

# Aromatherapy on Psycho-Emotional Symptoms and Fatigue in Nursing Professionals in the COVID-19 Setting

---

**Beatriz Farias Alves Yamada**

<https://orcid.org/0000-0001-6673-6756>  
Instituto Beatriz Yamada, Brazil  
iby@institutobeatrizyamada.com.br

✉ **Paula Helena Caldas Seixas**

<https://orcid.org/0000-0001-7737-042X>  
Universidade de São Paulo, Brazil  
paulaa\_seixas@usp.br

**Isabelle Lourenço Fedel**

<https://orcid.org/0000-0002-0878-9793>  
Universidade de São Paulo, Brazil  
isafedel@usp.br

**Ruth Natalia Teresa Turrini**

<https://orcid.org/0000-0002-4910-7672>  
Universidade de São Paulo, Brazil  
rturrini@usp.br

**Juliana Rizzo Gnatta**

<https://orcid.org/0000-0001-8689-5762>  
Universidade de São Paulo, Brazil  
juliana.gnatta@usp.br

Received: 05/04/2022

Sent to peers: 14/07/2022

Approved by peers: 13/09/2022

Accepted: 13/09/2022

**DOI: 10.5294/aqui.2022.22.4.5**

**Para citar este artículo / To reference this article / Para citar este artigo**

Yamada BFA, Seixas PHC, Fedel IL, Turrini RNT, Gnatta JR. Aromatherapy on Psycho-Emotional Symptoms and Fatigue in Nursing Professionals in the COVID-19 Setting. *Aquichan*. 2022;22(4):e2245. DOI: <https://doi.org/10.5294/aqui.2022.22.4.5>

**Subject:** Health promotion and prevention

**Contribution to the subject:** This study contributes by increasing knowledge on aromatherapy and essential oils, especially their use among nurses who experience stress in times such as during the COVID-19 pandemic. In addition, it encourages the production of more studies on alternative therapies.

## Abstract

**Objective:** To compare the effectiveness of aromatherapy with lavender essential oil (EO) versus an EO synergy on psycho-emotional symptoms and fatigue of nursing professionals in the COVID-19 setting. **Materials and Methods:** This is a quasi-experimental pilot study conducted in 2020. The professionals were randomized in Group 1 – lavender, and in Group 2 – lavender and other EOs synergy. The instruments were validated in Brazil, namely the Self-Reporting Questionnaire (SRQ-20) and the Fatigue Pictogram, which were applied at three moments: before the intervention, after 21 days of intervention, and three weeks after the end of the intervention follow-up. The data were evaluated using Pearson's  $\chi^2$  test or Fisher's exact test (dichotomous variables) and Student's t-test or Mann-Whitney test (continuous variables). **Results:** A total of 18 professionals participated, and both groups presented improved SRQ-20 scores ( $p < 0.010$ ), which was maintained in the follow-up for Group 1 compared to the pre-intervention moment ( $p = 0.033$ ). There was a significant decrease in fatigue in professionals in both groups ( $p = 0.010$ ), but no difference was observed in the improvement of the impact of fatigue on daily life. **Conclusions:** There was a reduction in psycho-emotional symptoms and fatigue in nursing professionals who used aromatherapy during the COVID-19 pandemic in both groups.

### Keywords (Fonte: DeCS)

Aromatherapy; psychic symptoms; nursing staff; fatigue; disease prevention.

## 4 Aromaterapia en los síntomas psicoemocionales y fatiga en profesionales de enfermería en el marco de la COVID-19

---

### Resumen

**Objetivo:** comparar la efectividad de la aromaterapia con aceite esencial (AE) de lavanda versus una sinergia de AE en síntomas psicoemocionales y fatiga de profesionales de enfermería en el marco de la pandemia ocasionada por la covid-19. **Materiales y método:** estudio piloto casi-experimental realizado en 2020. Se hizo randomización de los profesionales en Grupo 1 – lavanda y Grupo 2 – sinergia lavanda y otros AE. Instrumentos validados en Brasil, Self-Reporting Questionnaire (SRQ-20) y Pictograma de Fatiga, se aplicaron en tres momentos: antes de la intervención, luego de 21 días de intervención y tres semanas tras el término de la intervención *follow-up*. Se evaluaron los datos por la prueba  $\chi^2$  de Pearson o prueba exacta de Fisher (variables dicotómicas) y por la prueba t de Student o Mann-Whitney (variables continuas). **Resultados:** participaron 18 profesionales y ambos grupos mostraron mejores puntuaciones del SRQ-20 ( $p < 0,010$ ), que se mantuvo en el *follow-up* para el Grupo 1, comparado al momento preintervención ( $p = 0,033$ ). Hubo disminución significativa de la fatiga de los profesionales en los dos grupos ( $p = 0,010$ ), pero no se observó diferencia en la mejoría del impacto de la fatiga en la vida diaria. **Conclusiones:** hubo reducción en los síntomas psicoemocionales y la fatiga de profesionales de enfermería que emplearon aromaterapia durante la pandemia de la covid-19 en ambos grupos.

#### Palabras clave (Fuente: DeCS)

Aromaterapia; síntomas psíquicos; equipo de enfermería; fatiga; prevención de enfermedades.

# Aromaterapia nos sintomas psicoemocionais e fadiga em profissionais de enfermagem no contexto da COVID-19

---

## Resumo

**Objetivo:** comparar a efetividade da aromaterapia com óleo essencial (OE) de lavanda versus uma sinergia de OE em sintomas psicoemocionais e fadiga de profissionais de enfermagem no contexto da covid-19. **Materiais e método:** estudo-piloto quase-experimental realizado em 2020. Os profissionais foram randomizados em Grupo 1 — lavanda e Grupo 2 — sinergia lavanda e outros OE. Instrumentos validados no Brasil, Self-Reporting Questionnaire (SRQ-20) e Pictograma de Fadiga, foram aplicados em três momentos: antes da intervenção, após 21 dias de intervenção e três semanas após o fim da intervenção *follow-up*. Os dados foram avaliados pelo teste  $\chi^2$  de Pearson ou teste exato de Fisher (variáveis dicotômicas) e pelo teste t de Student ou Mann-Whitney (variáveis contínuas). **Resultados:** participaram 18 profissionais e ambos os grupos mostraram melhora nos escores do SRQ-20 ( $p < 0,010$ ), que se manteve no *follow-up* para o Grupo 1, comparado ao momento pré-intervenção ( $p = 0,033$ ). Houve diminuição significativa da fadiga dos profissionais nos dois grupos ( $p = 0,010$ ), porém não se observou diferença na melhora do impacto da fadiga na vida diária. **Conclusões:** houve redução nos sintomas psicoemocionais e na fadiga de profissionais de enfermagem que utilizaram aromaterapia durante a pandemia da covid-19 em ambos os grupos.

