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Comparison of Effects of Orange and Lavender Extract on Fatigue in Hemodialysis Patients

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ABSTRACT

Fatigue is one of the most common side effects of dialysis in hemodialysis patients and is associated with several psychological and physical complications. A new low-risk treatment for these patients is the use of complementary and alternative medicine such as aromatherapy. This study aimed at comparing the effects of inhaling lavender and orange extracts in hemodialysis patients. This randomized clinical trial (crossover) was conducted on 30 hemodialysis patients who were referred to hemodialysis center of Imam Khomeini Hospital in Zabol during February 2015-April 2016. Patients were divided into two groups of 15, each of which separately received orange and lavender aromatherapy. Data were collected using a demographic questionnaire and the Multi-dimensional Fatigue Inventory (MFI-20). The demographic questionnaire included age, sex, marital status, occupation, education, and duration of dialysis. Descriptive statistics and paired t-test were used for data analysis. Paired t-test showed a significant relationship between fatigue levels and inhalation of orange extract at the end of the first week (P=0.002); however, no significant relationship was observed in the second week. No significant relationship was observed between fatigue levels and inhalation of lavender extract (P=0.662). Considering the effect of orange extract, orange aromatherapy can be used as an easy, safe, non-invasive and relatively inexpensive nursing care.

Keywords: orange; lavender; fatigue; hemodialysis patients

INTRODUCTION

Chronic renal failure is a prevalent chronic disease and is one of the world's most important health problems [1, 2]. Treatment of chronic renal failure includes hemodialysis, peritoneal dialysis, and kidney transplant. Hemodialysis is the common treatment method and is the only treatment option next to kidney transplant (definitive treatment) and has had an important role in improving the survival of these patients [3]. More than 1.5 million patients around the world live by hemodialysis, peritoneal dialysis and kidney transplantation. The number of patients is projected to double in the next decade [4]. According to Iranian Renal Diseases and Transplantation Research Center, about 39,000 kidney patients lived in 2007, among whom, 14,000 people were undergoing dialysis [5]. Hemodialysis patients suffer from various physical and mental problems. Fatigue is the most common health problems in these patients, and 60-97% of patients suffer from fatigue. Fatigue is defined by reduced physical and mental capacity in the patient, which is a permanent feeling and cause a feeling of fatigue that is not resolved with rest [6]. Lee et al. (2007) classified fatigue in hemodialysis patients into three integral areas of physical, emotional and cognitive fatigue[7]. They believed that physiological factors (anemia, malnutrition, uremia, hemodialysis inadequacy, lack of physical activity, drugs' side effects and psychological factors including depression, anxiety, sleep disorders) and socio-demographic factors (age, sex, race, education, marital status, job and treatment-related factors) affect the

feeling of fatigue in patients [8].The first-line of treatment of psychiatric disorders in hemodialysis patients is drug treatment; however, the hypnotic drugs-induced sleep is an abnormal sleep. These drugs disrupt normal sleep periods. Many hypnotic drugs reduce nerve function and may create safety hazards for patients [9]. They are associated with side effects and high costs, and their prescription is not a nursing responsibility. Therefore, other methods such as aromatherapy should be used, which is alternative, safe, inexpensive and cost-effective. The use of aromatherapy is increasing in nursing care. Psychological aspects (anxiety, sleep disorders, quality of life and stress) are often overlooked in these patients. No study has been conducted on the effect of orange and lavender aromatherapy exclusively on fatigue in hemodialysis patients[10]. There are also controversies on the usefulness of aromatherapy, and its beneficial therapeutic effect has not been definitively confirmed yet. Therefore, this study examined the effect of orange and lavender extract aromatherapy on fatigue in patients referred to the hemodialysis ward of Imam Khomeini Hospital in Zabul in 2015.

MATERIALS AND METHODS

Design and Participants

This randomized clinical trial (crossover) was conducted on 30 hemodialysis patients who were referred to Hemodialysis Center of Imam Khomeini Hospital in Zabol during February 2015-April 2016.

