



The use of aromatherapy in alleviating anxiety*

O uso da aromaterapia no alívio da ansiedade

El uso de la aromaterapia en el alivio de la ansiedad

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ABSTRACT

Objectives: To determine how the use of essential oils (OE) Lavender and Geranium change the perception of anxiety, and to compare their effectiveness in treating anxiety. **Methods:** The sample included students from the first year of nursing school who were randomized into three groups: two groups received OE (in a gel polymer-based) and the other received a placebo (essence of Rose). A previously validated scale was used to assess anxiety. It was administered before the end of 30 and 60 days of use of aromatic gels. **Results:** The group using Lavender exhibited a reduction of -11.80 in mean scores on the anxiety scale, but this was not statistically significant. **Conclusion:** Although not statistically significant, there was greater efficacy of Lavender EO in reducing anxiety.

Keywords: Anxiety; Aromatherapy; Complementary therapies

RESUMO

Objetivos: Verificar como o uso dos óleos essenciais (OE) de Lavanda e Gerânio alteram a percepção de ansiedade e comparar sua eficácia. **Métodos:** Amostra foi composta por graduandos da 1ª série em Enfermagem que foram randomizados em três grupos: dois que receberam OE (em um gel de base polimérica) e o outro placebo (que recebeu essência de Rosa). A avaliação da ansiedade foi feita por meio de uma escala já validada, aplicada antes, ao final de 30 e de 60 dias de uso dos géis aromáticos. **Resultados:** O grupo que utilizou Lavanda teve uma redução de -11,80 na média dos escores, porém não significativa estatisticamente. **Conclusão:** Houve maior eficácia do OE de Lavanda na diminuição da ansiedade, porém não foi estatisticamente expressiva.

Descritores: Ansiedade; Aromaterapia; Terapias complementares

RESUMEN

Objetivos: Verificar cómo el uso de los aceites esenciales (OE) de Lavanda y Geranio alteran la percepción de ansiedad y comparar su eficacia. **Métodos:** La muestra estuvo compuesta por estudiantes del pregrado en Enfermería que fueron randomizados en tres grupos: dos que recibieron OE (en un gel de base polimérica) y el otro placebo (que recibió esencia de Rosa). La evaluación de la ansiedad fue realizada por medio de una escala ya validada, aplicada antes, al final de 30 y de 60 días de uso de los geles aromáticos. **Resultados:** El grupo que utilizó Lavanda tuvo una reducción de -11,80 en promedio de los escores, sin embargo no significativo estadísticamente. **Conclusión:** Huvo mayor eficacia del OE de Lavanda en la disminución de la ansiedad, mas no fue estadísticamente expresiva.

Descriptores: Ansiedad; Aromaterapia; Terapias complementarias

* Study performed with first year students of the Nursing Graduation Course, Nursing College of Universidade de São Paulo.

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INTRODUCTION

In the current world scenario, the use of complementary therapies has been on the spot, both in developed western countries and in developing countries⁽¹⁾, mainly because they have been encouraged by the World Health Organization. In Brazil, the use of some of these therapies is acceptable for the Sistema Único de Saúde – SUS (Brazilian Health System), by means of the Administrative Rule n° 971, which encourages and regulates the adoption of such techniques in the Healthcare Units of the States, Cities and the Brazilian Federal District⁽²⁾.

Complementary therapies, also known as Natural or Alternative Therapies, are defined by the São Paulo City Law n. 13.717, implemented in 2004, as “all health and disease prevention practices that basically use natural resources”⁽³⁾. They are considered Alternative practices when used as an alternative to Conventional Medicine, and complementary when associated to the allopathic medicine technique⁽⁴⁾.

The growth of such techniques is related not only to their effectiveness and low cost, but also to the healthcare practice, namely focused on the individual as a whole, not only the disease, allowing a holistic healthcare approach, as described by Martha Rogers’ theory in 1970, and Myra Estrin, Levine, in 1973⁽⁵⁾. As nurses build their knowledge based on holistic principles, besides being the professionals who establish deeper bonds with the community, they have a fundamental role managing integrative practices. Therefore, these professionals’ role is related to transmitting the preventive and therapeutic possibilities, and the need for investments in specific professional qualification. Moreover, such therapies represent another possible area of practice for nurses, since COFEN’s Resolution 197, from 1997, states that Complementary Therapies are part of nurses’ activities, provided that the professional concluded some type of course in the area, at a recognized educational institution, and a minimum of 360 hours⁽⁶⁾.