### Palavras-chave (Fonte: DeCS)

Aromaterapia; sintomas psíquicos; equipe de enfermagem; fadiga; prevenção de doenças.

## Introduction

Mass tragedies, such as those involving infectious diseases, can trigger psycho-emotional states such as depression, anxiety, and fear, influencing behavior and psychological well-being (1), as observed during the pandemic caused by the Coronavirus disease (COVID-19). As a result, frontline healthcare professionals have presented symptoms of depression, anxiety, anguish, and insomnia due to fear and concern over their own health and that of their colleagues and family members (2). An Ethiopian study (3) found a 21.5% prevalence of depression in healthcare professionals, and a Chinese study (4) with medical and nursing participants in Wuhan, China, who worked during the COVID-19 epidemic, found a higher risk of mental health impairment in women, nurses, and frontline personnel.

The work of nursing professionals in pandemic contexts, in addition to contributing to the onset of psycho-emotional symptoms and mental disorders, is marked by fatigue—which triggers a state of tiredness that is not relieved by usual strategies for restoring energy (5)—and can lead to exhaustion. Professionals exposed to work during the COVID-19 pandemic experience symptoms of stress, anxiety, fear, insomnia, anger, and denial, in addition to perceived well-being distress (6).

Among the approaches used to address wellness promotion and disease prevention, there is a growing interest in integrative and complementary health practices (ICPs), such as aromatherapy. Aromatherapy consists of using essential oils (EO), which are volatile concentrates extracted from plants, to promote well-being in a physical, mental, and emotional approach (7); they are natural remedies with great potential for adjusting health conditions, including emotional ones.

A clinical trial that evaluated the effects of inhaling an EO synergy composed of lemon, eucalyptus, tea tree, and *Mentha piperita* on stress, sleep quality, and immunity found that there was a reduction in perceived stress, depression, and improved sleep quality (8). Another study noted that an EO synergy composed of true lavender, sweet orange, and bergamot improves symptoms of depression (9). Analysis of the effect of inhaling lavender EO on preoperative anxiety identified a decrease in mean anxiety scores in female patients prior to undergoing surgery (10).

An integrative review of the therapeutic uses of *Lavandula angustifolia* concluded it provides benefits, such as reducing blood pressure and heart and respiratory rates, in addition to reducing stress, fatigue, anxiety, pain, and insomnia (11). In this sense, aromatherapy may represent a simple self-care practice to manage psycho-emotional symptoms and fatigue in nursing professionals who experienced the pandemic in their care practices; it is easy to use in the professionals' daily routine and of great value to reduce or avoid the need to use controlled medications.

When considering the nursing professionals' work environment during the pandemic, can aromatherapy be beneficial to alleviate this physical and psycho-emotional state? In this sense, this study aimed to compare the effectiveness of aromatherapy with lavender EO (*Lavandula augustifolia*) versus a synergy with lavender oil associated with other EOs on psycho-emotional and fatigue symptoms of nursing professionals in the COVID-19 setting. In the hypothesis of nullity, both formulas have equivalent effects. In the alternative hypothesis, the aromatic synergy was considered to be more effective in relieving physical and emotional symptoms than aromatherapy performed with the lavender EO alone.

## Materials and Methods

### Type of Study

This is a quasi-experimental pilot study of the before-and-after type, conducted between September and December 2020.

### Population and Study Site

The non-probability, convenience sample consisted of nursing professionals from a public teaching hospital of secondary healthcare who met the following inclusion criteria: being part of the nursing team; obtaining a score > 8 in the Self-Reporting Questionnaire instrument (SRQ-20 [12]), and a moderate to severe score in the Fatigue Pictogram (13). The exclusion criteria were being on vacation during the study period, being pregnant, or rejecting the EO aromas used in the study.

### Intervention

The two interventions described below were applied.

- **Group 1 (LAV):** Aromatherapy with lavender oil (*Lavandula augustifolia*) with 2.5%. This formula was prepared with 15 drops of lavender EO and fractionated coconut oil until it completed 30 mL.
- **Group 2 (EOSIN):** Aromatherapy with a synergy composed of lavender (*Lavandula augustifolia*) associated with sweet orange (*Citrus aurantium dulcis*), Sicilian lemon (*Citrus limonum*), bergamot (*Citrus aurantium bergamia*), eucalyptus globulus (*Eucalyptus globulus*), basil (*Ocimum basilicum*), peppermint (*Mentha piperita*), and geranium (*Perlagonium graveolens*) EOs. The concentration of each oil was 2.5%. The EOs synergy was formulated as follows: 15 drops of the EOs (7 of lavender, 2 of basil, and 1 drop each of the other EOs) fractionated with coconut oil to complete 30 mL. The EO formulas were offered in an amber glass bottle with a roll-on valve with a 10

mL capacity of these solutions, according to the study group, for personal and individual use. The participants were instructed to apply them to their skin four times a day for 21 days. The preparation of the EOs and the intervention were carried out by two nurses trained in aromatherapy.

The participants were instructed to perform a five-step EO application technique: I. Sanitize their hands with soap and running water or a liquid alcohol product; II. Clean the left and right retroauricular region with a gauze moistened with a small dab of soap and water or cleaning with liquid alcohol; III. Dry the right and left retroauricular region; IV. Rub the EO roll onto one of their fingers until moist, and V. Apply it in the left and right retroauricular region, massaging it gently, and then transfer the residual oil to the palm of one of the hands, rub the palms, and bring them close to the nose without touching it, forming a shell in order to inhale the aroma five times.