Inclusion and Exclusion Criteria

Inclusion criteria included hemodialysis three times a week, having a history of hemodialysis treatments more than six months, informed consent for the study, lack of acute stressful event in the past 6 months (Death of loved ones and having an accident), lack of history of allergy to aromas, lack of proven problem in sense of smell (healthy olfactory sense that was evaluated by a physician), and acute renal failure. Exclusion criteria included unwillingness to participate in the trial, kidney transplantation, and hospitalization in another ward except Hemodyalsis ward for other reason(MI, CVC, dyspnea).

Instrument

Data were collected using a demographic questionnaire and Multidimensional Fatigue Inventory (MFI-20). The demographic questionnaire included age, sex, marital status, occupation, education, and duration of dialysis. MFI-20 consists of five distinct dimensions of general fatigue, physical fatigue, mental fatigue, decreased activity, and decreased motivation. Each dimension includes four items, and responses are score based on a 5-point Likert scale from strongly agree to strongly disagree. Higher scores indicate greater fatigue [11] .Total score of each dimension ranges between 4 and 20, and the total fatigue score ranges between 20 and 100. Scores of 20-41 indicate mild fatigue, scores of 48-74 indicate moderate fatigue, and scores of 75-100 indicate severe fatigue [12]. The external validity and reliability of the tool have been confirmed in different international [13]and Iranian [14] studies. Validity and reliability of the Persian version of the tool were confirmed by Hafezi et al. with a Cronbach's alpha of 0.85 .

Data Collection

The patients who received hemodialysis were divided into two groups of lavender (group 1) and sweet orange (group 2) essential oil based in even and odd days of week. In the first phase of intervention, in each group, the patients were instructed to pour a drop of orange or lavender extract on a 2×2 cm gauze and pin the gauze to their shirt and rest the night after dialysis [15] . This was performed three times a week for two consecutive weeks. Patients in both groups received routine care as well [16] . Fatigue levels at the end of each week were examined by the questionnaire. After the end of week 2, two weeks were considered to eliminate the effects of extracts [17]. In the second stage and similar to the first stage, orange and lavender extract intervention was performed after switching groups, i.e. lavender was used in group 1 and orange extract was used in group 1. Fatigue levels were evaluated at the end of each week.

Data Analysis

In this study, data were qualitative and quantitative (continuous and discrete). Descriptive and inferential statistics were used for data analysis. After collecting, coding and entering the data into a computer, SPSS 22 was used to analyze the data.

RESULTS

The mean age of subjects was 47±14 years. The subjects' age ranged between 19 and 75. In terms of gender, 33% of patients were women and 67% were men. The majority of subjects in both groups of orange (76%) and lavender (0/80%) were married (Table 1).

Paired t-test results showed no significant difference between the fatigue levels before inhalation of lavender extract and the end of the first week (50±8.8) and the end of the second week (P <0.662). The test revealed a significant relationship between the fatigue levels before inhalation of orange extract and at the end of the first week (0.002), which indicated decreased fatigue levels after inhaling orange extract. However, no significant relationship was found between fatigue levels and inhalation of orange extract at the end of the second week (P=0.053), which indicated the ineffectiveness of orange extract aromatherapy on fatigue in these patients (Tables 2 and 3).

Table 1: Demographic characteristic of participants in study

Variables	Mean±SD	N
Age(Year)	47±14	30
Dialysis Duration(Year)	4±2	30
	N	%
Gender		
Female	10	33
Male	20	67
Marriage status		
Single	7	24
Married	23	76

Table 2. Effect of lavender extract on fatigue in various stages of study

Fatigue / Stage of study	Mean±SD	Confidence Interval of the Difference %95		t	Df	*P Value*
		Lower	Upper			
Before	47±8.5	-6.89	1.62	-1.26	29	0.216
First week	50±8.8					
Before	47±8.5	-5.48	2.01	-0.94	29	0.352
Second Week	49±7.5					
First week	50±8.8	-3.26	5.06	0.44	29	0.662
Second Week	49±7.5					

Table 3. Effect of orange extract on fatigue in various stages of study

Fatigue / Stage of study	Mean±SD	Confidence Interval of the Difference %95		T	Df	*P Value*
		Lower	Upper			
Before	47±8.5	-11.43	-2.89	-3.43	29	0.002
Third week	54±6.8					
Before	47±8.5	-7.98	0.05	-2.01	29	0.053
Fourth Week	51±6.2					
Third week	54±6.8	-0.36	6.72	1.85	29	0.074
Fourth Week	51±6.2					

Comparative test results showed a significant relationship between the inhalation of extracts and reduced fatigue so that orange was more effective than lavender in reducing fatigue (P=0.012) (Table 4).

