
A Quest for Quality Reporting in Aromatic Research



Aromatic Research Quality Appraisal Task force (ARQAT)

2022 WHITE PAPER



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Introduction

Aromatic research is at a crossroads. In recent years, use of essential oils and aromatics* to support the psycho-emotional and physiological needs of the public has increased dramatically. Despite the substantial increase of aromatic research published over the past 20 years (Koo, 2017), many studies lack details of the aromatic interventions used. High-quality aromatic research reporting is necessary to provide the evidence base for safe use and practice.

Without high-quality reporting of aromatic interventions, the scientific evidence base for clinical* use of essential oils remains weak (Freeman et al., 2019; Y. S. Zeng et al., 2018). Full descriptions of the aromatic interventions and essential oil characteristics are often minimal or omitted, preventing replication of the intervention, and making it difficult to translate studies into practice.

As a result, a task force of aromatherapy practitioners, educators, scientists, and researchers assembled to assess and determine how to proceed with quality standards for aromatic research creation and reporting.

*See [Clarification of Terms](#) section for more information

Problem Statement

Increased aromatic research is crucial to evidence informed practice, however, quantity does not always translate into quality. Many countries have limited formal education and verification of expertise in aromatic research. Suboptimal reporting can be traced to the reality that many aromatic practitioners are not trained as researchers. Conversely, healthcare researchers, steeped in scientific methods, are often not trained in aromatic inquiry, and they may not engage (or be able to identify) experts in the field of aromatics to inform their study protocols.

The need for guidance with quality appraisal was identified by the Aromatic Research Quality Appraisal Task force (ARQAT) President and Founder, Marian “Marnie” Reven, as she explored literature surrounding aromatherapy in palliative care. The studies examined were: (Candy et al., 2020; Goepfert et al., 2017; Kawabata et al., 2020; Kyle, 2006; Lai et al., 2011; Ovayolu et al., 2014; Serfaty et al., 2012; Soden et al., 2004; Wilcock et al., 2004; S. Wilkinson, 1995; S. Wilkinson et al., 1999; S. M. Wilkinson et al., 2007; Yildirim et al., 2020; Y. S. Zeng et al., 2018b). While the study design of the randomized controlled trials was often good, the aromatherapy and essential oil parts of the studies were lacking. Many studies were published without information about which essential oils were used, their Latin binomial, their major chemical constituents, or where they were sourced. Essential oils contain dozens, sometimes hundreds, of



constituents making identification vital as each constituent has its own characteristics and effects on the body. Because there are many factors influencing essential oil constituents, a full report is recommended.

While there was often a clear description of the massage intervention in studies that used both essential oils and massage, there was no indication beyond dilution about which essential oil was applied during massage and why. Many studies failed to report adverse reactions or include a statement that no adverse reactions were reported, and almost none of the studies gave any indication about odor recognition, odor preferences, expectancy, or perceived intensity.

These initial realizations led to further investigation of many other reviews found in the Cochrane library and various other databases. Systematic reviews and meta-analyses were available for studies done within the past 20 years. The conclusion of almost every one of these reviews was the same—the evidence for the beneficial effect of aromatherapy in healthcare was inconclusive (E. Ball et al., 2020; Es-haghee et al., 2020; Freeman et al., 2019). So many details were missing from the original research reports that it was difficult to meta-analyze, generalize, replicate, and create a robust evidence base that would enable healthcare professionals to accept non-pharmacological use of essential oils into mainstream healthcare.

Many would agree that research into modalities such as aromatherapy requires consideration of factors not present in pharmaceutical drug trials. In drug trials, it is possible to a great extent to isolate the impact of a single chemical and compare effects to comparable treatments and placebo. Those wishing to research aromatherapy are challenged in many ways, not least of which is fully considering the sense of smell, which has only within the past 20 years become more fully understood (Bowles, 2020a; Herz, 2009, 2016). For therapies involving complex multimodal and multicomponent interventions, such as aromatherapy, research criteria are not clearly defined (Ijaz et al., 2019).

The onus for improving aromatherapy research reporting rests on the shoulders of aromatherapists with research training and the related community of scientists and researchers with an interest in aromatherapy and aromatic research.

Formation of ARQAT

The Aromatic Research Quality Appraisal Task force (ARQAT), pronounced R-Cot, began as “The White Paper Project” composed of interested volunteers with backgrounds in aromatherapy, academia, science, and healthcare. The original vision of the task force was to publish a white paper detailing the need for specific appraisal and reporting criteria for aromatherapy research. Plans for the white paper evolved and continued to



flow alongside ideas and inspiration for quality appraisal. Those expressing interest attended meetings in January and February of 2021 via an online format. Those wishing to participate were required to have a strong “why” centered on quality of nonpharmacologic aromatic research reporting as this project was forecasted to be extensive.

During the second month of the project, the use of a Delphi process was discussed but then postponed when it was decided that the task force would first create a critique tool for authors and readers of aromatic research publications. This creation would originate from current aromatic literature and comment and suggestion from task force members. Plans to create a formal reporting guideline using a Delphi process continue to evolve.

Initial Brainstorming

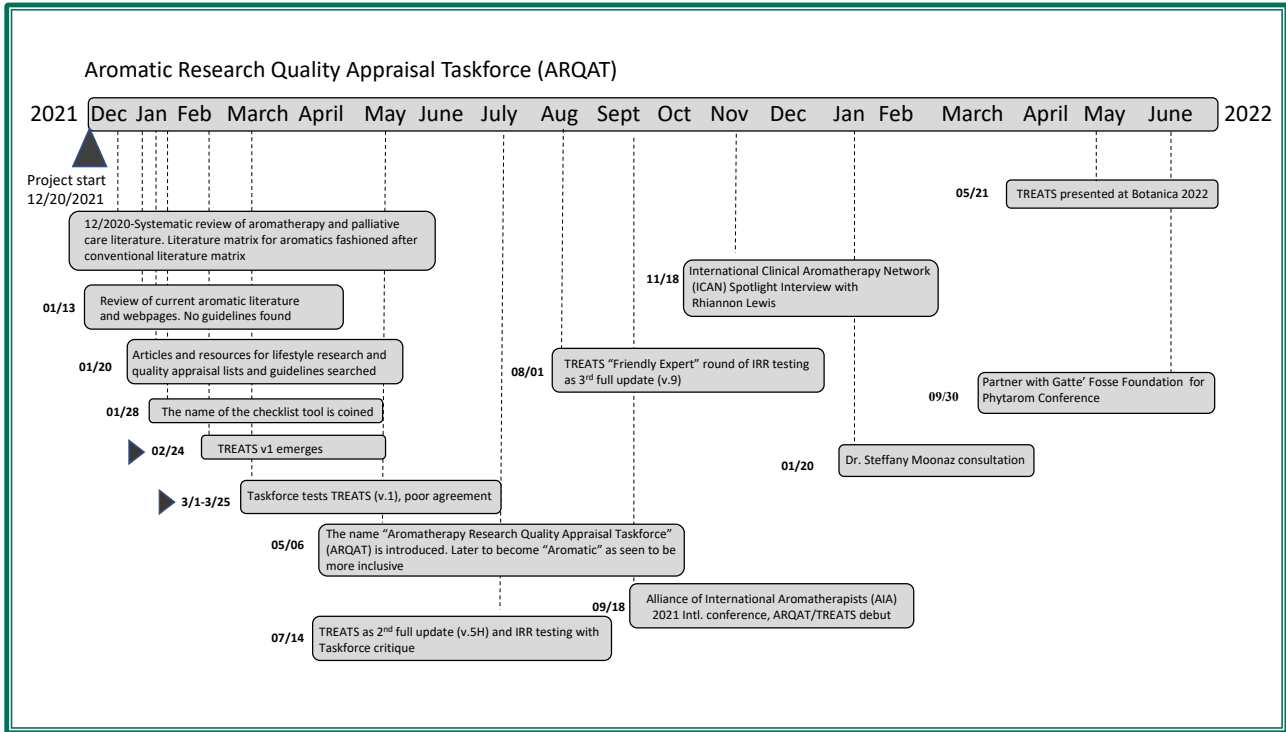
During the first meeting of what is now known as ARQAT, a brainstorming session was held to determine need, focus, and direction. An ARQAT Excel spreadsheet was created to house ideas, information, and data. The task force continues to gather information and data in Excel and use IBM SPSS Statistics software (Statistical Package for the Social Sciences) as appropriate.

