Aromatherapy with oil of *Lavandula angustifolia* for pain in women: scoping review

Aromaterapia com óleo essencial de Lavandula angustifolia *para dor em mulheres: revisão de escopo*

Ivanete de Freitas Lisboa[1], Anne Caroline Nunes Carmo[1], Priscilla Roberta Silva Rocha[1], Mani Indiana Funez[2]

DOI 10.5935/2595-0118.20230035-en

ABSTRACT

BACKGROUND AND OBJECTIVES: Aromatherapy with lavender essential oil has been used to reduce pain, anxiety, nausea and vomiting, among others. As the painful experience is unique, responses to therapeutic approaches may vary among individuals and there are specific conditions related to women's health that deserve to be examined. The objective of this study was to analyze the uses of aromatherapy with essential oil of lavender (*Lavandula angustifolia*), by nurses, for pain control in women.

CONTENTS: This is a scoping literature review. The search was carried out in the following portals and/or databases: BVS, Pubmed, Cochrane, on June 3, 2022, and was updated on June 9, 2023. The sample consisted of four controlled clinical trials addressing aromatherapy with lavender essential oil in the "inhalation" and "massage" modalities, to treat acute labor pain and dysmenorrhea. In all studies, the intervention provided a reduction in pain without unwanted effects ($p<0.05$) and the nurse participated as a member of the multidisciplinary team.

CONCLUSION: Aromatherapy with lavender essential oil during labor and dysmenorrhea proved to be effective in reducing pain in the analyzed sample.

Keywords: Cesarean section, Dysmenorrhea, Labor pain, Nursing care, Patient care team.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A aromaterapia com óleo essencial de lavanda tem sido utilizada para redução de dor, ansiedade, náuseas e vômitos, dentre outros. Assim como a experiência dolorosa é única, as respostas às abordagens terapêuticas podem variar entre os indivíduos e há condições específicas relacionadas à saúde da mulher que merecem ser examinadas. O objetivo deste estudo foi analisar os usos da aromaterapia com óleo essencial de lavanda (*Lavandula angustifolia*), por enfermeiros, no controle da dor em mulheres.

CONTEÚDO: Esta é uma revisão de escopo da literatura. A busca foi realizada nos seguintes portais e/ou bases de dados: BVS, Pubmed, Cochrane, em 03 junho de 2022, sendo atualizada em 09 de junho de 2023. A amostra foi composta de quatro ensaios clínicos controlados abordando aromaterapia com óleo essencial de lavanda nas modalidades "inalação" e "massagem", para tratar dor aguda do parto e da dismenorreia. Em todos os estudos a intervenção proporcionou redução na dor sem efeitos adversos ($p<0,05$) e o enfermeiro participou como integrante da equipe multidisciplinar.

CONCLUSÃO: A aromaterapia com óleo essencial de lavanda no trabalho de parto e dismenorreia mostrou-se eficaz para a redução da dor na amostra analisada.

Descritores: Cesariana, Cuidados de enfermagem, Dismenorreia, Dor do parto, Equipe de assistência ao paciente.

INTRODUCTION

Pain is conceptualized as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage"[1]. The experience of pain is unique and individual; therefore, its treatment must consider these aspects. Despite the available therapies, pain control is not always satisfactory. An important strategy has been to associate pharmacological and non-pharmacological treatment. Thus, the search for accessible and effective forms of treatment that can add to conventionally offered treatment justifies research in the area of herbal medicine.

Aromatherapy is an ancient practice used as therapy for health conditions through the use of essential oils extracted from aromatic plants[2]. Its use in nursing is based on the complementary nature of the therapy, helping to improve health conditions[3]. Among the nursing theories that support the use of aromatherapy are Florence Nightingale's environmental theory and Wanda de Aguiar Horta's theory of basic human needs[3]. In Brazil, Law

Ivanete de Freitas Lisboa – https://orcid.org/0000-0003-1497-5450;
Anne Caroline Nunes Carmo – https://orcid.org/0000-0002-3183-8493;
Priscilla Roberta Silva Rocha – https://orcid.org/0000-0002-2058-8548;
Mani Indiana Funez – https://orcid.org/0000-0002-4315-7185.