## Outcome

The reduction of psycho-emotional signs was measured by the SRQ-20 (12) and the fatigue ones by the Fatigue Pictogram (13).

## Collection instruments

The SRQ-20 instrument (12), validated in Brazil (13), was used as a predictor of psycho-emotional symptoms. The SRQ is a dichotomous questionnaire, composed of 24 items, of which 20 are non-psychotic states and four are psychotic states, developed to identify mental disorders in primary healthcare services, with a sensitivity ranging from 73% to 83% and a specificity ranging from 72% to 85%, depending on the field of study (12). The SRQ with the 20 non-psychotic states items was translated and validated into Portuguese using the standard psychiatric interview and obtained a sensitivity of 83% and a specificity of 80% (10%) (13). The SRQ-20 score ranges from 0 to 20, and the higher the score, the higher the level of emotional stress. Scores > 8 indicate the presence of emotional symptoms, and scores < 7 indicate their absence (12).

Fatigue was evaluated by the Fatigue Pictogram (14), with its psychometric properties validated in the Brazilian Portuguese version (5). This instrument is composed of two items, one for the impact and the other for the intensity of fatigue, with an illustrative Likert scale for five response options. The higher the score, the greater the intensity or impact of fatigue (5).

A questionnaire was applied for the sociodemographic profile (age, sex, underlying diseases, use of continuous medications, allergies, use of any integrative/complementary practice, number of people living in the same household), and occupational profile (specialty, level of education, time working in the unit and in the hospital). Due to the COVID-19 setting, it was verified if a participant, family member or close person became ill and required hospitalization for this illness.



## Randomization

The eligible participants were randomized by simple randomization into two groups, LAV and EOSIN, by the Research Randomizer Quick Tutorial program. The randomization was performed by a person outside the study, and two lists were generated, with one for each study group.

## Recruitment

The research was disseminated through the institution's electronic communication system (intranet) and by sending e-mails to the nursing professionals, through posters placed in the elevators, and through a television monitor installed near the hospital's cafeteria.

## Collection procedure

The SRQ-20, the Fatigue Pictogram, the biosociodemographic, and the occupational questionnaire instruments, in addition to the informed consent form, were sent via e-mail with a fixed deadline for return. Based on the information received, the participants were evaluated according to the eligibility criteria. Those eligible were assigned to the LAV or EOSIN groups with the use of a randomization website. At the first meeting, which was held in a private room at the study hospital, an olfactory acceptance test was performed: the participant received a cotton swab soaked with one drop of oil from the LAV or EOSIN formula, according to their study group, and performed three slow, consecutive inhalations. If the participant manifested olfactory acceptance, they would proceed in the study and receive guidelines on the application technique of the intervention, which were also sent electronically to each participant through a demonstration video.

The bottles containing the EOs were hand-delivered to the participants by the researchers at the work unit. The instruments were applied before the beginning of the intervention (pre-intervention), after 21 days of use (post-intervention), and three weeks after the end of the intervention (follow-up).

## Data analysis

The data collected through an electronic form were transferred to Microsoft Excel® spreadsheets and analyzed in the R 4.1.1. software by a statistical professional. The variables were described by using frequencies (gender, professional sector, age group, and Fatigue Pictogram), measures of central tendency, and variability (age, frequency of EOs application, and SRQ-20). To compare group attributes, Fisher's exact test was used for age group and professional sector, and Mann Whitney's was used for age and

frequency of EOs application. The evaluation of the intra-group comparison of each time point was done using Wilcoxon's paired test. Group comparison over time was evaluated using the ANOVA mixed effects model for the SRQ-20 and the cumulative binomial family mixed effects model for the Fatigue Pictogram. The effect size was calculated using Cohen's *d*. The significance level adopted was 5%.

## Ethical aspects

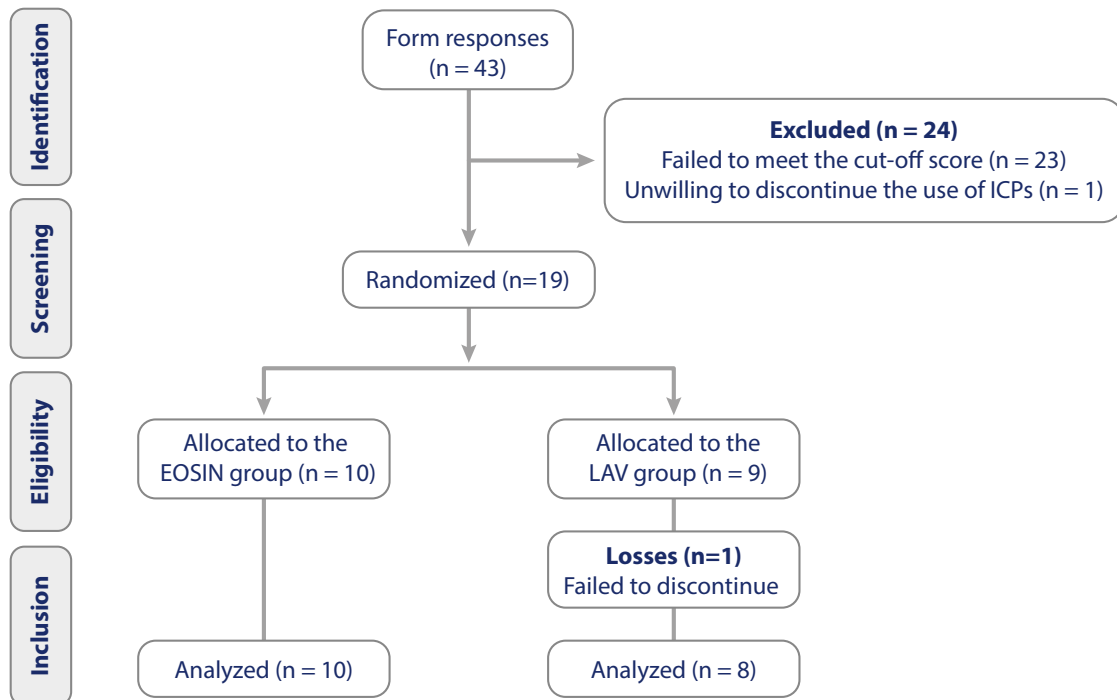
This study was approved by the Research Ethics Committee of the University Hospital of the University of São Paulo under Legal Opinion 4.226.060. The participants who agreed to participate in the study filled out the informed consent form. Despite prior testing for topical sensitivity to EOs, the participants could present a delayed reaction or olfactory discomfort from daily use of the EO.