After hours of discussion and email communications, the aromatic and scientific research expertise of the task force and current aromatic literature were pooled to create the preliminary TREATS checklist. (See Figures 1 & 3 and Table 1 for details)



Figure 1. ARQAT Timeline

The ARQAT is a task force actively working to improve creation and reporting of aromatic research through development of TREATS and future reporting guidelines. The task force is comprised of committed members who are willing to invest their time and talents to further this work.



Resources used by ARQAT

In addition to the initial systematic review (SR) on palliative care, SRs of aromatherapy and PMS (Es-haghee et al., 2020), dementia (Ball et al., 2020), postoperative nausea and vomiting (Hines et al., 2018), and pain in labor (Smith et al., 2011) were used to assess quality of reporting. Additional review was done for work-related stress (Liu et al., 2013), premenstrual emotional symptoms (Matsumoto et al., 2013), stress and anxiety (Paula et al., 2017), and mood states (Watanabe et al., 2015). The following other resources were also referenced in the creation of TREATS:

Current Aromatic Literature (Books)

- a. Aromatherapy Facts and Fictions (Herz, 2009)
- b. Aromatherapy for Health Professionals (Price & Price, 2012)
- c. Clinical Aromatherapy: Essential Oils in Healthcare (Buckle, 2015)
- d. Complementary Nursing in End of Life Care: Integrative Care in Palliative Care: Handbook for Nurses and Healthcare Professionals (Kerkhof-Knapp Hayes, 2015)
- e. Dr. Joy's Aromatherapy: Use Essential Oils with Confidence for Psyche, Skin, Medicine, and Health (Bowles, 2020a)
- f. Essential Oil Safety: A Guide for Healthcare Professionals (Tisserand & Young, 2014)
- g. The Complete Guide to Aromatherapy (Battaglia, 2003)
- h. The Complete Guide to Aromatherapy (3rd Ed.) (Battaglia, 2018)

Current Aromatic Research Paradigms

- a. Lifestyle research (Cockerham, 2007)
- b. Whole person health (National Center for Complementary and Integrative Health [NCCIH]) 2021-2025 strategic plan
<https://www.nccih.nih.gov/about/nccih-strategic-plan-2021-2025>
- c. Whole systems research (Ijaz et al., 2019)

Organizations

- a. Academic Collaborative for Integrative Health (<https://integrativehealth.org>)
- b. Academic Consortium for Integrative Medicine and Health (<https://imconsortium.org/>)
- c. Academy of Integrative Health & Medicine (<https://aihmed.org/>)
- d. Alliance of International Aromatherapists (AIA) <https://www.alliance-aromatherapists.org/>
- e. Alliance to Advance Comprehensive Integrative Pain Management (<https://painmanagementalliance.org/>)
- f. American Cancer Society <https://www.cancer.org/>
- g. American College of Healthcare Sciences (ACHS) <https://achs.edu/>
- h. Franklin Health Research, Dr. Jessie Hawkins
<https://www.franklinhealth.org/franklin-health-research>
- i. Integrative Health Policy Consortium (<http://www.ihpc.org/about-ihpc/mission/>)



- j. International Federation of Professional Aromatherapists (IFPA) <https://ifparoma.org/>
- k. NCCIH <https://www.nccih.nih.gov/health/aromatherapy>
- l. Tisserand Institute <https://tisserandinstitute.org/>

Quality Appraisal Checklist Resources

- a. A Proposed Framework for Developing Quality Assessment Tools (Whiting et al., 2017)
- b. AGREE (Appraisal of Guidelines for Research and Evaluation) (Brouwers et al., 2016)
- c. AGREE II (Brouwers et al., 2010)
- d. CASP (Critical Appraisal of Skills Programme) <https://casp-uk.net/casp-tools-checklists/>
- e. Critical Appraisal Tools and Reporting Guidelines for Evidence-Based Practice (Buccheri & Sharifi, 2017)
- f. GRADE (Grading of Recommendation, Assessment, Development, and Evaluation) (Meader et al., 2014)
- g. The Methodological Quality Assessment Tools for Preclinical and Clinical Studies, Systematic Reviews and Meta-Analysis, and Clinical Practice Guidelines: A Systematic Review (X. Zeng et al., 2015)

Reporting Guidelines & Extensions (Future planning)

- a. CLARIFY (Checklist Standardizing the Reporting of Interventions For Yoga) (Moonaz et al., 2021)
- b. CONSORT (CONsolidated Standards for Reporting Trials) (Moher et al., 2010)
- c. CONSORT-CHM (Chinese Herbal Medicine) (Cheng et al., 2017)
- d. CONSORT-NPT (Nonpharmacological Trials) (Boutron et al., 2017a)
- e. EQUATOR (Enhancing the QUALity and Transparency Of health Research) <https://www.equator-network.org/>
- f. STRICTA (Standards for Reporting Interventions in Clinical Trials of Acupuncture) (MacPherson et al., 2010)
- g. TIDIER (Template for Intervention Description and Replication) (Hoffmann et al., 2014)



TREATS

Creating a quality appraisal checklist for the essential oil and aroma therapeutic aspects of nonpharmacologic research involved months of effort.

TREATS Iteration One

The first iteration of TREATS originated from work done on a systematic review in the fall of 2020. A literature matrix was created to display elements of each study (Appendix A). Strengths and weaknesses of studies revealed that aromatic elements were missing which led to creation of a matrix specific to aromatics (Appendix B).