1. University of Brasília, College of Ceilândia, Nursing Course, Brasília, DF, Brazil.
2. University of Brasília, College of Ceilândia, Nursing Course and Graduate Program in Health Sciences and Technology, Brasília, DF, Brazil.

Submitted on April 07, 2023.
Accepted for publication on June 20, 2023.
Conflict of interests: none - Sponsoring sources: none

HIGHLIGHTS

- The treatment of painful conditions in women using lavender essential oil has been shown to be effective and without unwanted effects;
- The treatment modality addressed in the studies was aromatherapy, by inhalation and massage.

Correspondence to:
Mani Indiana Funez
E-mail: mani@unb.br

No. 7498 of June 25, 1986, and Decree No. 94406 of June 8, 1987, on Nursing Practice, establish that it is the nursing professional's responsibility to prescribe drugs previously established in public health programs and in routines approved by health institutions. The World Health Organization (WHO) supports the use of Traditional Medicine/Complementary/Alternative Medicine and the creation of supportive policies. Aromatherapy is a practice supported by Ordinance No. 702/GM/MS, of March 21, 2018, and can be performed by the healthcare team. It is also up to the nurse to apply aromatherapy[4]. The practice is also supported by Opinion No. 034/2020/CTLN/COFEN, which points out "the legality of the prescription of essential oils by nurses in their various uses, such as aromatherapy"[5]. Moreover, COFEN Resolution No. 625/2020 considers the specialty "Nursing in Integrative and Complementary Practices", in which aromatherapy is included[6].

Essential oils used in aromatherapy are substances with high structural diversity and multicomponents derived from secondary metabolism of aromatic plants, volatile, with effects on the nervous, immune, musculoskeletal, and respiratory systems, being used topically and/or by inhalation[2,7]. Aromatherapy with essential oils, including lavender, has been used in hospital and outpatient settings to reduce pain, anxiety, nausea, and vomiting, among others[3,8-10]. Thus, there is an opportunity to expand the strategies for adequate pain control by nurses together with the interdisciplinary team. However, as well as the experience of pain, responses to therapeutic approaches may vary in between individuals depending on conditions such as age, sex, among others. And there are specific conditions related to women's health that deserve to be examined in isolation. Thus, the objective of this study was to analyze the uses of aromatherapy with lavender essential oil (*Lavandula angustifolia*), by nurses, in pain control in women.

CONTENTS

This study is a scoping review of the literature, using the six steps proposed by Ercole, Melo, and Alcoforado[11]. The research question was developed according to the acronym PICO: study population (P), intervention of interest (I), comparison with the intervention of interest (C), outcome of interest (O). The question formulated was, "In women experiencing painful situations, what is the effect of aromatherapy with lavender essential oil performed by nurses compared to any intervention or no intervention"?

The search for scientific articles was performed in the following portals and/or databases: BVS, Cochrane, Medline/Pubmed, on June 3, 2022, and was updated on June 9, 2023. There was no time cut. To structure the search, controlled descriptors were selected from the Descriptors in Health Sciences (DeCS) and the Medical Subject Headings (MeSH): Pain OR females OR woman OR acute pain OR chronic pain women AND Lavander OR lavender essential oils OR volatile oils AND nurse OR nursing AND Patient outcomes assessment OR Pain Reduction Assessment OR quality of life OR comfort OR Pain Measurements.

Inclusion criteria were studies with women over the age of 18, that addressed aromatherapy intervention using lavender essential oil to treat pain, in which nurses were part of the interdisciplinary team, and that the strategies used had been described. Studies written in Portuguese and English were included (due to familiarity with the languages). Exclusion criteria were: studies that did not include the population and/or the outcome of interest; articles that used other essential oils; articles unavailable in their entirety.