Complementary Therapies comprehend Aromatherapy, a practice that uses volatile concentrates, known as essential oils. Such organic compounds originated from plants are formed by high complexity chemical molecules, which present several chemical functions, such as alcohols, aldehydes, esters, phenols, and hydrocarbonates, with a prevalence of one or two of them, thus characterizing the aroma. They are extracted from aromatic plants through distillation or by pressing parts of these plants, such as flowers, seeds, leaves, fruit, or roots, and diluted in varied concentrations, depending on the use intention⁽⁷⁾. These substances are employed in order to balance emotions, improve physical and mental well-being, and are applied differently in the organism, such as through inhalation, topical

use or intake. When inhaled, a minimal percentage of the essential oil (EO) activates the Olfactory System through the olfactory nerve and bulb, linked to the Central Nervous System, stimulating the Limbic System, responsible for controlling memory, emotion, sexuality, impulses, and instinctive reactions. The remaining inhaled amount goes through the respiratory system and reaches the blood stream. When the molecules stimulation occurs via skin, the essential oil is absorbed, and transported through the blood stream to the body organs and tissues. Finally, when they are taken in, the essential oil molecules are absorbed by the intestines and transported through several body tissues⁽⁸⁾.

Because nurses deal directly with the different physical and emotional states presented by the community members, Aromatherapy can represent a new tool to such professional, helping improve their clients’ physical or emotional unbalance, such as dealing with anxious individuals.

Anxiety is an emotional state that comprehends both psychological and physiological components, which comprise the different human experiences, and are responsible for stimulating performance. It becomes pathological when is disproportional to the triggering situation, or when it is directed to no specific object. The anxiety term is comprised by feelings of fear, insecurity, apprehension, or alterations of the awake and alert states⁽⁹⁾.

When assessing each individual’s self-esteem degree, it is essential to use reliable instruments. Authors⁽¹⁰⁾ have used a scale called State-Trait Anxiety Inventory (STAI), already validated in Brazil, and based on self-assessment statements, to measure individuals’ anxiety levels. Based on such scale, the objectives of the present study aimed to be reached by using Aromatherapy as a transformation instrument.

In order to develop the research, first year students of the Nursing College Graduation Course were chosen, considering that high levels of anxiety might affect learning and performance⁽¹¹⁾. Such students are in an unknown situation, which involves starting University and actually discovering the profession they have chosen. This new scenario students are presented with might cause insecurity, fear, and anxiety. Therefore, when put together, such factors might trigger an anxious state among students, making them an important element for the present study.

Therefore, the present research objectives were to verify how the Lavender and Geranium essential oils alter perception of the stress and anxiety states, and to compare the Lavender and Geranium effectiveness with regard to such perception.

METHODS

The present is an experimental study, with a

quantitative approach, performed with first year students of the Nursing College Graduation Course, Universidade de São Paulo. The research project was analysed and approved by the Research Ethics Committee of the same institution (Process n° 836/2009). All first year students were invited to participate, since they met the following inclusion criteria: a) being over 18 years old; b) accepting to participate in the research, and signing the Informed Consent Term; c) answering the STAI – trait and state; d) using the gel with the essential oil for the period and frequency suggested by the study. One of the exclusion criteria was not attending classes at the Graduation course for over a month. All individuals interested were informed about the minimum but immediate risk of participating in case they were allergic to the Lavender and Geranium aromas, or to the carboxyvinyl polymer and propylene glycol (PPG) compounds, since they could present hypersensitivity. If any complications occurred during the research, the University School Hospital would be available, considering that the students, as part of the University community, can be assisted in this healthcare institution through SUS (Brazilian Health System).