Many sources were searched, and three types of tools were explored including scales, checklists, and items. Additional tools were found including critical appraisal tools and reporting guidelines (See Section: Resources Used by ARQAT). Creating the TREATS checklist was inspired by AIA Research committee work involving creation of a grant application and review of proposals. The initial template document for TREATS was a checklist of items a funding agency wished to see in a proposal (Appendix C). Using matrix items and a checklist format, the first iteration of TREATS (Appendix D) was created (Table 1 & Figure 3).

The Naming of TREATS

The Transparent Reporting for Essential oil and Aroma Therapeutic Studies (TREATS) name came out of a brainstorming session on January 28, 2021. At that time “Nonpharmacological” was part of the name though later removed.

Current TREATS

The current TREATS and accompanying Explanatory Document represent the latest update and were released in June 2022 (Appendices E & F).



Table 1. TREATS Phases and Iterations

Three phases and nine iterations of the quality appraisal checklist, TREATS. *Indicates versions used for Trialing.

Phase 1: Development (January to June 2021)	1	Fall 2020 a need was recognized during systematic review of the literature of aromatherapy and palliative care
	2*	January 2021 a call was issued to see if there was interest in joining together to explore the need for some type of formal guidance for creation and appraisal of aromatherapy research
	3	Ongoing search of aromatic literature revealed that no formal guidance existed and that many studies were not created or reported in a manner that promoted application and replication
	4	The task force came together with plans to write a White paper Plans to write the White paper were put on hold as the priority to create guidance for authors and readers of aromatic research became increasingly apparent A preliminary checklist document was created using insights gained through literature search and comments and suggestions from experts
Phase 2: Trialing (June to December 2021)	4	Preliminary trialing of checklist 2 took place in February 2021 and showed little agreement amongst task force members, and no formal analysis was done
	5	Versions 1 through 4 checklists progressively contained elements deemed necessary for reporting of all research with aromatherapy using essential oils used to impact psycho-emotional and physiological states in humans in what would be considered a nonpharmacological, or non-drug, way Version 5 was where the task force realized the checklist was becoming more organized with emergence of 4 distinct sections (essential oils, carriers, intervention, and olfactory considerations) Need for a companion document to explain the checklist items was determined and an explanatory document created, and with refinement, version 6 was ready for testing
	6*	Version 6 was trialed with both the task force and a convenience sample beyond the task force. Internally, the task force also critiqued low risk of bias studies to gain further insight into checklist usability
Phase 3: Refinement (January to June 2022)	7	September 2021 to present, TREATS was introduced to the aromatic and scientific communities through conferences (Alliance of International Aromatherapists, International Integrative Nursing Symposium, and Botanica), and interviews (International Clinical Aromatherapy Network and Aromatic Podcast)
	8	Refinements of TREATS since January 2022 have been cosmetic in nature with a new logo and formatting updates TREATS is shared privately through personal contact with interested researchers
	9	May 2022, the Aromatic Research Quality Appraisal Task force launched its website (www.arqat.org) and now awaits publication before sharing TREATS with the public



During creation, TREATS cycled through development, trialing, and refinement with an iterative flow. This fits within the framework proposed by Whiting et al (2017) of initial steps including determination of need and interest, tool development, and dissemination.

Figure 2. The Cycle of Creation

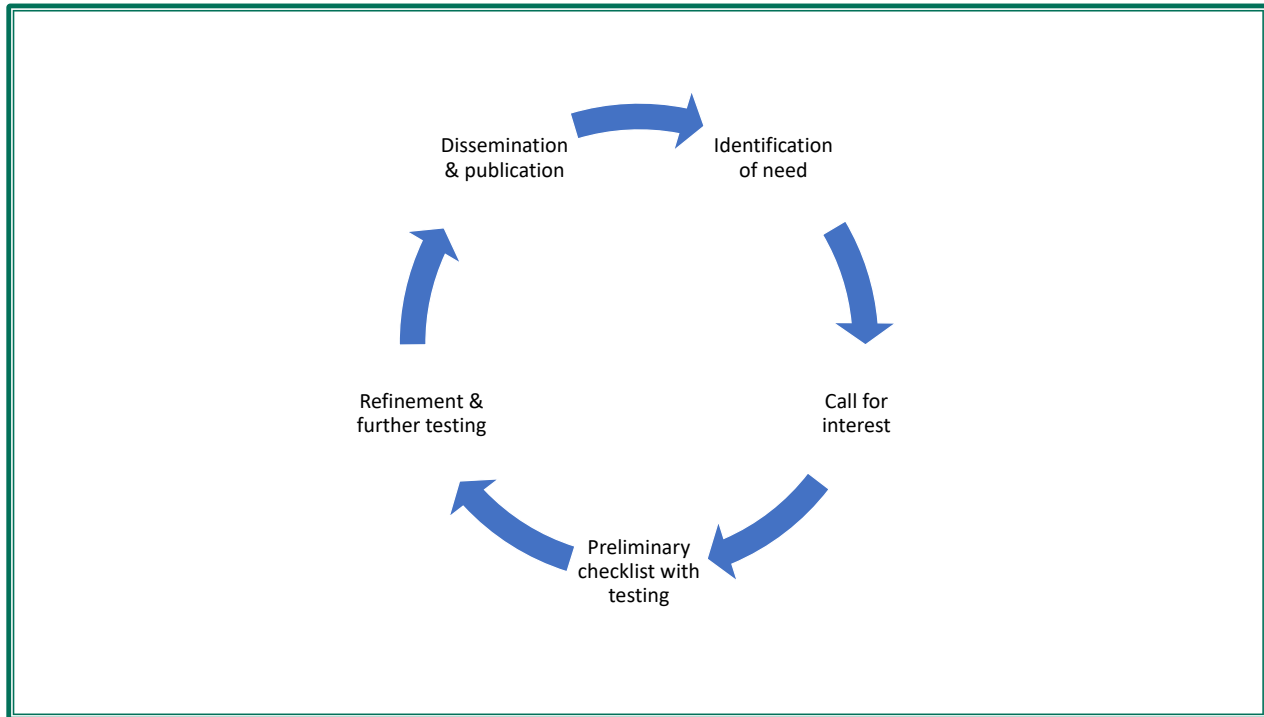
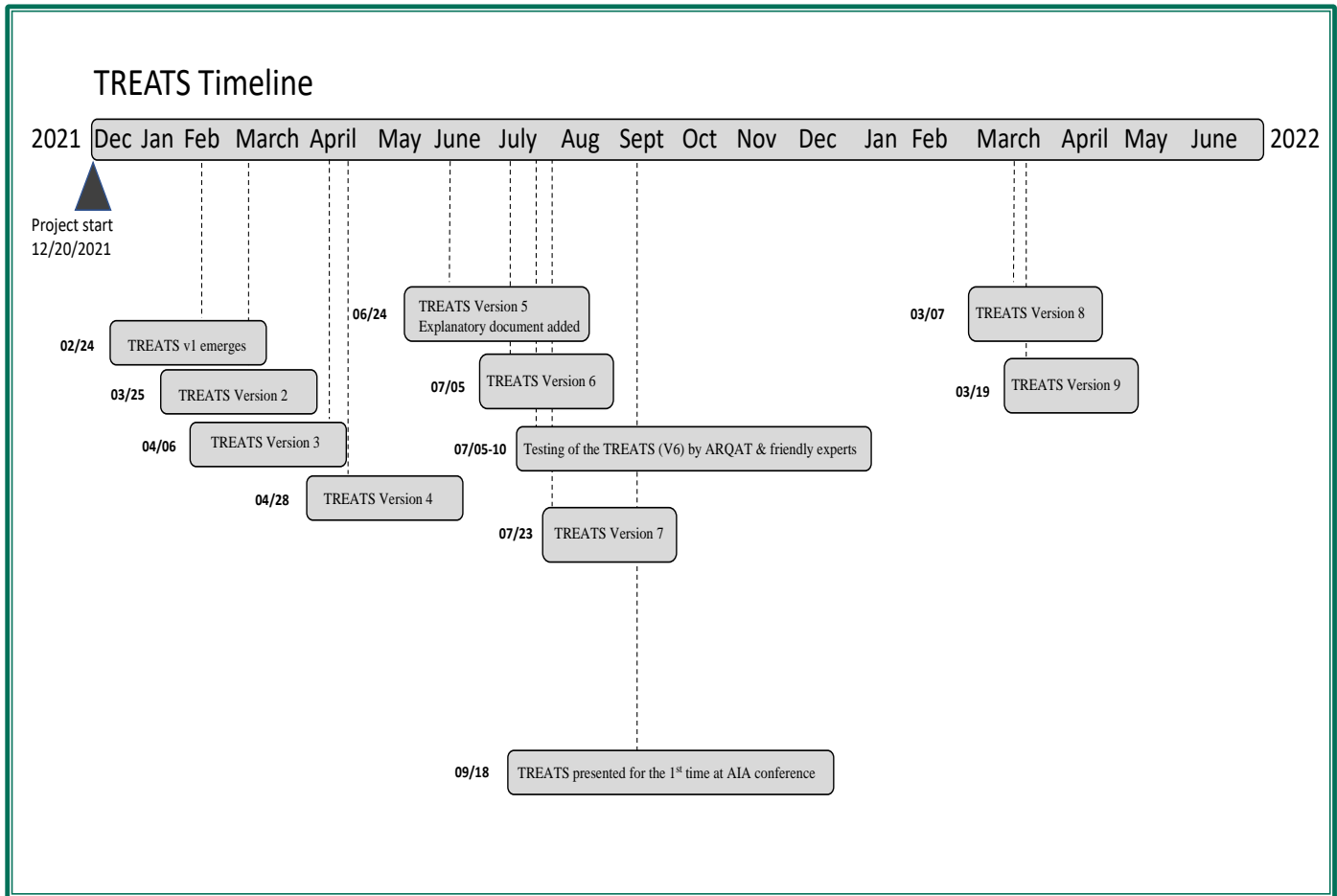