The participants who maintained high SRQ-20 scores at the end of the intervention were referred to psychologists or psychiatrists for care by the Welcoming Professionals Program, provided by the institution.

## Results

After the study was announced, 43 professionals expressed interest in participating in the research, and only 19 met the eligibility criteria. Of those 19, only one was excluded from the analysis for not discontinuing the use of the EO at the end of the 21-day intervention (Figure 1).

**Figure 1.** Participant Recruitment and Allocation Flowchart. São Paulo, Brazil, 2022



Source: Own preparation with research data.

Both groups consisted of women; as a whole, there was greater participation of professionals from critical care units, characterized by emergency units, operating rooms, emergency rooms, intensive care units, and materials and sterilization centers (n = 11; 73%). Furthermore, the groups were homogeneous in relation to these variables. The profile of the study population is described in Table 1.

**Table 1.** Distribution of Participants according to Sex, Age Group, and Professional Sector, according to the Study Group and p-value (Fisher's exact test). São Paulo, Brazil, 2022

Variable	Group 1 – LAV		Group 2 – EOSIN		Total		p-value
	n	%	n	%	n	%	
<b>Sex</b>	8	44	10	66	18	100	
<b>Age group</b>							
28-45	3	43	4	57	7	100	1.000
45-58	5	46	6	54	11	100	
<b>Work unit</b>							
Critical*	3	27	8	73	11	100	0.241
Semi-critical**	4	67	2	33	6	100	
Non-critical***	1	100	-		1	100	
<b>Total</b>	8	44	10	66	18	100	

\* Operating room, obstetric center, child or adult intensive care unit, emergency room, or materials and sterilization center.

\*\* Medical clinic, surgical clinic, pediatric clinic, shared living quarters, or primary healthcare unit.

\*\*\* Nursing coordination, administrative area.

Source: Own preparation with research data.

However, when comparing groups, EOSIN presented a higher number of professionals from critical units (n = 8; 73%) and LAV from inpatient units (n = 4; 67%). Regarding age, both groups presented a mean of 47.5 ( $\pm$  10.2) years, but different medians, namely 50.5 and 45.5 years, in the LAV and EOSIN groups, respectively (p = 0.829).

The mean SRQ-20 score was similar between groups (p = 0.893), with different variances according to Levene's test (p = 0.041). There was a reduction in SRQ-20 scores from the pre- to post-intervention stages in both groups, with a non-significant residual effect from post-intervention to follow-up, but with the maintenance of the effect reached within this period. When comparing the pre-intervention stage with the follow-up, a significant reduction was observed in the LAV group (p = 0.033) but not in the EOSIN group (p = 0.082).

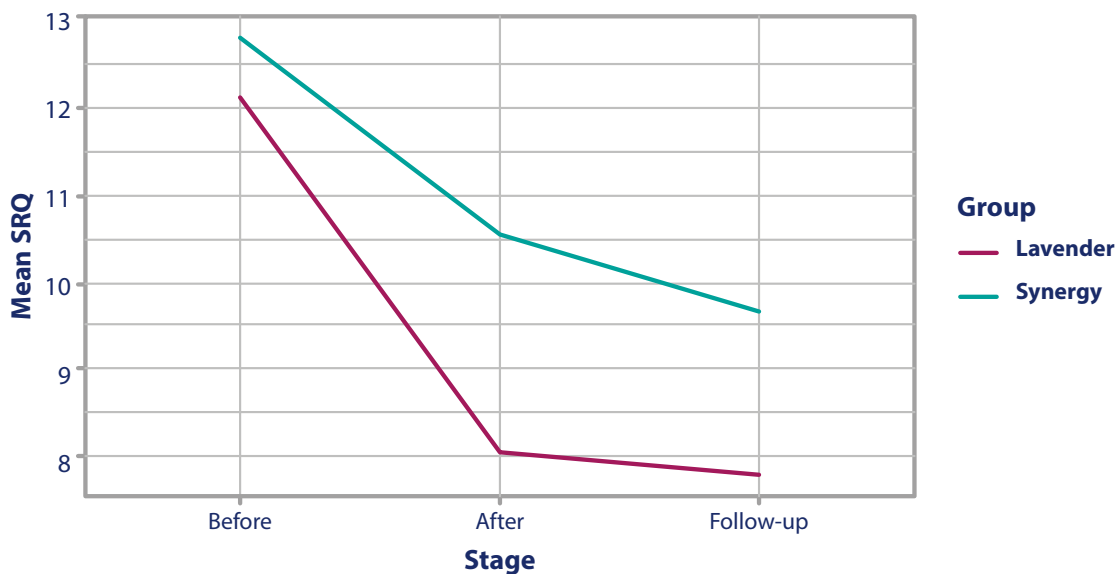
**Table 2.** Measures of Central Tendency and Variability of SRQ-20 Scores according to Stage and Study Group and Intragroup p-values (paired Wilcoxon's test). São Paulo, Brazil, 2022

Groups/Stage	Mean	SD±	CI 95%	Median	Variation	p (t <sub>0</sub> -t <sub>1</sub> )	p (t <sub>1</sub> -t <sub>2</sub> )
<b>LAV</b>							
Before (t <sub>0</sub> )	12.1	1.96	[10.5; 13.8]	12	9-15		
After (t <sub>1</sub> )	8.1	3.3	[5.4; 10.9]	8	4-13	p = 0.021	
Follow-up (t <sub>2</sub> )	7.9	4.7	[4.0; 9.5]	9.5	0-13		p = 0.931
<b>EOSIN</b>							
Before (t <sub>0</sub> )	12.8	3.9	[10.0; 15.0]	12	8-20		
After (t <sub>1</sub> )	10.6	4.3	[7.5; 13.7]	11	5-19	p = 0.037	
Follow-up (t <sub>2</sub> )	9.7	4.9	[6.2; 13.2]	11	2-16		p = 0.590

Source: Own preparation with research data.

