

Lavender aromatherapy for sleep in hospitalized patients: A scoping review

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ABSTRACT

Background and objective: The importance of promoting sleep for hospitalized patients is vital especially because sleep has been shown to promote healing. Complementary and alternative medicine approaches for health and wellness have been widely used in the United States. However, for hospitalized patients, while aromatherapy such as lavender is often used by nurses for comfort and sleep, the evidence for specific dosage and administration methods are unclear, even though its effectiveness has been shown and published. The purpose of this scoping review is to highlight the significant issues surrounding the evidence to date for lavender aromatherapy's clinical use for hospitalized patients.

Methods: This review utilized the PRISMA steps to identify literature important to the study's purpose.

Results: After the initial search using specific keywords yielded 588 articles, further steps in the process resulted in 8 studies whose purpose was to test the effectiveness of lavender aromatherapy for sleep in hospitalized patients. Three major categories that resulted from the review addressed the clinical evidence limitations associated with lavender's use for sleep: the wide range of sample characteristics and counties, mixed variables for study purposes, and disparate dosage and administration methods. Most significant for clinical practice was the disparate dosages and methods of lavender aromatherapy administration across the studies reviewed for effectiveness.

Conclusion and implications: Nurses should proceed with caution when using lavender aromatherapy for hospitalized patients. This review highlighted the need for nurses to conduct and disseminate findings from randomized clinical trials utilizing hospitalized general medical-surgical patients. Testing dosages and administration methods that have shown to be effective for medical surgical hospitalized patients is warranted.

Key Words: Lavender, Aromatherapy, Sleep, Hospitalized patients, Evidence

1. INTRODUCTION

Lavender aromatherapy for sleep is often used in hospitals in the United States. However, while meta-analyses have demonstrated its effectiveness,^[1,2] evidence related to dosage, type of aroma transmission, single vs mixed oils used, populations studied and countries where research has been conducted vary greatly. This variation impedes devel-

oping specific interventions and policies for nurses' use. The purpose of this scoping review is to map the body of studies demonstrating effectiveness conducted on lavender oil aromatherapy for sleep in hospitalized patients. Evidence for clinical interventions must go beyond effectiveness and determine under what circumstances study results could be used clinically with confidence.

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1.1 Background

Sleep is a critical activity for health and to promote recovery from illness. Sleep is one of the basic activities of human daily living affecting health physically and mentally.^[3] In general, decreased sleep time during illness, stress, or change of a sleep environment such as hospitalization, can affect sleep-wake cycles directly and causes future physical problems.^[4] For hospitalized individuals, there are various factors that can lead to poor sleep quality including physical factors such as disease and its severity, pain, and the hospital environment such as light and sound disturbances^[5,6] doctor and nurse interruptions, and psychological factors such as anxiety and stress.^[7-10]

The nurses' role has always included promoting sleep and sleep hygiene.^[8,11] The usual prescribed pharmacotherapy for sleep can have significant side effects and be costly. Many nursing-driven interventions have been tested to promote sleep and overcome sleep disturbances for hospitalized patients, primarily focusing on environmental changes such as decreasing noise, providing comfort, and dimming lights.^[8,12] However, two systematic reviews have not supported the effectiveness of non-pharmacologic interventions for sleep improvement or promotion.^[13,14]

Complementary interventions such as the use of essential oils like lavender have some reported effects on relaxation and have been used for symptoms such as anxiety and pain.^[15,16] Published studies describe lavender for use in non-hospitalized patients, in the general population, for decreasing anxiety and promoting sleep using it in both massage and aromatherapy.^[17,18]

For hospitalized patients, the few reported lavender aromatherapy studies have focused on a specific inpatient population such as those in the ICU, or those admitted for coronary surgery.^[15] Moreover, the method of application for lavender used across these studies has also varied from massage to inhalation that may be direct or indirect in administration. Further complicating determining evidence for lavender use for improved sleep is that investigations have tested lavender accompanied with other essential oils or with carrier oils; it has also been studied in combination with interventions such as music and acupressure.^[20,21] Many of the reported studies have been conducted internationally in many countries where nursing practice and its scope may differ.^[13] In addition, clinical reporting and publications on the use of lavender and other herbal interventions by nurses for hospitalized patients have also been limited in number, and lacking in specific methods for administration as well as outcomes.^[16,22]

A scoping review is warranted to map the existing scientific evidence regarding the use of lavender aromatherapy for

sleep in hospitalized patients. Compiling and evaluating the evidence on more than effectiveness is critical for clinical use as well as for recommendations regarding the need for further research.

