

Effects of blended aromatherapy using lavender and damask rose oils on the hemodynamic status of nursing students

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ABSTRACT

Background and Objective: Anxiety is inter alia the disorders experienced by the entire social-economical classes worldwide and it is known to lead to the increase in heartbeat rate, blood pressure, cardiac output as well as higher oxygen consumption and elevation of respiration rate. Thus, the present study aims at investigating the effect of blended aromatherapy using lavender and damask rose oils on the hemodynamic status of the nursing students.

Materials and Methods: The present clinical trial was conducted on 70 nursing students who were selected based on a simple sampling method and randomly assigned to two test and sham groups. For the test group, seven droplets of lavender essence, 10%, and three droplets of damask rose, 10%, were poured on a nonabsorbent pad which was placed in a 20-cm distance from the students' noses on the chair handle; for the sham group 10 droplets of sesame oil was spilled on a nonabsorbent pad which was placed within a 20-cm distance from the students' noses on their chairs' handles. The data were collected by taking advantage of demographic information questionnaire and sphygmomanometer and chronometer and were analyzed in SPSS software, ver. 20, by the use of descriptive and inferential statistics.

Findings: The results of the data analysis indicated that the vital signs' mean score was significantly decreased 15 minutes after the intervention onset and at the end of the test as compared to the mean score of the vital signs before the initiation of the test ($P < 0.05$). There was not found any significant difference in the sham group between the vital signs' mean score 15 minutes since the intervention initialization and at the end of test with the vital signs' mean score of the pre-intervention phase ($P > 0.05$).

Conclusion: Aromatherapy via blending the essences of lavender and damask rose is effective on the hemodynamic signs of the nursing students. Therefore, it can be applied as a nondrug and less expensive method having no side effects for mitigating exam anxiety.

Keywords: aromatherapy, hemodynamic signs, nursing students, lavender essence, damask rose essence

INTRODUCTION

University is a learning environment of great concern for the nursing students studying in MA major. In the meantime, the nursing students are faced with various stressing factors and they have to make progress through a predominantly exhausting competitive program featuring career orientation. However, learning in such environments is accompanied by challenges that cause tension and anxiety in the students. Higher levels of anxiety can influence the students' academic performance and expose the clinical and education cycles to evident threats. These students mention their large volume of lessons as the most important factors giving rise to anxiety (1).

Exam anxiety has been defined as a state of general anxiety and an unpleasant feeling featuring two physical and behavioral-psychological components during the process of an individual's being exposed to examination. The physical aspect includes sweating, heartbeat rate, impatience, shortness of breath, shivering and other signs and the behavioral/psychological aspect includes forgetfulness, fear, doubtfulness and negative thoughts (2).

Anxiety is defined as an unpleasant experience associated with the perception of imagined or real threat (3). Anxiety leads to an intensification of the sympathetic nervous system that might result in adverse effects on the heart and veins and respiratory system and epinephrine and norepinephrine hormones' levels are increased which results in an increase

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in heartbeat, blood pressure, heart output rate and higher consumption of oxygen and elevation of breathing speed (4). The most important measurable physiological scales are the vital signs including the temperature, heart rate, respiration and blood pressure (5).

Generally, the methods applied for treating the anxiety symptoms are categorized to two of drug-based and nondrug-based sets and the use of various branches of alternative medicine is inter alia the nondrug methods (6).

In between, aromatherapy as a branch of alternative medicine is largely supported and it is regarded as one of the ancient sciences in which the essences and the fragrances obtained from the various parts of the plants are utilized for the physical and psychological treatment of the individuals which results in the recovery and tranquility of the individuals and is known to provide the individuals with high energy. The oil essences, when being inhaled, cause the odorant molecules to enter the limbic system through the cavities existent in the olfactory mucosa. Odorant molecules influence the autonomic nervous system and endocrinal system and lead to the improvement of peripheral blood circulation, regulation of respiration, heart rate, and blood pressure thereby reducing the stress (7, 8).

The studies have shown that Lavender and red rose, act as analgesic, anti-depression and pain relievers in the body (9) and their effects are not only clearly discernible in the blood but also in the brain within 15 minutes of inhalation (10, 11)

According to a clinical- trial study showed that aromatherapy by lavender causes stabilization of vital signs Furthermore, in a study among the nursing student the vital signs' mean score after aromatherapy by lavender essence was not followed by much of a change (12, 13).