The software used on review for the management of references coming from databases was EndNote Web. The search and selection were performed by two independent authors (I.F.L and M.I.F), the selected articles are presented in table 1. A data extraction table was used to minimize errors. The instrument included the following items: article identification, objectives, sample, intervention, and results. The analysis was performed by two independent reviewers (I.F.L and M.I.F). In the first moment, after the search organization, the selection was made by reading the titles and abstracts, applying the eligibility criteria, by two independent reviewers (I.F.L and M.I.F). Then, the first reviewer (I.F.L) read the articles in full, applied the eligibility criteria, and extracted the data, which was checked by the second reviewer (M.I.F). The level of evidence of the studies included in the sample was analyzed according to the categories proposed by the Oxford Centre for Evidence-Based Medicine[12].

A qualitative synthesis of the included studies was then performed. After that, for assessment of methodological quality, there was individual judgment of the included studies (P.R.S.R) regarding bias on: selection and allocation, intervention/exposure administration, outcome assessment, detection and measurement, and participant retention and validity of statistical conclusions, according to the Joanna Briggs Institute (JBI) critical appraisal tool for clinical trials[13]. The checklist items were answered with "yes", "no", "unclear", and "not applicable". The final ranking took into account the percentage of "yes" answers each study received for total number of items in the assessment tool. Finally, the articles were classified as follows: low risk of bias - if the study achieved a 70% or higher "yes" score; moderate risk of bias - if the study achieved a 50% to 69% "yes" score; and high risk of bias - if the "yes" score was 49% or lower[14].

A total of 114 studies were found in the initial search, from which 26 duplicates were excluded. After applying the eligibility criteria through independent reading of titles and abstracts, 44 articles were excluded. After reading the articles completely, 40 studies were removed, of which: 22 did not use lavender essential oil, nine used it in children, and nine did not have separate data analysis of women or did not analyze pain as an outcome. The final sample consisted of four articles. The search and selection processes are described in the flowchart adapted from Preferred Reporting Items for Systematic reviews and Meta-Analysis (PRISMA)[15] checklist, as can be seen in figure 1.

Table 1 presents a summary of the selected articles. The final sample was composed of one article developed in South Korea1[6] and three in Iran[17-19], in the period from 2006 to 2020, most of them published in journals specialized on complementary therapies[16,18,19].

Table 1. Data overview

Authors and Country	Identification Number	Objective/ Evidence level	Sample	Intervention	Outcomes of Interest
Han et al.[16] South Korea	1	Explore the effect of aromatherapy on menstrual cramps and symptoms of dysmenorrhea. Level: 1	Total 67 LIG: 25 PG: 20 CG: 22 Women with pelvic inflammatory pain, dysmenorrhea.	LIG: Aromatherapy was provided in the form of abdominal massage with lavender, sage and Damask rose essential oils in a 2:1:1 ratio, diluted in almond oil at the final concentration of 3%. PG: The same treatment, only with almond oil. CG: No treatment was provided.	Pain severity was significantly lower in LIG than in the other two groups at both post-intervention times: first and second days of menstruation after treatment. First day post-intervention: aromatherapy was most strongly associated with change in pain severity p<0.001 and lower level of menstrual cramps p<0.001. The trend was the same for day two with change in severity p<0.02 and baseline value of cramping level p<0.05. Placebo: p>0.76 compared to control.
Azima et al.[17] Iran	2	To compare the effect of lavender massage and isometric exercises on primary dysmenorrhea. Level: 1	Total: 102 LIG: 34 EIG: 34 CG: 34 Women with pelvic inflammatory pain, dysmenorrhea.	LIG: Lavender extract was used in a 10% olive oil base and *effleurage* massage was performed. EIG: They were asked to perform the isometric exercises. CG: No treatment was provided. The interventions and variables were evaluated for all three groups in three consecutive cycles.	Significant difference was observed between the three groups regarding pain intensity in the second and third cycles; such that the decrease in pain intensity was more significant in the massage group (p<0.001). In addition, a significant difference was found between the three groups regarding the average pain duration after the third cycle (p<0.006). The results of the intra-group comparisons showed that pain duration decreased in both massage and exercise groups, with a greater reduction in LIG (p<0.001).
Yazdkhasti and Pirak[18] Iran	3	To investigate the effect of inhaling lavender essence on the severity of labor pain and labor duration. Level: 1	Total: 120 IG: 60 CG: 60 Women with acute pain (physiological labor).	IG: With a dropper, 10% lavender essence (1:10 with distilled water) was applied to the palm of the patient's hand, and she was asked to rub her hands together and inhale the perfume for 3 min, at a distance of 2.5 and 5 cm from her nose. CG: was treated with distilled water in a similar manner.	IG: There was a significant difference for the mean pain intensity scores between the two groups, at 5 and 10 cm dilation, pain intensity was decreased in IG p<0.001. Apgar score at the first minute, IG: was 8/8±0/37. CG: 8/7±1/01. No significant difference p=0.4. Apgar score at the fifth minute, IG: 9/9±0/35, CG: 9/7±1/01. No significant difference p=0.33.
Abbasijahrom et al.[19] Iran	4	To determine and compare the effect of aromatherapy with lavender and Damask rose essential oils on pain severity and anxiety after cesarean section. Level: 1	Total: 90 CG: 30 IG A: 30 IG B: 30 Women with postpartum pain (cesarean section).	CG (distilled water), IG A (lavender) and IG B (Damask rose). Inhale cotton balls with three drops of each essential oil at a distance of 10 cm for 30 minutes.	There was a significant difference between the groups regarding pain intensity after the intervention (p<0.042). The mean pain levels of Intervention groups A and B were significantly lower than those of the control group.