2. METHODS

2.1 Scoping review objectives

The objective of this scoping review was to chart the body of studies conducted on the use of lavender oil aromatherapy and its effect on sleep in hospitalized patients. By targeting existing studies and their outcomes, this review aims to consolidate, conceptualize and expose the merits of the use of lavender oil by inhalation on sleep quality of hospitalized patients.

2.2 Design

We conducted this scoping review based on Arksey and O'Malley's^[23] reported framework and principles. Additional guidance and recommendations were sought from Levac et al.'s^[24] and McGowan et al.'s^[25] reporting guidance for scoping review approaches. Given the review's purpose, the focus was on research studies, including systematic reviews, meta-analyses, randomized control trials and other experimental design studies. Opinions, editorials, case studies and white papers were not included in this review. The review included five key phases as described by Arksey and O'Malley:^[23] 1) Identifying the research question; 2) Identifying the relevant studies; 3) Selecting the studies; 4) Charting/formulating the records; and 5) Collating, summarizing, and reporting the findings.

2.2.1 Scoping review questions

- 1) What were the review authors' inclusion criteria for their studies?
- 2) What rationale did the review authors use to identify the specific intervention studies?
- 3) Are there similarities or differences in the terms used to identify the specific interventions studies?

2.2.2 Questions for charting of individual studies

How was aromatherapy administered: strength, time of intervention, mode for inhalation? Was sleep quality measured?

2.3 Data sources and search strategy

The authors conducted the literature search from May 2020—December 2020 to identify potential studies for inclusion: PubMed including the Cochrane Library, Scopus, ProQuest, Google Scholar, Medline and grey literature such as dissertations. The authors then updated their search in February 2021 to include any relevant studies published since December of 2020. The keywords used for the search included: Lavender Aromatherapy, Inhalation aromatherapy,

Lavender oil for sleep, Lavender oil and sleep quality, and Aromatherapy for sleep quality. We also examined the reference lists of all publications for additional studies. All search results were exported to an Endnote Library data base and duplicates were eliminated.

2.4 Eligibility criteria and process

We included all studies conducted on examining the effects of lavender oil aromatherapy by inhalation in hospitalized patients. The general eligibility criteria included any type of research study published from 2000 to February 2021,

full text available in English language, and the focus of the study was specific to lavender inhalation aromatherapy in hospitalized patients.

The selection review process consisted of three stages: initial screening conducted by the first author (AJ) of the title and abstracts, retrieval and screening of full texts completed by the first and second authors (AJ and JW), resolving discrepancies through discussion between the authors, and final selected studies' grouping and collation. The PRISMA-eR reports the phases of research study identification and selection (see Figure 1).