Students who accepted participating, after informed about the research method, also signed the Informed Consent Term, and were randomly chosen to integrate one of three groups: individuals using gel – a polymer-based gel – with Geranium essential oil (GRI), individuals using gel with Lavender essential oil (GRII), and a control group – which used gel associated to Rose essence (GRIII). None of the participants were informed about which oil or essence they were using.

After randomization, each participant answered to a State-Trait Anxiety Inventory (STAI)⁽¹⁰⁾. This scale is comprised of two distinctive self-assessment sub-scales: the trait-STAI, which is able to assess relatively stable individual differences regarding anxiety tendencies, that is, the way each person reacts to situations considered threatening; and the state-STAI, which refers to a transitory emotional state, or an organism condition influenced by a feeling of stress and apprehension. Therefore, such scores might vary depending on the meaning individuals attribute to certain threatening situations. Both subscales are comprised of 20 statements, whose answers intensity ranges from 1 to 4, and sum total classifies individuals according to the anxiety score: low (20-34 points), moderate (35-49), high (50-64), and very high (65-80 points), concerning both the trait and state scales.

Each participant received two flasks with aromatic gel, the first one when responding to the initial trait-state STAI, and the second, 30 days after they had started using the gel. Each flask contained 20g of polymer-based gel, enriched with 0.5% essential oil, or Rose essence, according to the group the participant was part of. Students were

instructed to apply and massage the gel in the wrists area, breastbone, periumbilical region, and foot soles, with soft and circular movements, three times a day: when waking up, at midday, and before going to bed, for 60 consecutive days, until its complete permeation. The STAI⁽¹⁰⁾ was applied again after a month of gel use and after 60 days. For ethical reasons, after the study was completed, control group members were offered the possibility to use the gels with essential oils (either Lavender or Geranium) of their preference for 2 months, after the collection period.

The essential oils choice was based on the Aromatherapy literature, which says both the Lavender EO (*Lavandula officinalis*) and the Geranium EO (*Pelargonium graveolens*) have a high amount of substances, that are chemically part of the Ester functional group (Lavender – Linalyl acetate, and Geranium – Geranyl acetate), having a tranquilizing, calming and balancing effect⁽¹²⁾. The literature also mentions that the Lavender EO is indicated to treat stress, melancholy, depression, debility, anger, fear, jealousy, guilt, apathy, mood changes, confusion, shyness, and divagation. The Geranium EO is indicated to treat anxiety, agitation, debility, nervous and mental exhaustion, anger, fear, nervous unbalance, and mood changes caused by hormonal alterations⁽¹³⁾.

Aromatherapy, just as Homeopathy, allows the chosen active substance to be used in a range of different concentrations. In Aromatherapy, the essential oils function according to the concentration chosen for the physical, mental and emotional aspects, from a higher to a lower concentration, respectively⁽¹⁴⁾. Therefore, the dose chosen was defined according to the present research focus, which is relieving anxiety – an emotional state of alertness – for which a low concentration of the active principles found in the essential oils would be enough to stimulate the olfactory sensors and access emotional memories in the Limbic System. A safe dose was chosen to prevent allergic reactions for topical use⁽¹⁵⁾.

The gel base proposed for the essential oil application (20g of gel + 0.5% of EO or essence) was chosen due to its chemical neutrality, for presenting pleasant sensorial aspects, and for being easy to transport and apply. The indicated application, topical use with a soft massage, reinforces the importance of the touch when taking care of one's self. The frequency of use was inspired by the Flower Therapy, which recommends its essences are used several times a day. The constant contact with the therapeutic elements favours the user's retreat from modern life undesired rhythm, since it requires attention and going back to a healthy daily rhythm.

RESULTS

Aiming to guarantee the reliability of the data

obtained, the result analysis was performed based on the assessment of the instrument itself during the first part of data collection, that is, during the trait-STAI and state-STAI application – both applied immediately before the aromatic gels started being used. In order to do so, the statistical indicator “Cronbach’s Alpha (α)” was utilized, and the value 0.883 was found for the initial trait-STAI, and 0.904, for the initial state-STAI. Moreover, both STAI data were intercepted in order to verify the possible correlation between the instruments, which was positive, with a 0.768 significance.

