

The Impact of Aromatherapy on the Anxiety of Patients Experiencing Coronary Angiography

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Abstract

Background: Anxiety among patients experiencing coronary angiography increases within invasive studies including angiography. Anxiety as an intensifier at cardiovascular reactions can endanger patients in angiography clinics. Studies indicate that *lavendula spica L.* inhalation can decrease anxiety. The purpose of this study is to determine the impact of aromatherapy on the anxiety level of patients experiencing coronary angiography.

Materials and Methods: This research is a clinical trial study performed on a group of 96 patients hospitalized in Sari Fatemeh-Zahra Hospital for coronary angiography who were randomly selected. They were divided in two subject (45 patients) and control (46 patients) groups. Demographic data sheets, recording sheet of homodynamic variables and Spielberger state-trait anxiety inventory were distributed among the two groups before and after aromatherapy. The data were analyzed using SPSS-16 as well as statistical T-test and chi-square test.

Results: The two groups were homogenous in terms of gender, marital status, level of education, sickness background, age and health insurance. The data indicated that anxiety level decreased significantly in the subject group compared with the control group after aromatherapy ($P < 0.0001$). There was also a significant difference in systolic and diastolic blood pressure and respiratory rate as well as heartbeat parameters in these two groups. ($P < 0.05$)

Conclusion: *Lavendula* aroma inhalation can decrease anxiety level of patients before coronary angiography and accordingly aromatherapy can be used as health care intervention and mental support, without any side effects, for the patients before invasive interventions such as angiography.

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Introduction

Cardiovascular diseases are the leading cause of mortality for men and women in all races and ages [1]. Mechanical and industrial life style and stress are factors to make our hearts sick [2]. The mortalities due to cardiovascular diseases have decreased over the past 40 years. One of the reducing agents is improvement of surgical and diagnostic technique the most important of which are coronary catheterization and angiography [3]. Coronary angiography is an invasive investigation and is used in diagnosis of known or suspected coronary artery disease [4]. According to the latest information presented by American Heart Association, one million patients in the United States undergo cardiac invasive and diagnostic tests annually [5].

In Iran, about 16 to 18 thousand cases of angiography are performed annually [6]. In most cases, invasive diagnostic tests create stress and anxiety for the patient [7]. Most hospitalized patients have some degree of anxiety the most common of which is anxiety before coronary angiography [1]. Anxiety as the enhancing agent of cardiovascular

reactions has an impact on patient's physiological responses such as respiration rate, heart rate, blood pressure, myocardial oxygen consumption and plasma concentration of epinephrine and norepinephrine and puts the patients at risk in angiography room [2, 8]. Also it causes irregularity of heart rate due to an increase in sympathetic nerves activity and also along with the increase in reactivity of blood vessels as well as increase in heart rate and blood pressure can lead to inter-tissue damages and platelets aggregation. The studies indicate that over 72% of patients face anxiety before coronary angiography [7]. In this regard, studies conducted by Uzun also indicate that 74 percent of patients experienced anxiety before angiography [9]. Among the methods that can be used to reduce anxiety are pharmacological and non-pharmacological methods [10]. Complementary therapies such as aromatherapy, meditation, massage therapy, muscle relaxation, music therapy and guided imaging can be enumerated amongst the non-pharmacological approaches [9]. The advantages of complementary therapies include low cost, easy

implementation, non-invasiveness, non-pharmacological and lack of chemical effects [11]. Aromatherapy is one of the non-pharmacological therapies that can reduce stress and anxiety [12]. Aromatherapy affects the senses through smell. Although scientific studies have not before angiography that even in some cases the operation was prevented by patients and on the other hand, have observed that no non-pharmacological measures are performed to reduce their anxiety. Hence, given that decrease of anxiety and stress is among nursing cares and hitherto the impact of Lavendula aroma on reducing stress and anxiety before angiography has not been studied, accordingly, this study is conducted with the aim to determine the effectiveness of Lavendula aroma on the anxiety of patients before coronary angiography in 2010-2011 at Fatemeh-Zahra Hospital of Sari.