In the comparative analysis between the groups via the mixed effects model, it was found that both presented a reduction in SRQ-20 scores after three weeks of intervention ( $p < 0.010$ ), although with no statistical difference between the groups ( $p = 0.285$ ), which demonstrates similar effectiveness of the therapies (Figure 2). The analysis of the interaction between the moment of evaluation and the group showed no statistical difference ( $p = 0.641$ ). In both groups, a residual effect was noted in the follow-up evaluation.

**Figure 2.** Mean SRQ-20 values according to group and time of evaluation. São Paulo, Brazil, 2022



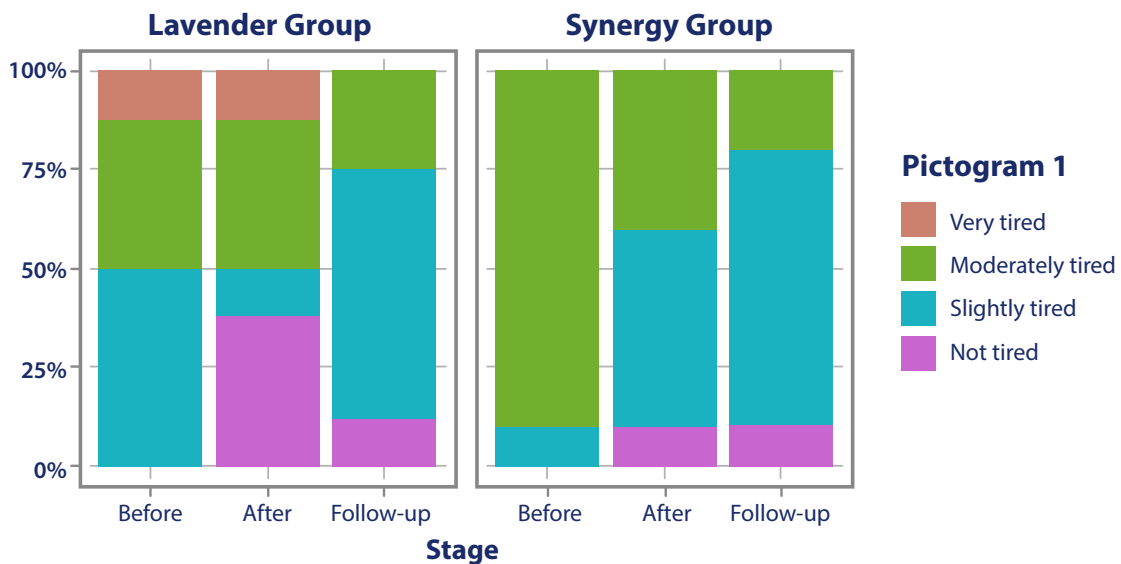
Source: Own preparation with research data.

The effect size between pre- and post-intervention was larger in the LAV group with a huge effect size of 1.56 and a relative reduction of 33%, while, in the EOSIN group, a medium effect size of 0.56 and a relative reduction of 17% were observed.

In the analysis of the question regarding *fatigue intensity* in daily life from the Fatigue Pictogram (Figure 3), it was found that, after the intervention, there was a reduction in fatigue intensity in both groups ( $p = 0.010$ ), with a residual effect. However, there was no difference between the groups ( $p = 0.559$ ) or the interaction between the groups and the time of evaluation ( $p = 0.641$ ).

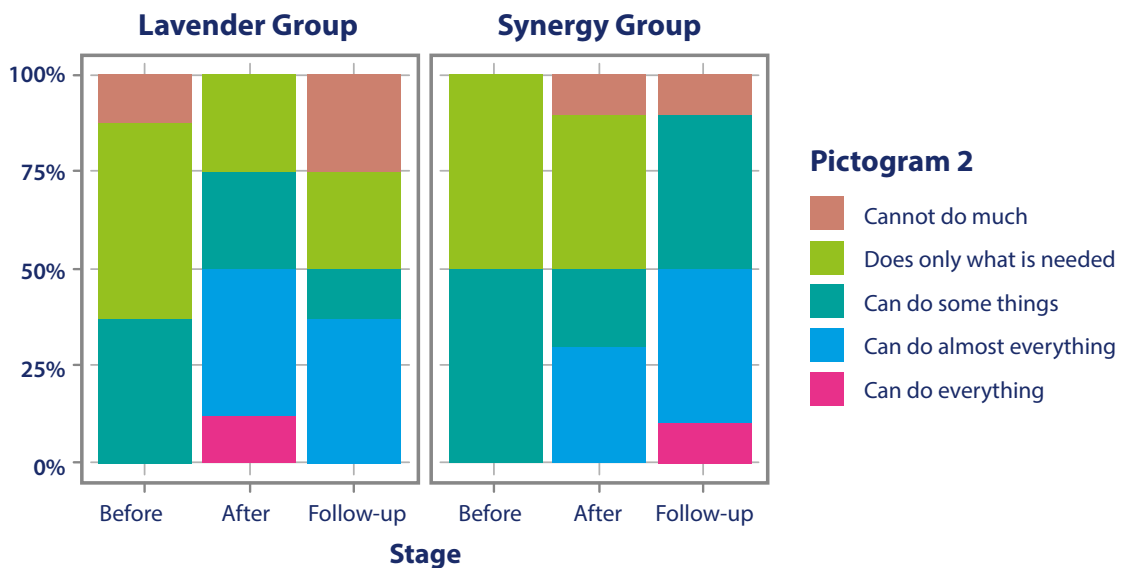
For the question on the *impact of fatigue* (Figure 4), there was no longitudinal difference between stages ( $p = 0.077$ ), between groups ( $p = 0.666$ ), or interaction between evaluation times and groups ( $p = 0.090$ ).