Figure 3. TREATS Timeline

The TREATS has evolved through multiple iterations



TREATS Iterations and Checklist Items

Data and insight gained through reviews of nonpharmacologic aromatic intervention studies informed inclusion of items on the TREATS checklist. For TREATS (version 1) this occurred prospectively through the unpublished SR done by Reven as well as a pre-menstrual syndrome (PMS) SR (Es-haghee et al., 2020). Throughout checklist creation, other studies found within additional SRs confirmed the need for inclusion of further checklist items (Armstrong et al., 2019; E. L. Ball et al., 2020; Ballard et al., 2002; Candy et al., 2020; Freeman et al., 2019; Hines et al., 2018; Smith et al., 2011). This research informed TREATS versions 2 and 3.

Section 1



Our primary concern was the inability to locate what we have identified as necessary information about essential oils within studies. Clear identification of which essential oils are used in research is fundamental to being able to replicate studies. The TREATS includes items that prompt complete identification of each essential oil, such as the botanical name, extraction method, plant part, cultivation method, country of origin, source, batch number, and major plant constituents as identified by chemical analysis using methods such as gas chromatography-mass spectrometry (GC-MS). Variations of constituents lead to differences in therapeutic properties illustrated by the calming effect of linalyl acetate and linalool commonly found in *Lavandula angustifolia* (Lavender) though not present in *Lavandula stoechas* (Spanish Lavender, also called French Lavender) with a main chemical constituent of camphor which is not known for calming but instead for clearing sinuses and congestion. Incomplete reporting hinders replication and the application of essential oils into evidence informed practice (Battaglia, 2003, 2018; Bowles, 2003; Buckle, 2015; Tisserand & Young, 2014).

Section 2

Application methods are covered in Sections 2A and B of TREATS. If application methods are not adequately described, replication of the study and inclusion of it in meta-analyses is not possible. Items included are the dose of aromatic delivered (including details of any dilution in excipient or carriers), frequency of treatment, duration of exposure to the essential oil, and delivery systems such as a diffuser or vaporizer. If diluents or carriers are used, full characterization of them is expected as is for the essential oils (Battaglia, 2003, 2018; Bowles, 2020a; Buckle, 2015; Kerkhof-Knapp Hayes, 2015; Price & Price, 2012; Tisserand & Young, 2014).

Section 3

To have an aromatic study on which to base evidence-informed decisions, the description of the aromatherapy intervention must be clear and detailed enough to allow for replication by other researchers. Section 3 of TREATS includes the rationale for use of the chosen essential oils and application methods, the choice of a theoretical and conceptual framework, consultation with a professional aromatherapist, reports of any allergic or adverse reactions, and consideration of safe storage and use of essential oils during the study (Battaglia, 2003, 2018; Boutron et al., 2017; Hoffmann et al., 2014; Lattin, 2019; Ninot, 2021; Tisserand & Young, 2014).

Section 4

The past two decades have seen an increase in understanding and appreciation for olfaction and the sense of smell. Section 4 of TREATS includes olfactory considerations such as pre-trial evaluation of olfactory ability and identification of anosmia, previous exposure to essential oils, evaluation of odor recognition, expectancies about the odor's therapeutic qualities, the perceived intensity of the odor, and any adverse effects from olfactory testing. These aspects of aromatic research are potential sources of bias and information related to causality is enhanced by inclusion of olfaction (Bowles, 2020a; Herz, 2009, 2016).



Explanatory Statement

Lessons learned from trials of TREATS (phase 1) led to creation of an Explanatory Statement document to be used with TREATS (phase 2). This document assists users and promotes consistent use of TREATS. The ARQAT recommends use of the Explanatory Statement document by all users, even those experienced in aromatherapy.