Materials and Methods

This research is a clinical trial study. The statistical population of this study includes all the patients undergoing coronary angiography who were exclusively hospitalized for angiography in the Angiography Ward of Training and Medical Center of Sari Fatemeh-Zahra Hospital. The research sample consisted of the persons who experienced only coronary angiography for the first time, without right heart catheterization. Before the angiography, the patients should not have undergone other invasive procedures such as echocardiography through esophagus, have not suffered from valvular heart disease and all subjects should have complete consciousness and should not have a disease with critical condition. This study was conducted on 96 eligible patients admitted to the Hospital, but two patients refused to complete the questions (due to hearing loss) and three emergency patients were transferred to the catheterism department and could not complete the questionnaire. Therefore, the study population consisted of 91 patients and was divided into two quite homogeneous groups of control (46) and subject (45). In this study, Fatemeh-Zahra Hospital- affiliated to Mazandaran University of Medical Sciences- which is the angiography and other invasive interventions center for cardiovascular patients of Mazandaran Province, was selected as the research environment. In this study, three following forms were used in order to determine the impact of aromatherapy on anxiety of patients before angiography and to collect data: 1) Demographic data questionnaire and the data related to disease included 6 questions, 2) recording sheet of hemodynamic variables, and 3) Spielberger standard questionnaire to measure anxiety. This test consisted of two separate covert and overt parts. The first part of this questionnaire contained 20 expressions to determine overt anxiety and the second part also contained 20

expressions to determine covert anxiety. Overt anxiety means the feeling of individual at that specific moment, and covert anxiety means the common feeling of individual at most cases [7]. The questions were measured from 1 to 4 based on Likert 4-degree scale. The total scores of both covert and overt anxiety scale were in the range of 20 to 80. After summing up the obtained scores, the studied subjects were classified into two anxious group with anxiety score of over 43 and non-anxious group with anxiety score of lower than 43. This questionnaire (STAI) is widely used by psychologists, experts and researchers and the validity and reliability of Persian translation of Spielburger test have been reviewed and approved by the faculty members of Shahid Beheshti University as well as the faculty members of Tehran Psychiatric Institute. In this study, same description was given to both groups and the individuals were engaged in the study with personal satisfaction. Demographic questionnaire was distributed among the subjects who were hospitalized for coronary angiography and after filling out by the patients their vital signs were recorder by nurse. After that, Spielburger questionnaire was filled out by nurse for both groups and in the next day intervention was carried out one hour before dispatching to angiography ward. In subject group, using dropper two drops of Lavendula were dripped on cotton balls in a pot with the volume of 10 ml and it was described to the patients to keep it at a distance of 5 cm from their nose and to sniff for 3 minutes and after 30 minutes their vital signs were checked and recorded by nurse and the anxiety form was completed (in the control group, intervention was carried out with the same method by distilled water).

It should be noted that during the study period, none of the samples experienced asthma, chest pain or atrial and ventricular extra systoles. This study was carried out under control and observation of the cardiologist who was the project partner. Statistical comparison of data was performed using SPSS-16 program. The values of $p < 0.05$ were considered significant. Chi square statistical test was used in order to match the groups. For comparison of the mean of hemodynamic signals and also for checking the level of anxiety, before and after the intervention in two groups, the independent t test and the paired t test were used separately to compare the above cases in each group.

Results

After sampling, the collected data was analyzed using computer and SPSS-16 software. Chi square statistical test indicated no significant statistical difference between the two groups in terms of gender, marital status, education level, history of heart disease, age and having health insurance. Thus, both groups were similar with respect to the above variables (Table 1).