CG = Control Group; IG = Intervention Group; LIG = Lavender Intervention Group; PG = Placebo Group; EIG = Exercise Intervention Group

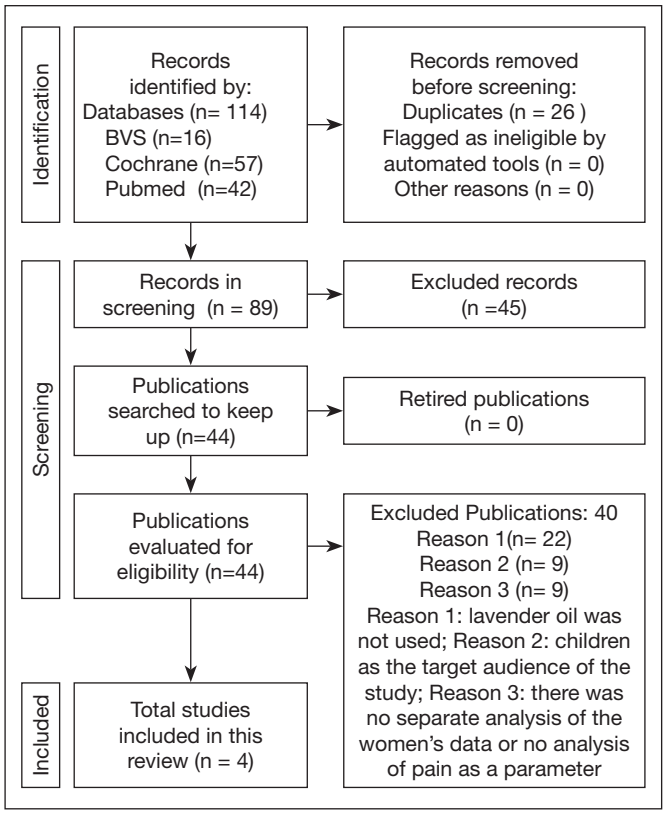

Figure 1. Flowchart of article selection adapted PRISMA

Characteristics of participants, methodology and evidence level of the studies

The sample of participants in the studies was composed of 67 to 120 women aged 18 to 29 years, presenting acute nociceptive and inflammatory pain located in pelvic region. All studies were classified with evidence level 1. As stated by the authors, the studies in the sample were: placebo-controlled randomized controlled trial[16], randomized controlled trial[17], single-blind randomized controlled trial[18], and double-blind randomized controlled trial[19].

Interventions

Most trials used control groups and intervention groups with lavender or other treatments[17-19]. One study also used a placebo group in addition to control group[16]. Pain was assessed using the visual analogue scale (VAS) in all studies.