Recent evidence proposes aromatherapy as a safe and cost-effective method and the literature on aromatherapy is indicative of the blending of essences being more effective than their separate use, but previous studies have failed to investigate the effect of blended aromatherapy on the vital signs of students; moreover, it took aromatherapy a little more than 15 minutes to influence an individual and the effects lasted a few weeks so the present study investigated the effects of the inhalation aromatherapy of concomitant lavender and damask rose essences on the hemodynamic symptoms of nursing students in the exam situation.

MATERIALS AND METHODS

The present study is a single-blind random clinical trial conducted, in 2017, on 70 boy and girl nursing students from Hormozgan Medical Sciences University all of whom had the study inclusion criteria.

The study population included all the nursing BA students studying in the field of nursing and midwifery department of Hormozgan Medical Sciences University. A total of 78 individuals were selected as the study sample volume by taking advantage of $N = d^2 / (2s^2)(z^2 + z1)$ in a 95% confidence interval and test power of 80% (equal to 1.96 and 84%) through considering a 10% drop-out rate. Eight individuals were excluded from the study due to the past history of heart diseases, pulmonary diseases and allergy to the flowers and plants and, in the end, the study was carried out on 70 nursing students (35 students in each group) (Figure 1). After acquiring an ethical code (HUMS.REC.2017.005) from the Ethics Committee and a clinical trial code (IRCT2017041533430N1), the study subjects were selected based on the following entry criteria following which they were asked to provide written informed consent letters; then, they were assigned to a study group (test and sham) by making use of a table outputted from RANDOM ALLOCATION software. The study inclusion criteria were: tendency of the study subject for taking part in the study, having no olfactory system disorders, having no past history of eczema and allergies to flowers and plants, the absence of background diseases like heart problems, respiratory difficulties, epilepsy and skin irritations, having no psychological-mental diseases, lack of undergoing aromatherapy and other alternative medicine methods including progressive muscular relaxation, music therapy and so forth for reducing the exam anxiety during the past 6 weeks before the exams, not having taken anti-anxiety and herbal drugs for six weeks before the exam; the study exclusion criteria were: lack of willingness to continue participation, observation of sensitivity to oil essence of damask rose and lavender during the research period or having developed unpleasant feelings during the intervention, the occurrence of any sort of physical symptoms in the study subjects preventing them from participation in the sessions. The data collection instrument was a two-part questionnaire that was completed by the assistance of the researcher's colleagues before, 15 minutes after the students' arrival and immediately after the exam session in the absence of the researcher by both of the study groups.

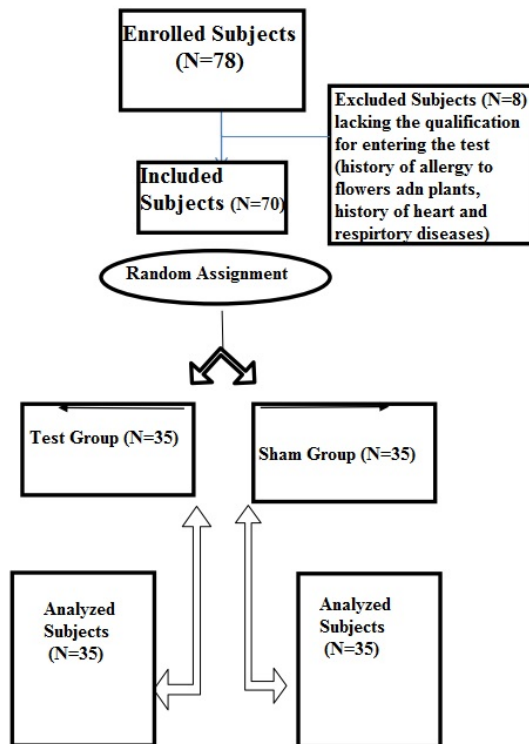


Figure 1: Consort

The first part of the questionnaire incorporated the demographic characteristics and contained 8 questions (regarding age, gender, marital status, place of residence, the number of lesson units to pass during the semester, the average marks of the past semesters, the use of alternative medicine methods for the past six weeks, the use of medicinal drugs or herbs for mitigating anxiety during the past six weeks); and, the second part of the questionnaire recorded the measured values of vital signs (blood pressure, heart rate, and respiration). In order to safeguard the reliability of the information logging paper, simultaneous observation by the researcher and co-researcher was the method of choice.