Among the 39 participating students in the beginning of the research, 14 effectively concluded it. With regard to the abandonments, 20 occurred before the first month ended, and only five occurred after the first 30 days of using the gel associated with aromas. Participants were distributed among the groups in the following fashion: the group using gel + Geranium EO, called GRI, had 14 participants, 4 of which concluded the research; GRII, which used the gel + Lavender EO, had 13 participants, 5 of which concluded the research; and GRIII, the control group, used gel + Rose essence, and initially had 12 participants, 5 of which stayed until the end of the study. Image 1 shows the subject flowchart along the trial.

In order to characterize factors related to the subjects, the quantitative variables were statistically analysed and no significant difference was found among the groups with regard to age average (GRI = 21.00, GRII = 20.07 e GRIII = 21.08 years old, with a general average of 20.72, and a standard deviation of 3.154). With regard to gender, three people were male – representing 7.7%. Only two participants were working during the study period, approximately 12 hours a week; one was part of GRI, and another, of GRII. None of the students

were taking anxiolytics of any type during the research.

In order to verify the groups’ anxiety state equality, the Analysis of Variance (ANOVA) was applied to the initial trait and state STAI, and to the participants’ age. No significant differences were found, with p values of 0.662 and 0.322 for both STAI, respectively. It was possible to observe that the anxiety level determined by the initial state-STAI, for the subjects who concluded the study, was comprised of: 28.57% of the sample presented low anxiety, 50.00% presented moderate anxiety, 21.43% high anxiety. No participants presented the ‘very high’ level of anxiety.

The Kolmogorov-Smirnov test was performed in order to verify the normality of the STAI scoring data, and it was possible to verify that the trait and initial state STAI, the STAI after 30 days, and the final state had a normal distribution, with p values of 0.665, 0.986, 0.927 and 0.935, respectively. Further on, the Kolmogorov-Smirnov test was applied again in order to verify the normality among the instrument application time interval, called D_1_2, where $D_{1_2} = D1 - D2$, where $D1 = T2 - T1$; and $D2 = T3 - T1$, with: $T1 = 30$ day interval when the aromatic gels were used; $T2 = 60$ day interval when the gels + aroma were used; and $T3 = 60$ day interval when the gel + EO and essence was used. The test determined that the difference among the intervals presented a normal distribution.

The results described below were obtained as of the state-STAI score average differences, according to the time period when the instrument was applied.

After 30 days using gels associated with EOs or Rose Essence, based on the state STAI score average after 30 days and in the beginning of the research, there was a score reduction for the three groups, with GRIII (which used Rose Essence) presenting the highest score reduction

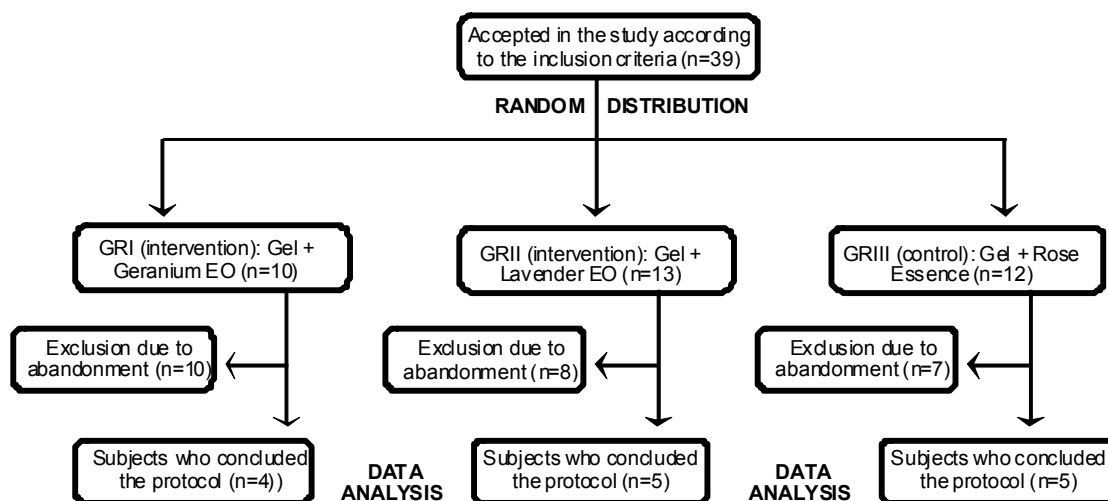


Image 1 – Subjects’ flowchart along the study .