Study 1[16] assessed inflammatory pelvic pain (dysmenorrhea). The pain level had to be greater than 6/10 points. Intervention and placebo groups received 15 minutes of aromatherapy or placebo, respectively. When aromatherapy and placebo intervention groups were compared with control group, aromatherapy was more effective in reducing pain severity and cramping level on the first and second day of intervention. It should be noted that lavender oil was applied in conjunction with two other oils, but its greater proportion was preserved in the preparation.

In study 2[17], inflammatory pelvic pain (dysmenorrhea) was also evaluated, and the *effleurage* massage method was used on abdomen, with lavender extract in a 10% olive oil base. This type of massage is performed with gentle, clockwise rotating movements between the top of the symphysis pubis and the navel for 15 minutes. When lavender intervention, isometric exercise intervention, and control groups were compared, aromatherapy was effective in reducing pain from the second cycle of therapy application and in reducing pain duration in the third cycle.

Study 3[18] evaluated the intervention group, which received aromatherapy by inhaling lavender oil, compared to control group, which received distilled water. Aromatherapy reduced labor pain at different stages of dilation (5-6-7 and 8; 9 and 10 cm). In addition, no effect was observed on labor duration and the newborns Apgar score, assessed at the first and fifth minutes of life.

Study 4[19] performed two interventions with inhalation aromatherapy application, one with lavender and one with Damask rose. It was about post-surgical pain, therefore post-operative pain. Pain was reduced in the two intervention groups, lavender and Damask rose, when compared to control group.

Regarding losses in follow-up, one pregnant woman left the sample due to an emergency cesarean section[18]. In study 2[17], from the initial sample of 120 participants, 18 were excluded, being 10 in exercise group, two in massage group and six in control group, due to high pain intensity, poor response to treatment with exercises, non-adherence to the exercise plan or by desire to no longer participate. In study 1[16], of the 85 selected, 67 entered the initial phase of the study.

Scenario and duration of the interventions

In study 1[16] the sample consisted of female students enrolled in South Korean universities. The period of study was not mentioned, being carried out during the phase before menstruation until second day after bleeding, on average. In study 2[17], on the other hand, female students residing in dormitories of a University in Shiraz (Iran) were approached. The study was conducted from October 2012 to June 2013. Study 3[18] was developed in a hospital setting, and conducted from September 2011 to January 2012. Study 4[19] was conducted at Motahari Hospital, affiliated with Jahrom University of Medical Sciences (Iran), in the fall of 2017.

Nurse's assignment

In study 1[16], aromatherapy was applied by nurses. Study 2[17] was conducted by a researcher belonging to the School of Nursing and Midwifery, who in multiprofessional teams or as a professional responsible for developing the intervention, applied and measured the outcomes. In study 3[18] the application of aromatherapy was performed by an experienced midwife, and the study team was part of the Department of Obstetrics. In study 4[19] a nurse participated in the selection of patients who had a cesarean section, and was responsible for the initial contact, screening, and patients' consultation for subsequent approach by the researcher.

Evaluation of the studies' individual methodological quality

Among the 4 included studies, most 75% (n=3)[15,18,19] had high methodological quality and 25% (n=1)[17] low quality. Regarding the evaluation of the studies with high quality, the blin-

Table 2. Evaluation of the studies' methodological quality

Authors	Identification Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	% Y	Methodological quality
Han et al.[16]	1	Y	Y	N	Y	I	Y	I	Y	Y	Y	Y	Y	Y	77	High
Azima et al.[17]	2	N	I	Y	N	N	N	N	Y	Y	Y	Y	Y	I	46	Low
Yazdkhasti and Pirak[18]	3	Y	Y	Y	Y	N	Y	I	Y	Y	Y	Y	Y	Y	84.6	High
Abbasijahromi et al.[19]	4	Y	Y	Y	I	I	Y	I	Y	Y	Y	Y	Y	Y	77	High