Moreover, to safeguard the scientific accuracy and the authenticity of the blood pressure, there was made use of four Riester aneroid sphygmomanometers the precision of which had been previously assessed through being calibrated by a Riester Mercury Sphygmomanometer by Shafa Medical Equipment Company. The heart and respiration rates were also counted by the use of the same chronometer. After the vital signs were measured by the Executive Peer No.1 for the first time, the same vital signs were again measured by the Executive Peer No.2 but this time through marking the placement location of sphygmomanometer's cuff and medical stethoscope so as to ensure the instrument precision. Pierson correlation coefficient of the four sphygmomanometers was calculated in a range from 0.961 to 0.966.

It is worth mentioning that coordination was made regarding the method of measuring vital signs with the researcher colleagues in sessions before the exam so as to make sure of the evaluation method's identicalness. Specialized peers and nurses were asked to measure the vital signs. Also, before the intervention onset, the vital signs of 20 university students were measured by all the four researcher's colleagues and the Pierson correlation coefficient of the diastolic and systolic blood pressures was in a range from 0.959 to 0.963; the Pierson correlation coefficient of respiration count was between 0.732 and 0.909 and that of the heart rate was ranging from 0.934 to 0.967. The university students were asked not to use any freshener (perfume, eau de cologne, spray and so on). The students who failed to enter the study or were excluded from the study were guided to a separate room to sit for the exam.

In the meanwhile, the corresponding exams were held at the same date in two separate halls under identical environmental and temperature conditions (quiet places with appropriate light and heat and free of any environmental stimulants) through coordination being made with the University's Instruction Department and the students were assured that the time they spend on responding to the questions of the questionnaire will not be subtracted from the time they are usually given for the exam. It has to be pointed out that the exams pertained to the lessons that were also identical in terms of the lesson units (nursing lessons of individual and family health and society health nursing) as well as in terms of the instructor.

Table 1: Comparing the mean values of age, number of units and average marks of the study subjects from the two groups

Variable	Test group		Sham group		Independent-t-test	
	Mean	Std. deviation	Mean	Std. deviation	t	P
Age (years)	20.30	1.31	20.49	2.34	0.39	0.69
Number of lesson units	19.67	0.84	19.54	0.85	0.60	0.55
Average mark	14.78	1.34	14.52	1.56	0.63	0.53

Table 2: Study subjects' demographic characteristics

Group	Variable	Test		Sham		χ^2	P
		Number	Percentage	Number	Percentage		
Gender	Male	18	51.4	15	42.8	0.89	0.34
	Female	17	48.6	20	57.14		
Residence status	In dormitory	27	77.1	24	68.6	1.44	0.23
	At home	8	22.8	11	31.4		
Marital status	Married	4	11.4	5	14.3	-	0.39
	Single	31	88.6	30	85.7		

The technique was implemented as described in the following words: after debriefing about the study stages, the demographic characteristics questionnaire was administered to all the participants by the inquiring peers and the students' vital signs, including the systolic and diastolic blood pressure rates, respiration count and heart rates were measured; then, the researcher placed nonabsorbent eye pads, half of which were smeared with three droplets of damask rose essence, 10%, and seven droplets of lavender essence, 10%, and the other half was smudged with ten droplets of sesame oil, on the handles of the chairs in the two halls some 20 centimeters away from the study subjects' noses 15 minutes before the exam onset. Afterwards, the students were asked to enter the halls. The students' vital signs were again measured 15 minutes after their entry and inhaling the scent following which the students began answering the questions. It is worth mentioning that there is not a single report indicating the anti-anxiety effect of sesame oil. The pads were left on the handles of the chairs and no additional essence was added to the prior droplets. Also, the vital signs were again measured after the exam session was ended. It is noteworthy that lavender essence had been purchased from Kashan's Barij Essence Company that produces these essences from the buds of the *Stoechas* Variety and the damask rose essence had been prepared of the flowers of the *Damascene Rose* Variety with a 100% concentration and they were diluted in the Molecular-Medicine Research center associated with Hormozgan's Medical Sciences University to a 10% concentration by the use of odorless sesame oil and dropper was applied to pour the essence drops on the pads. The data were analyzed aided by SPSS software, ver. 18, as well as by taking advantage of descriptive statistics (frequency, mean and standard deviation) and inferential statistics (independent t-test, variance analysis with observation repetitions, Fischer's precision test and LSD follow-up test).