(an average reduction of -8.00), followed by GRII – which used Lavender (with an average reduction of -5.62), and finally GRI – which used Geranium – with a reduction of -1.20.

Results will be demonstrated through Table 1 data.

Table 1 – Description of the differences between the state-STAI – after 30 days, and the initial state-STAI – São Paulo, 2010.

Group	State-STAI- after 30 days – STAI-initial State			
	Average	Minimum	Maximum	Standard deviation
I	-1.20	-6.00	3.00	3.70
II	-5.62	-19.00	3.00	7.29
III	-8.00	-16.00	3.00	7.66

Table 2 – Description of the differences between the STAI after 60 days, and the initial state STAI– São Paulo, 2010.

Group	State-STAI- after 60 days STAI-Initial State			
	Average	Minimum	Maximum	Standard deviation
I	.75	-7.00	8.00	6.60
II	-11.80	-19.00	-4.00	5.36
III	-1.80	-19.00	19.00	13.99

After 60 days of using the gels associated to aromas, it was possible to verify that the group with the highest score reduction was GRII, using Lavender, with a reduction of -11.80, followed by GRIII – which used Rose Essence – with a reduction of -1,80. The group using Geranium (GRI) had a score average increase of 0.75.

The data above described can be visualized through Table 2.

Table 3 – Description of the differences between the STAI after 60 days, and the STAI after 30 days – São Paulo, 2010.

Group	State-STAI- after 60 days STAI-State after 30 days			
	Average	Minimum	Maximum	Standard deviation
I	3.00	-4.00	6.00	4.76
II	-3.20	-10.00	1.00	4.44
III	9.40	-4.00	35.00	15.22

When comparing the differences between the STAI-state after 60 days, and the STAI- state after 30 days using the aroma, the group presenting a reduction was the Lavender group (GRII), with -3,20. According to data displayed on Table 3, groups I and III presented a

score average increase: 3.00 and 9.40, respectively.

Table 4 – ANOVA comparing the score averages in the time intervals D1, D2 e D_1_2 – São Paulo, 2010.

	Sum of Squares	df	Mean Square	F	Sig.
D1					
Between Groups	135.875	2	67.938	.483	.255
Within Groups	778.675	17	45.804		
Total	914.550	19			
D2					
Between Groups	412.864	2	206.432	2.208	.156
Within Groups	1028.350	11	93.486		
Total	1441.214	13			
D_1_2					
Between Groups	396.929	2	198.464	2.033	.177
Within Groups	1074.000	11	97.636		
Total	1470.929	13			

The ANOVA was applied in order to compare the score averages, according to the time intervals already mentioned, and it was verified that there were no statistically significant differences (as described on Table 4), with p values of 0.255, 0.156, and 0.177 for D1, D2, and D_1_2, respectively.

DISCUSSION

The researchers considered important to begin data assessment by verifying whether the scale proposed by the study methodology (STAI) was able to appropriately measure the anxiety levels, as aimed by the study objectives. In order to do so, the statistical indicator “Cronbach’s Alpha (α)” was used. It assessed the internal consistency of the measurement instrument, that is, it verified the reliability of data from a psychometric-based scale – the STAI⁽¹⁰⁾. Statistic specialists, as a general rule, classify the value $\alpha \geq 0,700$ as desirable. The present study found values of 0.883 for the trait-STAI and 0.904 for the initial state-STAI, which means it is possible to state that the instrument used is valid and reliable to obtain the information required by the research.