Table 1. Evaluation of homogeneity of demographic characteristics

Characteristics		Subject Group Number (%)	Control Group Number (%)	p-Value
Gender	Male	18 (40)	23 (50)	0.340
	Female	27 (60)	23 (50)	
Age Group	30-60	19 (42.22)	26 (56.52)	0.170
	60-90	26 (57.8)	20 (43.48)	
Marital Status	Single	4 (8.89)	2 (4.35)	0.430
	Married	30 (66.67)	36 (8.26)	
	Other	11 (24.44)	8 (17.39)	
Education Level	Illiterate	24 (53.33)	24 (52.17)	0.510
	Primary Education	13 (28.89)	9 (19.5)	
	Secondary Education	6 (13.33)	8 (17.39)	
	University Education	2 (4.44)	5 (10.8)	
Background of Disease	Yes	41 (91.11)	41 (89.13)	0.750
	No	4 (8.89)	5 (10.87)	
Health Insurance	Yes	45 (100)	45 (97/8)	0.320
	No	0 (0)	(2/2)	

Data analysis of covert and overt anxiety levels before coronary angiography indicated that the level of covert anxiety before the intervention in control group was 0.50% and in subject group was 48.89%, while overt anxiety before the intervention in the control group was 84.8% and in subjects group was 84.44% (Table 2). The results indicated that both

covert anxiety and overt anxiety in two groups were matched together prior to intervention. On the other hand, it was also observed that in both control group and subject group the levels of covert and overt anxiety are different in such a way that prior to intervention the level of overt anxiety has been more than covert anxiety in samples ($p < 0.05$).

Table 2. Distribution of studied samples according to levels of anxiety before the intervention in control and subject groups

Level of Anxiety	Control Number (%)		Total	Subject Number (%)		Total
	No Anxiety	Experienced Anxiety		No Anxiety	Experienced Anxiety	
Covert Anxiety	23 (50)	23 (50)	46 (100)	23(51.11)	22(48.89)	45(100)
Overt Anxiety	7 (15.22)	39 (84.78)	46 (100)	7(15.56)	38(84.44)	45(100)
p-Value		0.92			0.96	

Data analysis of covert and overt anxiety levels before coronary angiography indicated that the level of covert anxiety in the control group after intervention was 45.65% and in subject group was zero, while the overt anxiety in the control group after

intervention was 84.78% and in subject group was 53.33%. It was observed that there is a decrease in the level of both type of anxieties after the intervention ($p < 0.05$) (Table 3).

Table 3. Distribution of studied samples according to levels of anxiety after the intervention in control and subject groups

Group Level of Anxiety	Control Number (%)		Subject	
	No Anxiety	Experienced Anxiety	No Anxiety	Experienced Anxiety
Covert Anxiety	25 (54.35)	21 (45.65)	45 (100)	0 (0.0)
Overt Anxiety	7 (15.22)	39 (84.78)	21 (46.67)	24 (53.33)
p-Value		0.0001		0.0001

In table 4, it can be seen that aromatherapy in subject group, not only decreases significantly the anxiety level compared with the control group ($p > 0.05$), but also in this group, the anxiety level is decreased compared with before aromatherapy. According to the findings of table 3, it can be

observed that the intensity of Lavendula impact in subject group has been more than that of control group and has changed the level score of covert anxiety as well as overt anxiety, in addition in subject group after intervention there is significant decrease in

anxiety score compared with before the intervention (Table 4).

Table 4. Evaluation of anxiety level before and after intervention according to control group and subject group

Group Type of Anxiety	Control		Subject	
	Covert Mean±SD	Overt Mean±SD	Covert Mean±SD	Overt Mean±SD
Before Intervention	42.13±6.18	47.70±4.17	43.60±5.13	47.73±4.24
After Intervention	42.09±6.33	47.83±4.35	35.71±3.7	44.27±4.54
<i>p</i> -Value	0.69	0.97	0.000	0.0001

Table 5. Distribution of samples based on systolic and diastolic blood pressure, pulse rate and respiratory rate in subject and control groups before and after intervention