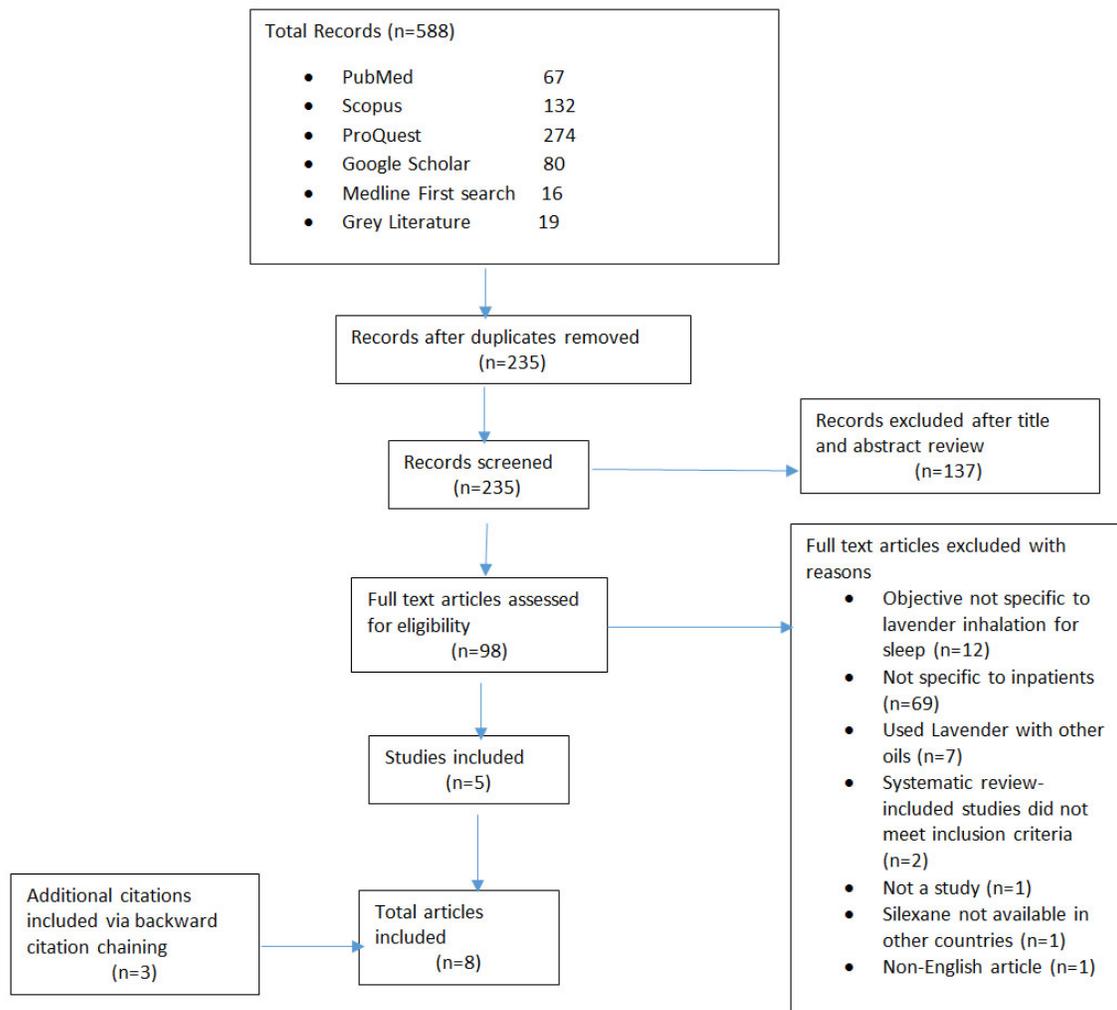


Figure 1. PRISMA flow diagram illustrating the search strategy

2.5 Data extraction and charting

Through the data base search, all articles were reviewed for eligibility using the inclusion exclusion criteria, by reading the title of the article and the abstract. All studies on lavender inhalation aromatherapy in hospitalized patients, published from 2000-February 2021 in English language with full text

availability were included for this review. Studies that used single or multiple aromatherapy modalities on healthy adults or studies conducted on outpatient clinics and in the community were excluded. The article retrievals were based on eligibility or if the eligibility was unclear. Those studies with unclear eligibility criteria, for example, whether the setting

was inpatient or outpatient, were also excluded from this review. All preliminary search results were initially screened by one reviewer. All eligible identified studies (8) were independently reviewed by AJ and JW.

2.6 Screening

Our electronic searches identified 588 citations of which 235 were screened for inclusion after removal of duplicates (see Figure 1). The titles and abstracts were assessed and reviewed for their relevance based on inclusion criteria. This resulted in 98 citations eligible for full text review. The full text of all the selected citations were accessed and reviewed to determine inclusion criteria (stage II, selection). Of these, 93 were excluded; 12 were excluded based on study objective in that they were not specific only to lavender inhalation for sleep, 69 were excluded because the study subjects were other than inpatients. In addition, seven were excluded for combining lavender with other oils for the main intervention, one was excluded because it was not reported research, two published were non-English, and one for non-availability and unknown status of a specific drug used as a comparison product in the study.