Conclusion

Our task force is a dedicated, passionate team focused on improving the quality of aromatic research and reporting. From the beginning the ARQAT kept the authors and readers of aromatic research in mind, desiring to help them evaluate the quality of studies. The TREATS quality appraisal checklist is our first creation. We have evaluated the robustness of TREATS and look forward to sharing it with the public.

Our next step will be to conduct a Delphi process to elicit expert consensus on items needed for an aromatic research reporting guideline. Other complementary therapies have similar guidelines for the conduct of their research, and such criteria would be equally as relevant to the study of aromatherapy.

The field of integrative health science requires quality research and reporting to enable practitioners to utilize results in evidence informed care. Watch for updates on our website www.arqat.org and LinkedIn [LinkedIn-ARQAT](https://www.linkedin.com/company/arqat). Aromatic research truly is at a crossroads, and we welcome you on the journey!

Acknowledgements

Acknowledgement of the efforts vital to the creation of the Aromatic Research Quality Appraisal Task force (ARQAT) and the Transparent Reporting for Essential oil & Aroma Therapeutic Studies (TREATS) Checklist follows.

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Roger Carpenter and Steffany Moonaz

Publication of the TREATS manuscript

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Guidance for creation of the TREATS

Anita James, Amanda Lattin, Jah Skipper, Robert Tisserand, Olysea Tokareva, Marco Valussi, Inga Weiser

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Platforms for sharing

Aromatherapy Journal Club with Dr. Joy, Aromatic Podcast with Melissa Holman, International Clinical Aromatherapy Network (ICAN), Rhiannon Lewis, The Alliance of International Aromatherapists (AIA), The Gattefossé Foundation and Delphine Marchand, and West Virginia University, USA

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Logo

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Clarification of Terms

Aromatic- Having fragrance. For ARQAT's work, this refers to materials, such as essential oils, studied for the purpose of finding a supportive benefit. In the broadest sense, aromatics could be considered any of a myriad of fragrant substances from the scent of bread baking to the smell of a rose, to the aroma emanating from an essential oil product. As an adjective, 'aromatic' is used to describe having an aroma that is noticeable and pleasant or fragrant, and having a strong, pungent smell. 'Aromatic' used as a noun is used in the context of an aromatic plant or aromatic plant part (essential oil) and an aromatic organic compound (again, could be describing an essential oil) <https://www.merriam-webster.com/dictionary/aromatic>. Considering how watered down the term aromatherapy has become, the term aromatic when coupled with intervention, practitioner, or medicine may be more palatable <https://tisserandinstitute.org/what-is-aromatherapy-petra-ratajc/>.

AT- Aromatherapy is a term initially coined by René Maurice Gattefossé that refers to the practice of using volatile organic compounds, also known as essential oils, of plant materials for the purpose of bringing about well-being. The use of aromatic materials and essences dates back as far as Imhotep (1600 BC) who was considered the God of Medicine by the ancient Egyptians and used aromatherapy in several ways including pain relief (El Molla, 2006).

One of aromatherapy's unique appeals is that it can have beneficial effects on both mind and body and be both natural and beautiful in fragrance. The past 20 years have seen the term 'aromatherapy' used as a marketing strategy for all types of fragrance industry products. This appears to some as a misrepresentation of what the term and heart of aromatherapy are and this has led some aromatherapists to avoid use of the term altogether <https://tisserandinstitute.org/what-is-aromatherapy-petra-ratajc/>.

Finally, "Aromatherapy is both art and science that encompasses the controlled and skilled use of pure essential oils for promoting health and wellness. Aromatic plants, essential oils, floral waters, and their extracts have been used by every major culture for thousands of years throughout history. There are several applications for aromatherapy including massage, aesthetics, psych-emotional, clinical, and therapeutic. Aromatherapy is considered a holistic and natural alternative for health maintenance." (Definition of Aromatherapy courtesy Laraine Pounds and Valerie Cooksley; The Institute of Integrative Aromatherapy Volume I., used with permission)

Aromatherapist- An individual trained in the use of essential oils with a goal of bringing about a supportive and beneficial result at their client's request. Aromatherapist is a term used to describe one who has been trained to administer essential oils to address physical and emotional conditions, and for overall well-being. There are no accepted international standards for one to call themselves an aromatherapist. Some countries require specific education and licensure, while other countries have no requirements.



One who uses the title Certified Aromatherapist (CA) has typically completed aromatherapy education requirements of a particular school. Requirements vary by school and some certification programs require more training than others. Two national aromatherapy organizations in the U.S., the Alliance for International Aromatherapists (AIA) <https://www.alliance-aromatherapists.org/> and the National Association for Holistic Aromatherapy (NAHA) <https://naha.org/>, have set educational and practice standards for the safe use of essential oils provided by a qualified aromatherapist. These two organizations and the Aromatherapy Registration Council (ARC) <https://aromatherapycouncil.org/>, an organization that sponsors voluntary aromatherapy examinations, all require a minimum of 200 hours of aromatherapy education that meets specific criteria.

An aromatherapist who successfully demonstrates a core body of aromatherapy knowledge by passing the ARC examination holds the title of Registered Aromatherapist (RA). According to the AIA, one who is operating in a clinical and research capacity should be at an Advanced Practice level having at least 400 hours of education and several other qualifications.

Covering this topic in its entirety would comprise an entire paper or book chapter. For this work, the ARQAT and the checklist tool, an “Aromatherapist” is designated as one who is a “Qualified Aromatherapist” and according to the task force and input from experts in aromatic/aromatherapy, a study involving aromatics that impact persons in psyche and physiological ways should have a qualified aromatherapist or consult with a qualified aromatherapist to create aromatically focused studies.

ARQAT- The **Aromatic Research Quality Appraisal Task force** came together in January 2021 and is a group of researchers, scientists, educators, aromatherapists, and healthcare practitioners dedicated to setting standards in aromatherapeutic research.

CAM- Complementary and Alternative Medicine is one of many terms used worldwide to describe care and modalities that are other than conventional. In the US, the National Cancer Institute (NCI) defines CAM as a term for medical products and practices that are not part of standard medical care <https://www.cancer.gov/about-cancer/treatment/cam>.

Clinical Aromatherapy- Use of essential oils in healthcare to support relief of symptoms such as pain, nausea, vomiting, insomnia, and anxiety. It is used in inpatient as well as outpatient settings.

Conventional Medicine- a system in which health professionals who hold recognized degrees (depending on country and region) treat symptoms and diseases using drugs, radiation, and surgery. It may also be called allopathic, bio, Western, mainstream, and orthodox <https://www.cancer.gov/about-cancer/treatment/cam>.



EBP- Evidence Based Practice in its purest form, describes practice that is based on evidence. Considered the gold standard for effective healthcare delivery, it also raises barriers because it can take a very long time to compile this base (Kumah et al., 2019).