Table 4. Comparison of lavender and orange extracts on the reduction of fatigue in patients undergoing hemodialysis

Groups	Mean	Std. Deviation	(Mean Difference (I-J	Std. Error	Confidence Interval for Difference %95	P Value
Lavender	48.85	0.97	-3.693	1.372	6.505, 0.882	0.012
Orange	52.54	0.97				

DISCUSSION

This study aimed to compare the effects of lavender and orange extracts aromatherapy on the reduction of fatigue in hemodialysis patients. Results showed that orange and lavender extracts did not reduce fatigue in most stages of the study. Demographic data analysis results revealed no statistically significant difference between groups of orange and lavender regarding age, sex, marital status, education, employment status, family size, medical support, and income. In other words, the three groups were similar in terms of characteristics.

In a study by Sajjadi, Farmahini-Farahani, Esmaeelpour Zanjani, Dormanesh and Zare (2012) titled “Factors affecting fatigue in patients with chronic renal failure undergoing hemodialysis”, subjects were homogenous regarding age, sex, employment, marital status, occupation, history of dialysis, duration of illness, education and family size in both the intervention and the control groups, which were consistent with our findings [18].

Paired t-test results showed no significant relationship between inhalation of orange and lavender extracts in most stages of the study (baseline until the end of the first week and the second week of treatment and the end of the fourth week) and reduction in fatigue. Consistent with the present study, in the study by Sajjadi et al. (2010), the majority of subjects (60.7%) suffered from severe fatigue, and 3.39% complained about moderate fatigue. The mean fatigue severity showed severe fatigue[18] another similar study that conducted by by Kim and Kang titled "effects of aroma of itching of hand, fatigue and stress in hemodialysis patients" showed no significant difference between fatigue severity at the baseline between the experimental and the group control (p=0.58) [19]. In another study by Lee et al. titled "effects of aromatherapy on sleep disorders, sleep satisfaction and fatigue in hemodialysis patients", no significant difference was observed between the two groups before the intervention in terms of severity of fatigue[20]. Findings are consistent with the present study. Findings also showed that lavender and sweet orange essential oil massage was more effective in reducing fatigue, and inhalation of lavender and sweet orange was more effective in reducing the severity of fatigue compared to the control group that received no intervention. The mean fatigue levels in the control group increased compared to the baseline, and the majority of patients suffered from severe fatigue [21]

Regarding the comparison of effects of orange and lavender on fatigue, findings revealed greater effectiveness of orange on reducing fatigue compared to lavender in hemodialysis patients. In contrast, Sakamoto concluded that lavender essential oil improves the level of concentration during work, and lavender suppresses the sympathetic system, improves mood and reduces fatigue. Lavender is considered a soothing aroma and can reduce fatigue. Findings of this study showed that aromatherapy use were not statistically significant in improvement of fatigue but can be used for the following effects of it includes: energy-enhancing effects, improves sleep, reduces stress and creates tranquility, can improve its effects through aromatherapy [22]. According to Lee Sung Hee, aromatherapy is a convenient way to protect and support patients' health [21].

CONCLUSION

Findings were indicative of higher effectiveness of orange extract compared to lavender extract on fatigue in hemodialysis patients. Aromatherapy is one of the popular complementary medicine in nursing and is easy, safe, non-invasive and relatively inexpensive. Its improves blood flow, reduces pain, causes muscle relaxation, and reduces anxiety, depression and fatigue through blocking impulses to the brain and secretion of endorphins and serotonin, dopamine and decreasing sensitivity and muscle stiffness. Therefore, massage therapy can be used as a suitable complementary therapy in these patients.

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