FINDINGS

The results of the present study indicated that there was no significant difference between the two groups in terms of age, the number of lesson units and average marks before the intervention ($P > 0.05$). The study subjects of the test group were mostly men (52.9%) and the study subjects of the sham group were mostly women (58.3%). The highest percentage of the study subjects from the test group (79.4%) and sham group (66.7%) were staying in dormitories and the lowest percentage of the study subjects from the test group (11.4%) and sham group (14.3%) were married. The obtained results indicated that there was no significant difference between the study groups in terms of gender, place of residence and marital status before the intervention and the two groups were almost identical in regard of the above variables ($P > 0.05$) (Tables 1, 2).

The results showed that there was no significant difference between the systolic blood pressure means of the two groups before the intervention ($P > 0.05$) but the difference between the test group and sham group was found statistically significant 15 minutes after the intervention onset and immediately after the exam was ended ($P < 0.05$). The results of the variance analysis with observation repetitions demonstrated that there is a significant difference in terms of the systolic blood pressure means of both sham and test group between the three measurement times ($P < 0.05$). LSD follow-up test indicated that there was a significant difference in the test group's systolic blood pressure means 15 minutes after the intervention and immediately after the exam was finished ($P < 0.001$). In the sham group, as well, the systolic blood pressure was significantly higher after the intervention and there was found a significant difference in the

Table 3: Comparing the mean systolic blood pressure in different times (before intervention, 15 minutes after intervention and immediately after intervention) of the two groups

Time	Test group		Sham group		Independent t-test	
	Mean	Std. Deviation	Mean	Std. Deviation	t	P
Before intervention	112.65	8.37	111.56	12.08	0.44	0.66
15 min after intervention	103.82	8.17	117.22	13.65	5.01	<0.001
Immediately after intervention	104.26	6.76	116.08	11.46	5.29	<0.001
Variance analysis with observation repetitions	F	52.90	6.77			
	P	<0.001	0.003		-----	

Table 4: Comparing the mean diastolic blood pressure in different times (before intervention, 15 minutes after intervention and immediately after intervention) of the sham and test groups

Time	Test group		Sham group		Independent t-test	
	Mean	Std. Deviation	Mean	Std. Deviation	t	P
Before intervention	73.38	9.51	72.36	9.96	0.44	0.66
15 min after intervention	71.32	7.21	75.69	10.01	2.08	0.04
Immediately after intervention	70.74	7.80	75.69	10.70	2.20	0.03
Variance analysis with observation repetitions	F	1.85	2.19			
	P	0.17	0.13		-----	

Table 5: Comparing the mean respiration rate in different times (before intervention, 15 minutes after intervention and immediately at the end of the exam) of the sham and test groups

Time	Test group		Sham group		Independent t-test	
	Mean	Std. Deviation	Mean	Std. Deviation	t	P
Before intervention	20.82	1.78	20.75	1.59	0.18	0.86
15 min after intervention	19.15	1.40	21.39	1.55	6.34	<0.001
Immediately after intervention	19.12	1.32	21.22	1.07	7.30	<0.001
Variance analysis with observation repetitions	F	25.49	3.19			
	P	<0.001	0.06		-----	

systolic blood pressure means 15 minutes after the intervention and immediately after the exam was finished ($P=0.02$) (**Table 3**).

Independent t-test indicated that there was not any significant difference between the two groups in terms of the diastolic blood pressure means ($P>0.05$). But, there was found a significant difference 15 minutes after the intervention onset and immediately after the end of the exam in terms of diastolic blood pressure means in the test group as compared to the sham group ($P<0.05$). Variance analysis with observation repetitions indicated that there was no significant difference in any of the two groups between the three measurement times in terms of diastolic blood pressure means ($P>0.05$) (**Table 4**).

