comparing the effects of relaxation technique and inhalation aromatherapy on fatigue in patients undergoing hemodialysis.

2. Objectives

According the importance of reducing the level of fatigue in the patients undergoing hemodialysis, this study aimed to compare the effectiveness of Benson muscle relaxation and the inhalation of *lavender* essential oil on the level of fatigue in the patients undergoing hemodialysis.

3. Materials/patients and methods

3.1. Participants and setting

The current randomized controlled clinical trial was conducted from June 2015 to April 2016. The study population consisted of patients undergoing hemodialysis in Khatam-ul-anbia and Imam Ali hospitals in Zahedan city, Iran. The sample size of the study, based on similar studies [6,34] with 95% of level of confidence and 80% testability, was calculated 26 cases in each group, which was estimated to 35 in each group (a totally of 105 cases) due to the possibility of sample loss.

3.2. Inclusion and exclusion criteria

The inclusion criteria were as follows: age 20–60 years old, no history of major surgery stress-causing event within the last six months; lack of neuro-muscular disorders, mental disorders, malignant diseases or blood disorders; lack of smelling impairment or allergic rhinitis or respiratory problems, no smoking, using drugs and alcohol; allergy to *lavender* aroma by the statement of the patients; must sign the written informed consent; have an active profile; regularly refer to the selected hemodialysis centers at least for 12 weeks (three sessions per week); have approved audio-speech ability to answer the questions, and have a fatigue score of at least 4 based on brief fatigue inventory (BFI). The exclusion criteria were kidney transplant and peritoneal dialysis during the study, using sedatives or a non-drug-based method to reduce the level of fatigue during the study, death, changing the dialysis program, using perfumes during the study, and failure to follow the treatment program.

3.3. Instrument

Data-gathering tools included the demographic questionnaire and BFI. The demographic questionnaire included information such as age, gender, marital and occupational statuses, information about fatigue score based on the interviews, and using patient's medical history.

The BFI is a 10-item questionnaire. The first question indicates the unusual fatigue during the last week by yes/no reply. The questions evaluated the level of current fatigue, usual fatigue within the last 24 h, the highest level of fatigue in the last 24 h, the impact of fatigue on general activities within the last 24 h, walking ability, relationships with other people, and enjoying the life in a grading scale of 0–10. A score of 0 means no fatigue and a score of 10 means the highest level of fatigue. The total score of fatigue was obtained through summing up the score of questions 2–10 (nine items) and dividing by nine. This is a standard scale used in different studies [22,27,39]. Many studies conducted in Iran and other countries confirmed the validity of this questionnaire ($r = 0.9$) [6,35,39].

3.4. Procedure

After providing the required details and aims of the study, the level of fatigue was measured before the intervention using BFI questionnaire, and again after the hemodialysis session when the patient's situation was fixed by himself/herself. In case of literacy, this was done before starting the intervention with the help of a second researcher. After evaluating questionnaires, 105 eligible patients were enrolled in the study after signing the informed consent. The subjects were allocated into three groups randomly by lottery based on the days of week done. The two hospital-based research environments were divided based on morning and afternoon shifts and even and odd days. Then, every shift, the hospital and day were assigned randomly to one of the groups: A (relaxation techniques), B (aromatherapy), or C (control group). At first, each group was assigned a number and drew, in that order, another set of numbers to determine their lottery drawing order. At that time,