**Figure 3.** Fatigue Pictogram Response Rate – Intensity according to Group and Time of Evaluation. São Paulo, Brazil, 2022



Source: Own preparation with research data.

**Figure 4.** Fatigue Pictogram Response Rate – Impact according to the Group and the Time of Evaluation. São Paulo, Brazil, 2022



Source: Own preparation with research data.

When evaluating the interaction between fatigue and the SRQ-20, it was found that the higher the state of fatigue, the higher the SRQ-20 score ( $p < 0.001$ ), and the higher the impact of fatigue, the higher the SRQ-20 score ( $p < 0.001$ ).

## Discussion

With the COVID-19 pandemic, nursing professionals are experiencing a situation of uncertainty and fear, which impacts their quality of life and stress levels, leading to signs and symptoms such as depression, insomnia, anxiety, and suffering, which are more intense in women, nursing professionals, and those who work directly in COVID-19 patient care (2, 15), which is precisely the population of the present study.

Through this study, it was found that nursing professionals from both intervention groups (LAV and EOSIN) achieved significant improvement in the state of psycho-emotional symptoms measured by the SRQ-20, although the mean scores in all three times of evaluation had results close to 8 or higher, which is the cut-off value for the suspicion of non-psychotic mental disorders. No significant difference was observed in the reduction of emotional stress when comparing the two interventions, accepting the null hypothesis of the study. It is also noteworthy that the effect of the intervention in Group 1 – LAV was sustained during the follow-up period.

The choice of EOs was based on the premise of providing emotional support to these professionals. Lavender EO (*Lavandula augustifolia*) presents anxiolytic (16), antidepressant (9), and analgesic properties with indications for stress, anxiety, anguish, emotivity, insomnia, pain, and inflammation, among other properties. It is considered a harmonizing oil that is ready to provide relief from any aggression that destabilizes the individual (7, 10).

For the formula with aromatic synergy, EOs with information about their effects on psycho-emotional symptoms were used. The sweet orange EO (*Citrus aurantium dulcis*) is known for its calming and balancing properties, indicated for stress, anxiety, nervousness, and depression (7, 9, 17). The Sicilian lemon EO (*Citrus limonum*) is a natural calming agent (18); its inhalation produces anti-stress, antidepressant, and anxiolytic effects (19). The basil EO (*Ocimum basilicum*) helps reduce anxiety and feelings of restlessness and promotes a sense of focus and relief from stress and fatigue, in addition to its immunostimulatory, analgesic, and anti-inflammatory properties (20). The bergamot EO (*Citrus aurantium bergamia*) is calming, relaxing, and soothing; it helps to build focus and concentration (9), it is beneficial in cases of distress, and it is also immunostimulating and mentally stimulating (18). Its inhalation stimulates positive feelings and reduces depressive symptoms (10, 21). The geranium EO (*Perlagonium graveolens*) has calming properties (20), relieves

depression, and elevates the mind, as it is a nerve tonic (22). The eucalyptus EO (*Eucalyptus globulus*) provides relaxation (9), and the peppermint EO (*Mentha piperita*) improves vigor and pro-activity, is relaxing (9), mentally stimulating, a nerve tonic, and improves apathy and palpitations.

Since aromatherapy presents several variables not yet agreed upon in scientific literature concerning the application route, frequency, and duration of the treatment (23), an application technique was standardized that allowed for the administration of EOs through the cutaneous and olfactory routes, potentiating their entrance into the body.

A systematic review on the use of aromatherapy to improve work-related aspects, such as the burnout syndrome, found that 71.4% of the studies analyzed were conducted with healthcare professionals and the use of lavender EO, with the improvement of burnout symptoms and increased job satisfaction (24). A double-blind, randomized clinical trial conducted with 120 nurses working in a hospital analyzed the effect of music therapy and aromatherapy using lavender and chamomile EOs, which found that both ICPS used separately or in combination reduced anxiety in nurses ( $p < 0.0001$ ) when compared to the control group (25). Such studies, as well as the present one, highlight the potential of aromatherapy as a possible, easily applicable, and non-invasive strategy to help improve the emotional symptoms of nursing professionals.

A pilot study randomized with two arms, control and intervention, in nursing professionals working in a surgical center to evaluate the effect of massages with a lavender 1% (*Lavandula angustifolia*) and geranium 2% (*Perlargonium graveolens*) EO-based cream did not present significant effects according to the List of Stress Symptoms and Work Stress Scale, but significant differences in the evaluation of physiological parameters were found, namely: heart rate, diastolic and systolic blood pressure (26). A review study on the effects of *Lavandula angustifolia* EO showed it improves people's physical and emotional states when compared to non-aromatic therapies due to its effect on the limbic system by modulating N-methyl-D-aspartate and inhibiting serotonin transport and calcium channels (11). Another review that focused on the relief of common symptoms during pregnancy noted that for anxiety, stress, and poor sleep quality, the most commonly used EO was lavender, although other EOs, such as bergamot, lemon, orange, and tangerine, have also presented relaxation and mood-enhancing effects (27). An analysis of the effect of *Lavandula dentata* and *Citrus sinensis* EOs on physical, emotional, and behavioral symptoms of occupational stress in office staff identified that both EOs administered separately by inhalation through a diffuser were effective in reducing symptoms when compared to the control group (28).

Regarding the intensity of fatigue felt by the professionals, there was a significant reduction in both groups, but when the interventions were compared, there were no statistically significant differences. The analysis of the reduction of the impact of fatigue on the participants' daily lives also did not show statistical relevance, despite the improvement observed in the percentage of answers.

A group of nursing students who used EOs compared to a control group showed significant improvement in sleep as measured by the Pittsburgh Sleep Quality Index and in the total score and subjective perception of fatigue dimension as measured by the Individual Strength Checklist. A stone made of lavender, stored in a closed glass jar, was handed to the students and should be placed 10-15 cm from their beds for seven nights, starting 10-15 min before they went to bed (29). A literature review on the use of EOs for fatigue reduction in hemodialysis patients noted that the main EOs used were lavender, orange, rosemary, chamomile, and almond; with the best effects found in formulas with aromatic synergy, and lavender was the main oil used. For almost all studies, the administration route was inhalation, with the exception of one that applied the EO in bath water (30).