Also, the study findings are indicative of the idea that there was not any significant difference between the two groups in terms of the respiration counts before the intervention ($P>0.05$) but there was found a significant difference between in the test group as compared to the sham group in terms of the respiration counts 15 minutes after the intervention initiation ($P<0.05$). Variance analysis with observation repetitions showed that there was not any significant difference in the sham group in terms of the respiration counts between the three measurement times ($P>0.05$) but there was found a significant difference between the three measurement times in terms of the respiration counts in the test group ($P<0.05$) (**Table 5**).

Also, there was found no significant difference between the two groups in terms of the heart rate before the intervention ($P>0.05$). But, there was found a significant difference in the test group in contrast to the sham group in terms of the heart rates 15 minutes after the intervention initiation and immediately at the end of the exam ($P<0.05$). Variance analysis with observation repetitions indicated that the mean heart rate did not signify any significant difference in any of the groups between the three measurement times ($P>0.05$) (**Table 6**).

Table 6: Comparing the mean heart rate in different times (before intervention, 15 minutes after intervention and immediately at the end of the exam) of the sham and test groups

Time	Test group		Sham group		Independent t-test	
	Mean	Std. Deviation	Mean	Std. Deviation	t	P
Before intervention	78.68	12.61	78.58	9.48	0.03	0.97
15 min after intervention	76.12	7.42	80.11	6.07	2.47	0.02
Immediately after intervention	76.06	6.34	80.92	7.35	2.95	0.004
Variance analysis with observation repetitions	F	0.97			1.90	
	P	0.39			0.16	-----

DISCUSSION AND CONCLUSION

The present study aims at evaluating the effect of blended aromatherapy using lavender and damask rose oils on the hemodynamic status of the nursing students. The present study is one of the few that examined the effect of blended aromatherapy on the vital signs of the students. The current study found that blood pressure, respiratory rate and heart rate were decreased after the intervention. However, the findings of the current study differed from previous experimental studies. In a study, the results indicated that there has not been any significant difference between the nursing students mean vital signs before and after the aromatherapy (13). This inconsistency may be due to the short time allocated to aromatherapy during a session. In another clinical-trial study, there was not found any significant difference between the test and control groups in terms of vital signs means during the day two and day three after the intervention. Such a conflicting result can be due to the longer time allocated to aromatherapy and difference in the concentration and the type of the applied oil essences (two droplets of lavender essence, 2%), as well as due to the aromatherapy technique applied; furthermore, the average ages of the aromatherapy group and control group were 65.13 ± 9.76 years and 65.63 ± 10.80 years, respectively, that might have been a likely reason for the finding differences (14). The results obtained in studies of the students should be cautiously generalized to Patients who are admitted to the hospital, as there may be many differences in the two situations that both groups have undergone (during the exam day or in reference to hospitals); also, the health statuses of the students and patients might also differ. Any changes in sleep quantity and quality, age-related changes, decrease in the total sleep duration and sleep difficulties in the night before the exam are common in students and they have to be taken into account.

This is while in a study of 120 nursing students, the vital signs of the test group were found decreased after aromatherapy with rosemary essence compared to the control group. Aromatherapy was conducted for a period of thirty minutes by the use of lavender essence (15). The results of this study and previous studies indicate that the aromatherapy reduces the hemodynamic variables (systolic blood pressure, diastolic blood pressure, heart rate, and respiratory rate) and when a person experiences a treatment, s/he can benefit from the inhalation effect of the essence that is manifested in the form of sympathetic nervous stimulation and elevation of hemodynamic variables levels (16).

Accurate measurement of anxiety is difficult because it is a subjective experience. People's perception of anxiety may also be different because of cultural and economic differences. Also, people's psychological state is effective when measuring vital signs (14).

The findings of the current study have some limitations. First, in this study, we assessed nursing students at semester two and three, all on the same lesson class. Their providing of answers to the questions might have been biased. Additionally, there is a lack of specific information about other problems that cause students' anxiety on the exam day and change their vital signs. Despite these limitations, the current study provides important new information about the association between blended aromatherapy and reduced vital signs, especially among nursing students. According to the study results, it is suggested here that further researches can be carried out within the format of a comparative study of the aromatherapy and massage therapy effects on the nursing students' hemodynamic status; additionally, the evaluation of the effects of other essential oils on vital signs in nursing students or other groups can also be recommended as a future research plan.

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