EIP- Evidence-Informed Practice is described as the application of evidence in practice that is informed by prior research though not necessarily limited to it. According to Kumah and colleagues (2019), the principles of evidence-based practice are likely contained within the research awareness found in an evidence-informed practice model (Kumah et al., 2019). The ARQAT prefers the use of this term.

EO- An Essential Oil is a fragrant volatile organic compound found in many herbaceous plant materials. Essential oils are “mixtures of volatile, organic compounds originating from a single botanical source and contribute to the flavor or fragrance of a plant” (Tisserand & Young, 2014, p. 5). The word ‘essential’ is used to reflect the intrinsic nature or essence of the plant. The term ‘oil’ is used to indicate that this substance is a liquid that is lipophilic and insoluble in water. Essential oils typically contain dozens of constituents. Each constituent has its characteristics and effects on the body. Because there are many factors influencing essential oil constituents, a full report of a single essential oil is complex and requires careful consideration.

Holistic Health- Holistic is a term used when referring to something that is encompassing the whole. Defined as ‘relating to or concerned with wholes or with complete systems rather than with the analysis of, treatment of, or dissection into parts’ <https://www.merriam-webster.com/dictionary/holistic>. The ‘whole’ could be seen in healthcare as considering all aspects of a person’s life, not simply their symptoms or illness. This is reflective of trends in healthcare and research where persons are viewed as ‘whole systems’ or whole persons’ (Cockerham, 2007; Ijaz et al., 2019; NCCIH, 2021). Aromatic practitioners (aromatherapists) may operate within a holistic paradigm in interactions with clients and when creating support plans (Buckle, 2015; Kerkhof-Knapp Hayes, 2015; Lattin, 2019). *See Aromatherapy in Holism Model proposed by Professor Amanda Lattin (Lattin, 2019).

Integrative Health- In the United States, the NCCIH has worked to advance the position that evidence-based complementary therapies should be “integrated” with and not used as an “alternative” to conventional medicine. The term is not universal as others propose that the term “nonpharmacologic” is preferred.

Lifestyle Research- Health lifestyles are collective patterns of health-related behavior based on choices from options available to people according to their life chances. In lifestyle research, health is looked upon as an achievement (Cockerham, 2007).

Meta-Analysis- Statistical information gleaned from combining the results of similar studies identified during a systematic review.



NCCIH- National Center for Complementary and Integrative Health is the U.S.-based institute within the NIH concerned with the study and evaluation of complementary and alternative health practices <https://www.nccih.nih.gov/about/nccih-strategic-plan-2021-2025>.

NIH- National Institutes of Health is a part of the U.S. Department of Health and Human Services. The NIH is the largest biomedical research agency in the world. NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability <https://www.nih.gov/about-nih/what-we-do/mission-goals>.

Nonpharmacologic- Interventions not involving the use of medications. The impetus for the task force was poor reporting of aromatic components of aromatherapy studies in palliative care populations. The task force is mainly focused on the concerns and quality of nonpharmacologic aromatic research and reporting. The term nonpharmacologic is used and refers to the application of aromatics in the form of essential oils in human beings where effects on human psyche outcomes are self-reports of relief of distressing psychological symptoms, such as stress and anxiety. Non-pharmacologic aromatic-based studies may also report physiological data on outcome parameters such as heart rate (HR), heart rate variability (HRV), cortisol levels, blood pressure (BP), pulse, and respiratory rates.

Olfaction- the sense of smell, or the act or process of smelling. The ability to smell and the connections and associations made with the perception of odors are thought to play a large role in the effects attributed to aromatherapy (Bowles, 2020a). Section #4 of TREATS is dedicated to both olfactory function and bias.

Quality Appraisal Checklist- a list of items aimed at allowing the researcher to evaluate the content of a study for the purpose of assessing its value.

Quality Appraisal Tool- any tool designed to target one or more aspects of the quality of a research study (Whiting et al., 2017). Meant to be used by authors and readers of research to determine the quality of reporting. In the case of TREATS, the checklist is designed to identify those aspects considered germane to most nonpharmacologic aromatic intervention studies using essential oils via inhalation or topical application. Examples include AGREE, AGREE II, CASP, and TREATS.

Reporting Guidelines- aid in the structured, comprehensive, and transparent dissemination of outcomes and findings during the publication process. Meant to be used by researchers as a guide to those aspects of studies considered pertinent for the design chosen. Examples include CONSORT, STROBE, and CLARIFY.

SR- A Systematic Review is a search of scientific literature (including peer-reviewed articles, texts, white papers, gray literature, etc.) using a predetermined and



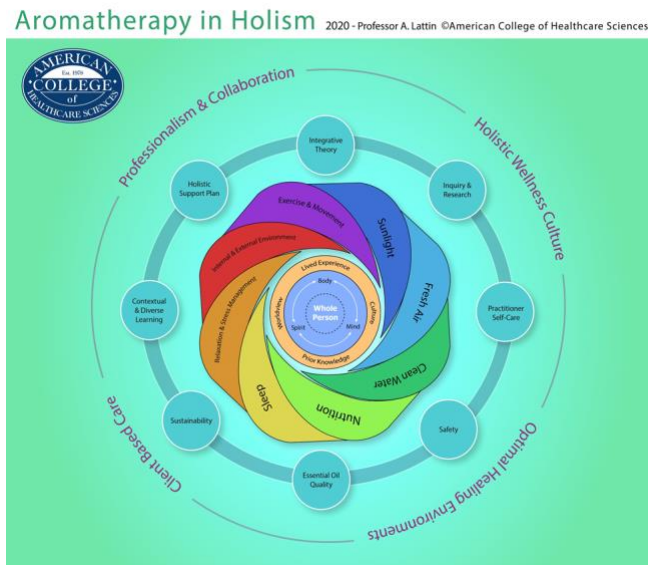
comprehensive method to search and screen to identify relevant information within an area of focus.

TREATS- Transparent Reporting for Essential oil and Aroma Therapeutic Studies is the title for the appraisal checklist created by the ARQAT with the aim to improve reporting of nonpharmacologic aromatic essential oil studies.

Whole Person Health- a concept put forth by the NCCIH in their 2021-2025 Strategic plan. Whole-person health involves looking at the whole person—not just separate organs or body systems—and considering multiple factors that promote either health or disease. It means helping and empowering individuals, families, communities, and populations to improve their health in multiple interconnected biological, behavioral, social, and environmental areas. Instead of treating a specific disease, whole person health focuses on restoring health, promoting resilience, and preventing diseases across a lifespan <https://www.nccih.nih.gov/health/whole-person-health-what-you-need-to-know>.

Whole Systems Research- brought out in a systematic review by Ijaz and colleagues in 2019, the concept of whole systems research considers model validity and asks the question, does the round peg of traditional complementary and integrative medicine fit into the square hole of the accepted paradigm of randomized controlled clinical trials? (Ijaz et al., 2019)?