Other effects of EOs on fatigue have been explored in animal model experiments. One experiment subjected rats to chronic sleep deprivation to induce central fatigue, and one group also inhaled an EO synergy (*Santalum album*, *Citrus aurantium*, *Citrus limonum*, *Styrax benzoin*, *Citrus paradisi*, *Mentha piperata*, *Acori tatarinowii rhizoma*, *Rhodiola crenulatae radix et rhizoma*, and *Camellia sinensis* (linn.) o. ktz), in addition to the control group of well-fed rats. From the results, the group that inhaled EO showed increased physical function in the forced swim test and better behavioral performance associated with anxiety and cognitive function in the Open Field test (31). Another study compared the effect of citric oils (*Citrus sinensis* L., *Citrus limon Osbeck*, *Citrus bergamia Risso*, and *Poit*) with a control group in reducing fatigue in rats fatigued by forced swimming, which showed that the three citrus EOs reduced exhaustive exercise-induced fatigue by inhibiting oxidative stress, preventing muscle injury, and promoting glycogen-dependent energy supply. Also, the orange-bergamot EO was the best at relieving fatigue, and sweet orange was ineffective (32).

The comparison between the scales showed that the higher the stress levels measured by the SRQ-20, the greater the impact and intensity of fatigue assessed by the Pictogram. It is inferred that the COVID-19 pandemic impacts both emotional and physical symptoms that are often related to each other, as we are holistic beings.

The limitations included the small sample size, which undermined the power of the test, the possibility of a Hawthorne effect due to the participant's voluntary entry into the study, and the low use of EOs throughout the day by most participants. Although the tests showed significant differences after the intervention, the confidence intervals, especially for the EOSIN group, were somewhat wide.



# Conclusions

The present study showed a reduction in the emotional stress experienced by nursing professionals working in a public teaching hospital through the use of aromatherapy, with both lavender EO and EOs synergy, during the COVID-19 pandemic setting. There was evidence of a significant reduction in the intensity of fatigue in this population in both groups. However, there was no statistically relevant difference in the impact of this physical symptom on daily life in either group.

Due to the limited sample, the development of randomized clinical trials with a larger sample is suggested for better exploration of the effect of this practice in restoring the mental health of nursing professionals, which is a relevant recommendation for the authors, as aromatherapy is part of the PICS, is easily applicable, low-cost, non-invasive, and helps to reduce emotional stress.

**Conflict of interest:** none declared.

# References

- Galea S, Merchant RM, Lurie N. The mental health consequences of COVID 19 and physical distancing. The need for prevention and early intervention. *JAMA Intern Med* [Internet]. 2020;180(6):817-18. DOI: <https://doi.org/10.1001/jamainternmed.2020.1562>
- Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus 2019. *JAMA Netw Open* [Internet]. 2020;3(3):e203976. DOI: <https://doi.org/10.1001/jamanetworkopen.2020.3976>
- Wayessa Z], Melesse GT, Hadona EA, Wako GW. Prevalence of depressive symptoms due to COVID-19 and associated factors among healthcare workers in Southern Ethiopia. *SAGE Open Med* [Internet]. 2021;9. DOI: <https://doi.org/10.1177/20503121211032810>
- Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perception of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun* [Internet]. 2020;87:11-17. DOI: <https://doi.org/10.1016/j.bbi.2020.03.028>
- Mota DDCF, Pimenta CAM, Fitch MIF. Fatigue Pictogram: an option for assessing fatigue severity and impact. *Rev Esc Enferm USP* [Internet]. 2009;43(spe):1079-86. DOI: <https://doi.org/10.1590/S0080-62342009000500012>
- Kang L, Li Y, Hu S, Chen M, Yang C, Yang BX, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry* [Internet]. 2020;7:e14. DOI: [https://doi.org/10.1016/S2215-0366\(20\)30047-X](https://doi.org/10.1016/S2215-0366(20)30047-X)
- Baudoux D. Aromathérapie: Biochimie des molécules, propriétés pharmaco [Internet]. Malakoff: Dunod Editeur; 2017. 544 p. DOI: <https://doi.org/10.3917/dunod.baudo.2017.01>
- Lee M, Lim S, Ji-Ah S, Kim M, Hur M. The effects of aromatherapy essential oil inhalation on stress, sleep quality and immunity in healthy adults: Randomized controlled trial. *Eur J Integr Med* [Internet]. 2017; 12:79-86. DOI: <https://doi.org/10.1016/j.eujim.2017.04.009>
- Xiong M, Li Y, Tang P, Zhang Y, Cao M, Ni J et al. Effectiveness of aromatherapy massage and inhalation on symptoms of depression in Chinese community-dwelling older adults. *J Altern Complement Med* [Internet]. 2018;24(7):717-24. DOI: <https://doi.org/10.1089/acm.2017.0320>
- Koehler T. Lavender aromatherapy as a nurse-driven intervention for preoperative anxiety. *Nurs Womens Health* [Internet]. 2021;25(4):286-95. DOI: <https://doi.org/10.1016/j.nwh.2021.05.005>
- Botello-Jacuinde MG, Avello-Lorca M, García-Campos ML, Fernández-Rocca P, Beltrán-Campos V, Jiménez-García SN. Usos terapéuticos de la aromaterapia con lavanda (*Lavandula angustifolia*): revisión integrativa de la literatura [Therapeutic use of aromatherapy with lavender (*Lavandula angustifolia*): an integrative literature review]. *Rev iberoam Educ investi Enferm* [Internet]. 2020;10(1):48-56. Disponible en: <https://www.enfermeria21.com/revistas/aladefe/articulo/323/usos-terapeuticos-de-la-Spanish>
- Harding TW, De Arango MV, Baltazar J, Climent CE, Ibrahim HH, Ladrado-Ignacio L, et al. Mental disorder in primary health care: A study of their frequency and diagnosis in four developing countries. *Psychol Med* [Internet]. 1980;10(2):231-41. DOI: <https://doi.org/10.1017/S0033291700043993>
- Mari JJ, Williams P. A validity study of a psychiatric screening questionnaire (SRQ-20) in primary care in the city of São Paulo. *Br J Psychiatry* [Internet]. 1986;148:23-6. DOI: <https://doi.org/10.1192/bjp.148.1.23>
- Fitch MI, Bunston T, Mings D, Sevean P, Bakker D. Evaluating a new clinical assessment tool: The fatigue pictogram. *Lung Cancer* [Internet]. 2003;41(2):s262. DOI: [https://doi.org/10.1016/S0169-5002\(03\)92640-7](https://doi.org/10.1016/S0169-5002(03)92640-7)