Q1 = Was true randomization used to assign participants to treatment groups? Q2 = Was allocation to treatment groups concealed? Q3 = Were the treatment groups similar at baseline? Q4 = Were participants blinded to treatment assignment? Q5 = Were those administering the treatment blind to the treatment assignment? Q6 = Were the treatment groups treated identically except for the intervention of interest? Q7 = Were the outcome assessors blinded to receiving the treatment? Q8 = Were outcomes measured in the same way for the treatment groups? Q9 = Were outcomes reliably measured? Q10 = Was follow-up complete and, if not, were differences between groups in follow-up adequately described and analyzed? Q11 = Were participants analyzed in the groups to which they were randomized? Q12 = Was appropriate statistical analysis used? Q13 = Was the study design appropriate and were any deviations from the standard RCT design (individual randomization, parallel groups) taken into account in the conduct and analysis of the study?

ding of the evaluators was uncertain in two studies[16,19] and absent in one study[15]. Another uncertain issue was whether the outcome assessors were blinded[16,18,19]. In one study[16] the treatment groups were not similar. In study 2[17] there was no randomization, no blinded allocation of groups, participants and assessors were not blinded, treatments were distinct, and there was uncertainty about whether the design was conducted in a way that avoided bias. More information about the methodological quality can be found in table 2.

DISCUSSION

Based on the studies analyzed, it was evidenced that aromatherapy using lavender essential oil, combined or not with other essential oils, was effective in reducing acute pain associated with dysmenorrhea and childbirth (natural or cesarean) conditions. It was possible to identify two modalities of aromatherapy application, namely "inhalation" and "massage". And no undesired effects for women and/or newborns were identified.

The use of lavender essential oil through inhalation was observed as an approach that can be used by nursing professionals for pain management. Similarly, the studies evaluated that used massage observed a reduction in pain intensity and duration. The mechanism of this effect is not yet well defined. It is known that by topical route there is absorption through the skin and that structures such as muscles and joints can be reached, with potential for an anti-inflammatory effect[7,17].

Essential oils, including lavender oil, can interact with neurotransmitter systems such as enkephalins, endorphins, noradrenalin, serotonin, dopamine, and glutamate, and can modulate several functions such as sleep, pain, anxiety, and depression[3,7,20,21]. It is possible to reach the upper and lower respiratory tracts via inhalation, and also, via the olfactory nerve, several central nervous system structures that can contribute to pain and other symptoms control[7,17]. Olfactory pathway has a direct connection with limbic system (amygdala-hippocampus complex), which is responsible for controlling emotions and influences the nervous and endocrine systems[3,7,21].

A characteristic of essential oils is that they have multiple organic and volatile constituents, with diverse structures[7]. Lavender essential oil has over 100 components, among them: linalool, perillyl alcohol, linalyl acetate, camphor, limonene, tannin, triterpene, coumarin, cineol and flavonoids[22]. Due to its chemical complexity, it is unlikely to have action on a single pharmacological target[7]. For analgesic effect, there is evidence of its action on the gabaergic neurotransmission process, especially via $GABA_A$ receptors, increasing its inhibitory activity, its action on the cholinergic system, and its action on opioid and cannabinoid receptors involved in the endogenous pain control system[22-24].

In two studies that addressed inhalation for acute pain treatment, the interventions were found to be effective in reducing pain. The interventions consisted of inhalations for short periods of no more than 30 minutes[18,19]. Aromatherapy through inhalation provided improvement in assessed pain[18,19]. Moreover, it was observed that lavender reduced pain compared to control group; however, when compared to treatment with Damask rose essential oil, the latter provided greater pain relief[19]. Two other studies analyzed used lavender massage as an intervention, associated or not with other types of essential oils[16,17]. One study showed that the duration and intensity of pain decreased after the intervention was repeated, i.e., from the second cycle onward[17]. The pain decreased right after the intervention, demonstrating that such a method can be developed and applied by nurses in women, to decrease the intensity of pain[16].

Methods such as inhalation and massage using lavender essential oil have also shown beneficial effects in improving acute pain in burned women[25]. Because it is a non-pharmacological method, the practice can be prescribed for nursing care[25]. These data corroborate the findings of this review, which showed that lavender was effective whether applied alone or together with another essential oil, in inhalation or massage modalities.