*Aromatherapy in the Context of Holism (Used with permission)



References

- Armstrong, M., Flemming, K., Kupeli, N., Stone, P., Wilkinson, S., & Candy, B. (2019). Aromatherapy, massage and reflexology: A systematic review and thematic synthesis of the perspectives from people with palliative care needs. *Palliative Medicine*, 33(7), 757–769. <https://doi.org/10.1177/0269216319846440>
- Ball, E. L., Owen-Booth, B., Gray, A., Shenkin, S. D., Hewitt, J., & McCleery, J. (2020). Aromatherapy for dementia. *Cochrane Database of Systematic Reviews*, 8. <https://doi.org/10.1002/14651858.CD003150.pub3>
- Ballard, C. G., Psych, M. R. C., Reichelt, K., & Perry, E. K. (2002). Aromatherapy as a Safe and Effective Treatment for the Management of Agitation in Severe Dementia: The Results of a Double-Blind, Placebo-Controlled Trial With Melissa. *J Clin Psychiatry*, 6.
- Battaglia, S. (2003). *The complete guide to aromatherapy*. (2nd Edition). International Centre of Holistic Aromatherapy. ISBN 0 646 42896 9
- Battaglia, S. (2018). *The complete guide to aromatherapy*. (3rd Edition, Vol. 1). Black Pepper Creative.
- Boutron, I., Altman, D. G., Moher, D., Schulz, K. F., Ravaud, P., & for the CONSORT NPT Group. (2017). CONSORT statement for randomized trials of nonpharmacologic treatments: A 2017 update and a CONSORT extension for nonpharmacologic trial abstracts. *Annals of Internal Medicine*, 167(1), 40. <https://doi.org/10.7326/M17-0046>
- Bowles, E. J. (2003). *The chemistry of aromatherapeutic oils* (3rd ed). Allen & Unwin.
- Bowles, E. J. (2020a). *Dr Joy's aromatherapy: Use essential oils with confidence for psyche, skin, medicine and health*. <https://nla.gov.au/nla.obj-2918800428>
- Bowles, E. J. (2020b). Remembering the heyday of aromatherapy in Australian aged care facilities. *International Journal of Professional Holistic Aromatherapy*, 8(4), 17–24.
- Brouwers, M. C., Kerkvliet, K., Spithoff, K., & AGREE Next Steps Consortium. (2016). The AGREE reporting checklist: A tool to improve reporting of clinical practice guidelines. *BMJ*, i1152. <https://doi.org/10.1136/bmj.i1152>
- Brouwers, M. C., Kho, M. E., Browman, G. P., Burgers, J. S., Cluzeau, F., Feder, G., Fervers, B., Graham, I. D., Grimshaw, J., Hanna, S. E., Littlejohns, P., Makarski, J., & Zitzelsberger, L. (2010). AGREE II: Advancing guideline development, reporting and evaluation in health care. *CMAJ*, 182(18), E839–E842. <https://doi.org/10.1503/cmaj.090449>
- Buccheri, R. K., & Sharifi, C. (2017). Critical appraisal tools and reporting guidelines for evidence-based practice: *Worldviews on Evidence-Based Nursing*, 14(6), 463–472. <https://doi.org/10.1111/wvn.12258>
- Buckle, J. (2015). *Clinical aromatherapy: Essential oils in healthcare* (3rd ed.). Elsevier.
- Candy, B., Armstrong, M., Flemming, K., Kupeli, N., Stone, P., Vickerstaff, V., & Wilkinson, S. (2020). The effectiveness of aromatherapy, massage and reflexology in people with palliative care needs: A systematic review. *Palliative Medicine*, 34(2), 179–194. <https://doi.org/10.1177/0269216319884198>



- Cheng, C., Wu, T., Shang, H., Li, Y., Altman, D. G., Moher, D., Bian, Z., & for the CONSORT-CHM Formulas 2017 Group. (2017). CONSORT Extension for Chinese Herbal Medicine Formulas 2017: Recommendations, Explanation, and Elaboration. *Annals of Internal Medicine*, *167*(2), 112. <https://doi.org/10.7326/M16-2977>
- Cockerham, W. C. (2007). New directions in health lifestyle research. *International Journal of Public Health*, *52*(6), 327–328. <https://doi.org/10.1007/s00038-007-0227-0>
- El Molla, A. F. (2006). 996 Pain management in ancient Egypt. *European Journal of Pain*, *10*(S1), S257c–S2258.
- Es-haghee, S., Shabani, F., Hawkins, J., Zareian, M. A., Nejatbakhsh, F., Qaraaty, M., & Tabarraei, M. (2020). The Effects of Aromatherapy on Premenstrual Syndrome Symptoms: A Systematic Review and Meta-Analysis of Randomized Clinical Trials. *Evidence-Based Complementary and Alternative Medicine*, *2020*, 1–13. <https://doi.org/10.1155/2020/6667078>
- Freeman, M., Ayers, C., Peterson, C., & Kansagara, D. (2019). *Aromatherapy and essential oils: A map of the evidence* [Essential oil evidence summary]. Department of Veterans Affairs. <https://www.hsrd.research.va.gov/publications/esp/aromatherapy.pdf>
- Goepfert, M., Liebl, P., Herth, N., Ciarlo, G., Buentzel, J., & Huebner, J. (2017). Aroma oil therapy in palliative care: A pilot study with physiological parameters in conscious as well as unconscious patients. *Journal of Cancer Research and Clinical Oncology*, *143*(10), 2123–2129. <https://doi.org/10.1007/s00432-017-2460-0>
- Herz, R. S. (2009). Aromatherapy facts and fictions: A scientific analysis of olfactory effects on mood, physiology and behavior. *International Journal of Neuroscience*, *119*(2), 263–290. <https://doi.org/10.1080/00207450802333953>
- Herz, R. S. (2016). The role of odor-evoked memory in psychological and physiological health. *Brain Sciences*, *6*(3). <https://doi.org/10.3390/brainsci6030022>
- Hines, S., Steels, E., Chang, A., & Gibbons, K. (2018). Aromatherapy for treatment of postoperative nausea and vomiting. *Cochrane Database of Systematic Reviews*, *3*. <https://doi.org/10.1002/14651858.CD007598.pub3>
- Hoffmann, T. C., Glasziou, P. P., Boutron, I., Milne, R., Perera, R., Moher, D., Altman, D. G., Barbour, V., Macdonald, H., Johnston, M., Lamb, S. E., Dixon-Woods, M., McCulloch, P., Wyatt, J. C., Chan, A.-W., & Michie, S. (2014). Better reporting of interventions: Template for intervention description and replication (TIDieR) checklist and guide. *BMJ*, *348*(mar07 3), g1687–g1687. <https://doi.org/10.1136/bmj.g1687>
- Ijaz, N., Rioux, J., Elder, C., & Weeks, J. (2019). Whole systems research methods in health care: A scoping review. *The Journal of Alternative and Complementary Medicine*, *25*(S1), S21–S51. <https://doi.org/10.1089/acm.2018.0499>
- Kawabata, N., Hata, A., & Aoki, T. (2020). Effect of Aromatherapy Massage on Quality of Sleep in the Palliative Care Ward: A Randomized Controlled Trial. *Journal of Pain*