With regard to the high abandonment rate, it is important to remind that the proposed intervention depended on the research subject him/herself in order to be consolidated, for the students were responsible for the aromatic gel application on the indicated areas, similarly to a prescribed treatment. Therefore, the non-adherence to the therapy was an existing possibility for the present research, considering that there was not a therapist available to perform the procedure. One of the study intentions was to eliminate the possibility of a therapeutic bond to influence the research results, since the EO active principles should be enough⁽⁷⁻⁸⁾. Authors⁽¹⁶⁾ estimate that only a third of patients present appropriate adherence to the treatment, therefore, if this fraction was

calculated on the initial number of participants, the result would be 13, which is close to the number of subjects who concluded the study (14 participants). It is relevant to highlight that treatment adherence is not only a difficulty faced by Health Complementary Practices, but also by allopathic treatments, mainly long-term treatments, such as the ones proposed to hypertensive, diabetic, and HIV/AIDS carrier patients.

The fact that GRIII, which used Rose Essence, presented a better performance at first – after 30 days using the aromatic gel (Table 1) – can be related to the placebo effect. Moreover, such situation could have been reinforced by the fact that the Rose essence, used only as an olfactory stimulus (perfume), without any therapeutic properties, is widely used in toiletry cosmetics, mainly in some popular bath soaps, and therefore, is recognized by a great number of people. This might justify the placebo action results reached by this group, since such olfactory memory can be associated to relaxing moments, such as a shower, for instance.

The worst performance, presented by the Geranium EO, might be related to the fact that its aroma is fairly intense and not always appreciated by people, mainly because the essential oil presents olfactory notes that are not part of the trivial olfactory repertory. The main therapeutic characteristic of this EO is regulating mood changes and bringing balance for mental confusion and stress situations, which are symptoms presented in high anxiety cases^(7-8,12-13), not the case of the present research participants.

The higher effectiveness presented by the Lavender EO in the end of the study might have been related to the sample profile, essentially comprised of students with moderate anxiety, which, according to the literature^(7-8,12-13), present emotions for which the Lavender EO is recommended. Because the sample was comprised of young first year graduation students, anxiety factors are stimulated, such as stress related to studying and discovering what their profession is actually about, including the first contact with patients, anger, fear, and jealousy, common in the experienced relationships; confusion; divagation and fear for being in a transition moment. Possibly because the Lavender EO reaches emotional nuances that are more related to such feeling, when data collection was concluded, this oil was able to better meet the proposed objectives.

Although there was a decrease in the state-STAI score presented by students using the Lavender EO after 60 days, which indicates improvements to the anxiety state, it was not statistically significant. It is important to highlight that the present research results might not have

yet reached significant relevance due to the small sample size, and because the study did not deal with highly anxious individuals, but with a moderately anxious sample, according to the initial state-STAI. Therefore, a possible suggestion would be to pre-select the subjects' scores so as to choose only highly anxious individuals.

The study results reinforced the literature about Aromatherapy, mainly with regard to the Lavender EO indications^(7-8,12-13). Although the literature about the subject is internationally recognized, books neither refer as to how they have got to the current indications, nor to researches performed in the field validating the information provided. Hence, further researches about the EO applications should be performed, especially regarding the application dose, via, and frequency. Some difficulties found by the present research were to define the EO dose, to choose the application via (inhalation, skin contact), and oil exposure frequency. Even among researches that describe the Lavender effect relieving anxiety among Nursing students⁽¹⁷⁾, there is not a clear description about the study method.

CONCLUSIONS

According to the first objective, it was possible to verify that the Lavender EO relieved the anxiety state after 60 days of use, however, not with statistical significance. Nevertheless, it is important to highlight that the study was developed with a moderately anxious sample. Based on the described results, it is possible to conclude that, regarding the second objective, the Lavender EO was found to be more effective, since the group using the Geranium EO concluded the study with a score average increase, even though it was not significant. However, it is not possible to affirm that the present results are definitive, since the average differences were not significantly expressive.

FINAL CONSIDERATIONS

Although there were non-significant improvements regarding the anxiety state and the use of Lavender EO, the results reinforce the Aromatherapy bibliographic references about the essential oil indications. New studies with a pre-selected highly anxious sample should be performed, along with researches that aim to better assess the Geranium EO effectiveness. Moreover, researches on variables such as application via, dose, and application frequency of the essential oils still have to be developed.

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