Type of Anxiety	Systolic Blood Pressure	Diastolic Blood Pressure	Pulse Rate	Respiratory Rate
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
Before Intervention	124.89±8.43	76.67±6.4	74.36±5.95	18.83±1.55
	124.89±8.43	76.6±6.4	74.36±5.95	18.22±1.99
	66.66	89	89	89
	0.51	0.78	0.03	1.617
After Intervention	0.61	0.44	0.98	0.11
	127.3±15.04	79.35±8.27	74.41±4.86	18.59±1.26
	109.11±8.48	67.33±4.47	70.60±4.24	16.84±1.4
	7.33	8.59	3.99	6.26
<i>p</i> -Value	71.29	89	87.9	89
	0.0001	0.0001	0.006	0.0001

The above Table presents the mean and standard deviation of vital signs before and after intervention in both control and subject groups. The figures of Table indicate that there is no significant difference between vital signs before intervention of subject and control groups ($p > 0.05$). However, there is significant difference between the vital signs of subject and control groups after the intervention ($p < 0.05$). The results indicate that after the intervention in subject group the hemodynamic parameters are reduced significantly.

Discussion

The research findings indicated that Lavendula aroma inhalation reduces the anxiety level before coronary angiography and can put positive impact on vital signs and also can decrease the parameters of vital signs.

Most hospitalized patients experience some degree of anxiety the most common of which is anxiety before coronary angiography [1]. Aromatherapy is among the non-pharmacological therapies that can reduce stress and anxiety [12]. Given that angiography is used as invasive and definitive method to detect coronary artery disease [4], in this study with the assumption that the Lavendula aroma can be an effective pharmaceutical plant for reducing anxiety before coronary angiography [8,10,13], the impacts of aroma on anxiety level of patients before angiography are studied. Also, the impacts of Lavendula aroma on hemodynamic variables (blood pressure, pulse and respiration rates) were studied.

The findings indicated that the level of covert anxiety before intervention in control group was 50% and 48.89% in subject group respectively and overt anxiety of both groups before intervention was over

80% which are consistent with the results of study conducted by Majidi et al titled "the impact of the Qur'an recitation sound on patients' anxiety before angiography as well as the study conducted by Uzun et al titled "evaluation of covert and overt anxiety levels before angiography" [7, 9]. These results indicate that the patients before angiography suffer from high anxiety and this anxiety is considered as one of the important factors which determine patients' comfort and relieve. Given that nurses are among the most significant members of treatment team who have important roles in maintaining physical and mental support to patients, therefore it is suggested, nurses incorporate anxiety reduction measures in their care agenda in order to improve the quality of treatment.

The findings also indicated that the levels of covert and overt anxiety are reduced after using Lavendula aroma and there is a significant difference in anxiety level before and after intervention (Table 4). Mirzaei and colleagues in a study conducted about the impact of Lavendula aroma on cortisol plasma concentration and anxiety decrease during parturition have found out that this aroma can reduce cortisol concentrations and anxiety prior to delivery [16]. Shinia et al have reported sedative effects of Lavendula aroma on coronary artery blood circulation [8]. Several studies have shown that Lavendula aroma can reduce anxiety which is consistent with our study [8,16,17]. However, in a study conducted by Lorie et al titled "aromatherapy and anxiety reduction before diagnostic tests", it was concluded that there is no significant statistical relationship before and after aromatherapy in subject group [11]. According to such studies and the results of our study, it can be proposed that Lavendula aroma through stimulating smell routes puts an impact on hypothalamus and reduces the corticotropin-releasing hormone and

subsequently the secretion level of adrenocorticotropin from hypothysis is decreased and reduces secretion of the adrenal gland [16-18]. The results of the condition of hemodynamic variables after intervention of systolic and diastolic blood pressure as well as heart rate and respiratory rate indicated a statistically significant difference and reflected the fact that after intervention the subject group compared with the control group, had a more favorable situation which are consistent with the findings of Majidi et al [7]. In another study, it was shown that using aroma for 30 minutes per week for 8 week will remarkably reduce blood pressure [19]. It seems that the extract of *Lavendula* by reducing adrenocorticotropin and eventually epinephrine and adrenaline as well as its high sedative effects can relieve anxiety and reduce blood pressure in heart disease patients. Some environmental factors (environment and hospital equipment) which are not under the control of researcher can affect patient's anxiety.

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