Two systematic reviews were excluded because all of the review articles in those analyses did not meet the inclusion criteria for this scoping review. However, we included three citations identified through this backward navigation that met the scoping review's criteria.

In total eight citations were included in this scoping review that were published between 2000 and 2021 (see the Appendix). Randomized controlled trials, seven, were the most common type of reviews included.^[15,26-31] The remaining study was a pretest-post-test design.^[19] The studies that met the inclusion criteria are listed in the Appendix with pertinent information examined for this review.

3. RESULTS

Scoping reviews based on their results can often highlight the need for research or further systematic reviews. Our results demonstrated three specific themes that describe the reviewed, limited, published studies: study population characteristics and country of investigation, study purposes, and intervention (lavender), and administration variations. In addition, the review highlighted some important clinical information related to nursing practice and are highlighted in the results.

3.1 Study population and country of investigation

All the studies included in the review were individual studies (n = 8) of which seven were conducted in intensive care units. Of these, five studies were specifically conducted on patients

with cardiac illnesses admitted to a coronary care unit or intensive care unit.^[15,27,29-31] The remaining two studies were conducted on patients admitted to a general ICU.^[19,28] One study was conducted with cancer patients as subjects.^[26] All studies included in the review utilized adult patients as their sample. One study was a pilot study.^[28] Of the eight studies reviewed, five were conducted in Iran.^[26,27,29-31] Each of the remaining three studies were conducted in different countries: one each in the United States,^[28] the Republic of Korea,^[19] and Turkey.^[15]

3.2 Purposes of studies

Of the eight studies in this review, five studies solely focused on the effect of inhaled lavender oil aromatherapy on sleep quality.^[26,27,29-31] Two studies focused on lavender aromatherapy's effect on sleep quality and vital signs' changes,^[19,28] and one study's emphasis was on patients' anxiety levels with improved sleep as a secondary outcome.^[15]

3.3 Application of lavender as intervention

In reviewing lavender as an intervention, several disparate application aspects were noted. These differences across studies focused on the intervention, lavender, and the concentration of the oil, the dosage, and the method used for inhalation. The concentration and dosage of lavender oil used varied across the eight studies. Two studies^[26,30] used three drops of 100% lavender oil on a cotton ball or napkin attached to the patient's skin for 20 minutes prior to sleep. One investigation reported^[28] using three mls. of 100% lavender oil in a glass jar near the patient from 10 pm-6 am. In another study, the researchers used two drops on a cotton ball placed in a small box near the patient's pillow from 10 pm-6 am., and the oil concentration was not specified.^[31] One study used 15 drops of 20% lavender oil on a swab pinned to patient's pillow all night.^[27] In another study, the researchers used two drops of 2% lavender oil in a 2x2 gauze attached to patients' clothing, placed 12 inches below the nose.^[15] One study reviewed used 15 drops of oil with no details on concentration, duration, or mode of inhalation delivery.^[29] The one pretest/post-test study used three drops of lavender oil using an aroma stone on the patients' bed for the entire night.^[19] Seven studies included in the review used a control group; the pre-test post- test study did not. Further, in one of the randomized controlled studies, the researchers used three arms, rather than only a control group; the intervention arms were lavender oil, the second group received peppermint oil, and the third group received aromatic distilled water.^[30] Measuring sleep quality was an outcome in all eight studies although different instruments were used.

4. DISCUSSION

The objective of this scoping review was to report, through a step wise methodology, a synthesis of the body of research literature on lavender inhalation aromatherapy, aimed at improving sleep in hospitalized patients. By focusing on existing research, this review aimed to conclude best practices for nurses for the use of lavender aromatherapy to improve sleep quality. Following the review, there were four resulting categories that influence a lack of confidence in the present evidence for nurses' use of lavender aromatherapy for sleep in hospitalized patients; these are discussed. In addition, while not the focus of the literature reviewed, other factors that compounded the research search are described. Also considered here is significant clinical information such as the impact of studies on healthy individuals, a vigilance of regulatory issues around botanicals, and nurses' education and training related to lavender aromatherapy for sleep in hospitalized patients.