15. Rojas JG, Lopera-Betancur MA, Forero-Pulido C, García-Aguilar LC. Cuidar al paciente con COVID-19: entre la incertidumbre y el deseo de salir adelante [Caring of patients with COVID-19: between uncertainty and the desire to move forward]. *Rev Colomb Enferm*. [Internet]. 2021;20(2):e035. DOI: <https://doi.org/10.18270/rce.v20i2.3291>
16. Donelli D, Antonelli M, Bellinazzi C, Gensini FG, Firenzuoli F. Effects of lavender on anxiety: A systematic review and meta-analysis. *Phytomedicine* [Internet]. 2019;65:153099. DOI: <https://doi.org/10.1016/j.phymed.2019.153099>
17. Damian P, Damian K. *Aromaterapia: aroma e psique*. Belo Horizonte: Editora Laszlo; 2018.
18. Dosoku NS, Setzer WN. Biological activities and safety of *Citrus spp.* essential oils. *Int J Mol Sci* [Internet]. 2018 Jul 5;19(7):1966. DOI: <https://doi.org/10.3390/ijms19071966>
19. Farrar AJ, Farrar FC. Clinical aromatherapy. *Nurs Clin North Am* [Internet]. 2020;55(4):489-504. DOI: <https://doi.org/10.1016/j.cnur.2020.06.015>
20. Rhind JP. *Sinergias aromáticas: aprendendo a combinar corretamente os óleos essenciais*. Belo Horizonte: Editora Laszlo; 2019.
21. Han X, Gibson J, Eggett DL, Parker TL. Bergamot (*Citrus bergamia*) essential oil inhalation improves positive feelings in the waiting room of a mental health treatment center: A pilot study. *Phyther Res* [Internet]. 2017;31:812-6. DOI: <https://doi.org/10.1002/ptr.5806>
22. Price S. *Aromaterapia e as emoções*. Rio de Janeiro: Editora Bertrand Brasil; 2018.
23. Gnatta JR, Piason PP, Lopes CLBC, Rogenski NMB, Silva MJP. Aromatherapy with ylang-ylang for anxiety and self-esteem: A pilot study. *Rev Esc Enferm USP* [Internet]. 2014;48(3):492-9. DOI: <https://doi.org/10.1590/S0080-623420140000300015>
24. Araújo PRS, Silva JMS, Silva MGS, Fernandes LN, Araújo PDS, Bezerra PAS. Aromatherapy in the reduction of occupational stress and in the care of Burnout Syndrome: A systematic review. *Res Soc Dev* [Internet]. 2021;10(8):e24810817366 DOI: <https://doi.org/10.33448/rsd-v10i8.17366>
25. Zamanifar S, Bagueri-Saveh MI, Nezaketi A, Mohammadi R, Seidi J. The Effect of music therapy and aromatherapy with chamomile-lavender essential oil on the anxiety of clinical nurses: A randomized and double-blind clinical trial. *J Med Life Sci* [Internet]. 2020;13:87-93. DOI: <https://doi.org/10.25122/jml-2019-0105>
26. Montibeler J, Domingos TS, Braga EM, Gnatta JR, Kurebayashi LFS, Kurebayashi AK. Efetividade da massagem com aromaterapia no estresse da equipe de enfermagem de centro cirúrgico: estudo-piloto. *Rev Esc Enferm USP* [Internet]. 2018;52:03348. DOI: <https://doi.org/10.1590/s1980-220x2017038303348>
27. Angarita-Navarro AM, Casas-Cárdenas PD, López-Aguirres JP. Uso da aromaterapia em gestantes: uma revisão de literatura. *Rev Cienc Cuidad* [Internet]. 2022;19(1):107-18. DOI: <https://doi.org/10.22463/17949831.3092>
28. Ormachea MJU. Efecto de la aromaterapia en base a los aceites esenciales de *Lavandula dentata* y *Citrus sinensis* en el control de los síntomas del estrés laboral de los trabajadores administrativos de la Universidad Tecnológica de los Andes – filial Cusco 2018 [dissertação]. [Cusco, Peru]: Universidad Tecnológica de los Andes – filial Cusco; 2021. Disponible en: <https://repositorio.uandina.edu.pe/handle/20.500.12557/4365>
29. Kavurmaci M, Sariaslan A, Yildiz I. Determination the effects of lavender oil quality of sleep and fatigue of students. *Perspect Psychiatr Care* [Internet]. 2022;58:1013-20. DOI: <https://doi.org/10.1111/ppc.12892>
30. Yangöz ST, Kavradim ST, Özer Z. The effect of aromatherapy on fatigue in adults receiving haemodialysis treatment: A systematic review and meta-analysis of randomised controlled trials. *J Adv Nurs*. 2021;77:4371-86 [Internet]. DOI: <https://doi.org/10.1111/jan.14922>
31. Han C, Li F, Tian S, Liu Y, Xiao H, Wu X, et al. Beneficial effect of compound essential oil inhalation on central fatigue. *BMC Complem Altern Med* [Internet]. 2018;18(1):309. DOI: <https://doi.org/10.1186/s12906-018-2375-6>
32. Lei T, Tan H, Shansahn Z, Hongyan Z, Chenxi Y, Guiting C, et al. A comparative study on relieving exercise-induced fatigue by inhalation of different Citrus essential oils. *Molecules* [Internet]. 2022;27:3239. DOI: <https://doi.org/10.3390/molecules27103239>