Dysmenorrhea and pain related to labor, natural or not, are common conditions in women. Although natural childbirth has a physiological mechanism, offering additional means for pain relief is essential, providing women with greater tranquility at this time in their lives. Controlling postoperative pain related to the cesarean section procedure is an important measure of comfort and control of symptoms that can negatively influence the puerperium. Making available methods that cause minimal or no adverse effects and lead to an improvement in discomfort during dysmenorrhea[26] and childbirth are equally important[27]. In this sense, it is noteworthy that there were no reports of adverse effects due to aromatherapy for either women[16-19] or newborns[18].

It is worth mentioning that as an additional effect, lavender can provide a calming sensation[28]. In fact, one of the studies in this research sample showed that aromatherapy with lavender essential oil contributed to an improvement in anxiety, a factor that can consequently have a positive impact on pain levels[19]. In women, lavender oil aromatherapy has psycho-physiological effects, stabilizing brain and prefrontal cortex activity, besides decreasing systolic blood pressure[29]. These effects can be interpreted as responses to stress control[29]. Thus, in addition to pain control, there is the possibility of additional effects that contribute to women's well-being.

The results of all the studies suggest that lavender aromatherapy, compared to control group, is effective in reducing pain. Aromatherapy can be considered a nursing intervention acting to improve individuals' quality of life and comfort[3]. As evidenced in the sample studied, nurses can apply this method because it is safe, simple and viable, but they need to be trained and seek knowledge to practice it in their care[16].

According to the study[30], nurses should be encouraged to suggest non-pharmacological measures as an option for pain reports and in complement to the traditional pharmacological method. The study brings the development and introduction of a clinical aromatherapy program in a hospital system using a model training instructor, within the context of holistic nursing theory and practice. Despite the advances regarding research on the subject in literature, it is pertinent to develop more studies, including those based in Brazil, with methodological rigor for scientific basis, and that support the application of aromatherapy by nurses.

The relevant points of this research are the knowledge of the lavender essential oil application forms and its effect on pain in women, grounding the application of aromatherapy in health professionals' practices. In addition, the observation of nurse's role in multidisciplinary teams and its importance in development of easy-to-apply interventions. Therefore, works with this theme have relevance in the clinical practice of nurses to providing non-pharmacological methods for relief of pain in women who are experiencing painful situations, increasing the quality of nursing care. As well as in the development of safe protocols and training for professionals to apply aromatherapy and/or guide patients to its use.

Limitations include the evaluation of acute pain related to labor and dysmenorrhea, not having found studies with other types of pain in which it was possible to analyze women's data in isolation. In addition, the sample found in this research was small, no aromatic control was performed in the studies, and there is little diversity of countries, since data generated was concentrated in Iran and Korea. Thus, it is recommended that more clinical studies be conducted.

CONCLUSION

Aromatherapy with lavender essential oil was shown to be effective in reducing pain in women. The painful conditions studied were associated with dysmenorrhea, natural childbirth, and cesarean section. The methods used were inhalation and massage with lavender essential oil in monotherapy or associated with other oils, with a greater proportion of the former.

From the analysis of this research results, it is possible to infer that aromatherapy with lavender essential oil has the potential to be applied for treatment of pain by nurses in health teams. Therefore, it constitutes a field to be explored because it is a simple method, of relatively low cost, and, so far, with no evidence that it can cause adverse effects. However, further studies are needed to establish scientific evidence for the inclusion of therapy in care and the development of safe protocols.

ACKNOWLEDGMENTS

To the professors of the University of Brasília Nursing course, College of Ceilândia, Ana Claúdia Afonso Valladares Torres and Alecssandra de Fátima Silva Viduedo, for the generous review of this work.

AUTHORS' CONTRIBUTIONS

Ivanete de Freitas Lisboa
Data Collection, Conceptualization, Research, Methodology, Writing - Preparation of the Original, Writing - Review and Editing, Visualization

Anne Caroline Nunes Carmo
Research, Methodology, Writing - Preparation of the Original, Writing - Review and Editing, Visualization

Priscilla Roberta Silva Rocha
Research, Methodology, Writing - Review and Editing, Validation, Visualization

Mani Indiana Funez
Conceptualization, Resource Management, Project Management, Research, Methodology, Writing - Preparation of the Original, Writing - Review and Editing, Supervision, Visualization

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