4.1 Limitations

4.1.1 Number of Studies

The scoping review provided only a limited number, 8, of articles from which to draw conclusions. While these are useful in knowing the "state" of the effectiveness of aromatherapy for sleep, that is, some positive outcomes have been reported, the mechanism for application and its dosage including application time are so disparate, they provide little clarity for clinical intervention.

4.1.2 Wide range of populations and countries

Only one study was conducted in the United States.^[28] The use of evidence for practice is of course country-specific as nursing practice regulations differ across countries. In many countries and cultures specifically Asian^[19] and Middle Eastern,^[15] there is more familiarity with, and subsequent comfort with, and use of complementary/alternative interventions as remedies in health and illness. Practitioners especially nurses in the US are less familiar with such use and also must adhere to regulations especially those that regulate botanical and herbal remedies. Moreover, within US healthcare facilities, a practice protocol or policy guides nursing care and includes a description of any intervention for specific purposes, and in this case, sleep or comfort would be the identified purpose.

Often in US hospitals, nurses address patient comfort called "tuck in" interventions for promoting sleep hygiene that includes a variety of non-physician ordered interventions and are more environmental change procedures such as decreasing noise and light.^[7] Generally, clinical nurses working with hospitalized patients in the US do not diagnose disorders such as insomnia or anxiety but rather their scope of

practice would include sleep hygiene or promoting sleep. This influences the critical need for evidence to develop the appropriate protocols.

4.2 Disparate Methodology

Study interventions in this review varied in application of lavender oil for aromatherapy such as the inhalation method. While indirect application as a method was a key component of the selection for review, this could imply oil on a cotton ball applied to a patient's gown or collar,^[26,30] or inhalation through a diffuser in the room.^[28,31] The length in time of the inhalation itself also varied from 20 minutes to 10 hours.^[15,19,26-31] Compounding the lack of a consistent application method was the extreme variance in the strength of the oil in percentage from 2%, to 100%.^[15,26,28,30] and the amount of the oil used in the application itself from a minimum of 2 drops to 3 ml.^[15,19,26-31] It was also unclear in the studies reviewed how many times, or nights, the intervention occurred.

4.3 Study purposes and designs clinical reports: confounding the evidence

Some studies were not included in this review because their purpose was the effect of lavender on both anxiety and sleep, therefore the interaction of anxiety, or the impact of reducing anxiety had on promoting sleep, must be considered as a limitation when searching for clinical evidence. While sleep is improved, in one study, it was unclear if the reduction of anxiety actually improved sleep as this analysis was not undertaken.^[15] Many studies, also not included in this review, utilized lavender in combination with other oils as an intervention, some researchers used carrier oils; this again blurs the findings on the actual effect of lavender oil on sleep. Caution must also be observed when searching for evidence in nursing reports on the clinical use of lavender aromatherapy. One nursing-authored study with a large sample size reported using a retrospective review of hospitalized patients. Unfortunately, this article merely reported on the large number of incidents in which essential oils were used for patients, many in combination, and for a variety of different symptoms with little information about dosages, application, and importantly no outcomes were included.^[16] In addition, many studies we uncovered, but were not included in this scoping review, utilized healthy individuals or community samples of individuals with self-reported complaints of sleeping difficulties to demonstrate the effectiveness of lavender aromatherapy. This evidence can confuse lavender aromatherapy's effectiveness for practice when the focus is on hospitalized individuals. The context for sleep itself, which is a new environment for individuals who are ill or facing surgery is different. As well, the health assessment of community samples studied, when

compared to hospitalized patients must also be considered when evaluating evidence.

4.4 Additional Influencing Factors: Safety and Adverse Effects

Unlike clinical trials of pharmacotherapy agents that are tested in exact dosages and application processes for use, essential oils fall into the category of botanicals and are not regulated as drugs in the US by the Food and Drug Administration (FDA). Herbal substances are regulated as food and their manufacturer's safety and efficacy are not determined through rigorous trials whose findings are approved by the FDA.^[32] Moreover, because oils are sold over the counter for personal use and manufactured by botanical companies not regulated for safety quality and effectiveness, there is no expectation of standardization for individuals' personal use or specific application; that is, manufacturers can sell a product in the US without proving it works.^[32] However, manufacturers in the US may not advertise their products as effective for illnesses or disease. Commercial advertising can allude to effectiveness using anecdotal evidence. However, unfortunately, this information can influence the way botanicals are widely used even by clinicians.

Finally, none of the studies reviewed reported safety incidents when testing for effectiveness. Yet, some related literature on lavender use has demonstrated that while allergies are uncommon with lavender oil inhalation methods, some allergies have been noted if the oil touches the skin.^[33] Caution should also be observed in hospital rooms when one patient agrees to lavender aromatherapy, especially through indirect methods, and the other patient might be exposed.

Blood pressure lowering is also an important concern with lavender inhalation. In one reported study on stroke patients, lavender aromatherapy for anxiety was shown to lower blood pressure and anxiety levels.^[34] Nonetheless, in another study with ICU cardiovascular patients, lowered blood pressure results were not deemed to be clinically relevant when lavender aromatherapy was used.^[35]

4.5 Nurses' education and knowledge

There is limited published literature on nurses' education regarding aromatherapy. Some of the nursing literature has focused on nurses' knowledge and their comfort with the use of complementary and alternative medicine (CAM), and its effect on patient referral. One study concluded that nurses generally believed they did not have sufficient knowledge regarding CAM; however, their personal use and positive attitude were speculated to be influential on nurses' integration of evidenced base CAM into practice.^[36] Some nursing-focused publications have provided important information

for nurses about herbal supplements, their composition, use, and adverse effects. One comprehensive review primarily focused on nurse practitioners' informational needs; noteworthy, in the US, they have a different scope of practice from hospital based clinical RNs.^[37]

Some nurses who are certified in holistic care also are trained in various CAM modalities. Importantly, holistic nursing as a specialty is not synonymous with education and training in CAM, although that may be one focus of the specialty role.^[38] Some nurses are licensed herbal practitioners in the US and some have specific knowledge and training in the use of essential oils.^[39] These specialists may not generally be employed in hospitals and, if employed, may not be in the role of bedside clinical nurses. However, their expertise can be utilized in supporting the need for evidence for hospital nursing procedures and clinical protocols for aromatherapy and sleep, especially regarding dosages, strength of oils and application methods.

Authors of an early publication that reviewed nurses' use of aromatherapy in a wide-range of specialties in the UK recommended that nurses have at least a basic understanding of the chemical structure and physical properties of essential oils as well as their safe application.^[40] However, the authors suggested that nurses ideally engage in formal training as aromatherapists also stressing that at all times nurses should be guided by professional and legislative requirements.

4.6 Research recommendations

This review demonstrated several areas that warrant research to provide the evidence for nurses' use of lavender aromatherapy for hospitalized patients. Nurses need to engage in clinical trials with hospitalized patients that use randomization with placebo and control groups, or utilize the usual standard of nursing practice in a comparison group. Lavender intervention's effectiveness must include specific uniform dosages, strengths, amount, and applications determined from findings of the limited published reports to date on similar hospitalized patients. Moreover, the effect of lavender as an intervention on sleep should consider self-reported sleep quality as well as length of time asleep. In addition, more than one night of lavender intervention should be considered in any research design because the first night of hospitalization, in a new environment, might itself induce anxiety affecting the outcome of sleep quality and amount of time asleep.

5. CONCLUSIONS

The use of lavender aromatherapy by nurses may rely on data about its effectiveness from meta-analyses that have to date not taken into account important clinical information

on dosages and application procedures. These useful meta-analyses report on the limitations of the research such as small sample sizes or a lack of sample randomization. However, on closer inspection of the literature, several limitations that affect the evidence needed for nursing practice are apparent. The evidence should be closely examined prior to developing policies and protocols. Nurses working at the bedside may need more specific training and education re-

garding aromatherapy especially related to adverse effects and safety issues. Nurses should also undertake rigorous clinical trials to determine the effectiveness of lavender aromatherapy for sleep in hospitalized patients. Disseminating such results will strengthen practice and improve patient care quality.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare no conflicts of interest.

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