- and Symptom Management*, 59(6), 1165–1171.
<https://doi.org/10.1016/j.jpainsymman.2020.01.003>
- Kerkhof-Knapp Hayes, M. (2015). *Complementary nursing in end of life care: Integrative care in palliative care : Handbook for nurses and health care professionals : Aromacare, massage, aquacare, relaxation*. Kicozo - Knowledge Institute for Complementary Nursing.
- Koo, M. (2017). A bibliometric analysis of two decades of aromatherapy research. *BMC Research Notes*, 10, 46. <https://doi.org/10.1186/s13104-016-2371-1>
- Kumah, E. A., McSherry, R., Bettany-Saltikov, J., Hamilton, S., Hogg, J., Whittaker, V., & van Schaik, P. (2019). PROTOCOL: Evidence-informed practice versus evidence-based practice educational interventions for improving knowledge, attitudes, understanding, and behavior toward the application of evidence into practice: A comprehensive systematic review of undergraduate students. *Campbell Systematic Reviews*, 15(1–2), e1015. <https://doi.org/10.1002/cl2.1015>
- Kyle, G. (2006). Evaluating the effectiveness of aromatherapy in reducing levels of anxiety in palliative care patients: Results of a pilot study. *Complementary Therapies in Clinical Practice*, 12(2), 148–155.
<https://doi.org/10.1016/j.ctcp.2005.11.003>
- Lai, T. K. T., Cheung, M. C., Lo, C. K., Ng, K. L., Fung, Y. H., Tong, M., & Yau, C. C. (2011). Effectiveness of aroma massage on advanced cancer patients with constipation: A pilot study. *Complementary Therapies in Clinical Practice*, 17(1), 37–43.
<https://doi.org/10.1016/j.ctcp.2010.02.004>
- Lattin, A. (2019). Aromatherapy in the context of holism: Homeostasis, terrain, and the individual. *International Journal of Professional Holistic Aromatherapy*, 8(3), 5–23.
- Liu, S.-H., Lin, T.-H., & Chang, K.-M. (2013). The physical effects of aromatherapy in alleviating work-related stress on elementary school teachers in Taiwan. *Evidence-Based Complementary and Alternative Medicine*, 2013, 1–8.
<https://doi.org/10.1155/2013/853809>
- MacPherson, H., Altman, D. G., Hammerschlag, R., Youping, L., Taixiang, W., White, A., & Moher, D. (2010). Revised STAndards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA): Extending the CONSORT statement. *PLoS Medicine*, 7(6), e1000261. <https://doi.org/10.1371/journal.pmed.1000261>
- Matsumoto, T., Asakura, H., & Hayashi, T. (2013). Does lavender aromatherapy alleviate premenstrual emotional symptoms?: A randomized crossover trial. *BioPsychoSocial Medicine*, 7(1), 12. <https://doi.org/10.1186/1751-0759-7-12>
- Meador, N., King, K., Llewellyn, A., Norman, G., Brown, J., Rodgers, M., Moe-Byrne, T., Higgins, J. P., Sowden, A., & Stewart, G. (2014). A checklist designed to aid consistency and reproducibility of GRADE assessments: Development and pilot validation. *Systematic Reviews*, 3(1), 82. <https://doi.org/10.1186/2046-4053-3-82>
- Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gotzsche, P. C., Devereaux, P. J., Elbourne, D., Egger, M., & Altman, D. G. (2010). CONSORT 2010 Explanation and



- Elaboration: Updated guidelines for reporting parallel group randomised trials. *BMJ*, 340(mar23 1), c869–c869. <https://doi.org/10.1136/bmj.c869>
- Moonaz, S., Nault, D., Cramer, H., & Ward, L. (2021). CLARIFY 2021: Explanation and elaboration of the Delphi-based guidelines for the reporting of yoga research. *BMJ Open*, 11(8), e045812. <https://doi.org/10.1136/bmjopen-2020-045812>
- NCCIH. (2021). NCCIH strategic plan fiscal year 2021–2025. *NCCIH*. <https://www.nccih.nih.gov/about/nccih-strategic-plan-2021-2025>
- Ninot, G. (2021). Defining Non-pharmacological Interventions (NPIs). In G. Ninot, *Non-Pharmacological Interventions* (pp. 1–46). Springer International Publishing. https://doi.org/10.1007/978-3-030-60971-9_1
- Ovayolu, Ö., Seviğ, Ü., Ovayolu, N., & Sevinç, A. (2014). The effect of aromatherapy and massage administered in different ways to women with breast cancer on their symptoms and quality of life: Effectiveness of aromatherapy in breast cancer. *International Journal of Nursing Practice*, 20(4), 408–417. <https://doi.org/10.1111/ijn.12128>
- Paula, D., Luis, P., Pereira, O. R., & Maria Joao, S. (2017). Aromatherapy in the control of stress and anxiety. *Alternative & Integrative Medicine*, 06(04), 1–5. <https://doi.org/10.4172/2327-5162.1000248>
- Price, S., & Price, L. (Eds.). (2012). *Aromatherapy for health professionals* (4th ed). Churchill Livingstone/Elsevier.
- Serfaty, M., Wilkinson, S., Freeman, C., Mannix, K., & King, M. (2012). The ToT Study: Helping with touch or talk, a pilot randomised controlled trial to examine the clinical effectiveness of aromatherapy massage versus cognitive behaviour therapy for emotional distress in patients in cancer/palliative care: The ToT Study. *Psycho-Oncology*, 21(5), 563–569. <https://doi.org/10.1002/pon.1921>
- Smith, C. A., Collins, C. T., & Crowther, C. A. (2011). Aromatherapy for pain management in labour. *Cochrane Database of Systematic Reviews*, 7. <https://doi.org/10.1002/14651858.cd009215>
- Soden, K., Vincent, K., Craske, S., Lucas, C., & Ashley, S. (2004). A randomized controlled trial of aromatherapy massage in a hospice setting. *Palliative Medicine*, 18(2), 87–92. <https://doi.org/10.1191/0269216304pm874oa>
- Tisserand, R., & Young, R. (2014). *Essential oil safety: A guide for health care professionals* (2nd ed.). Elsevier Ltd.
- Watanabe, E., Kuchta, K., Kimura, M., Rauwald, H. W., Kamei, T., & Imanishi, J. (2015). Effects of bergamot (*Citrus bergamia* (Risso) Wright & Arn.) essential oil aromatherapy on mood states, parasympathetic nervous system activity, and salivary cortisol levels in 41 healthy females. *Complementary Medicine Research*, 22(1), 43–49. <https://doi.org/10.1159/000380989>
- Whiting, P., Wolff, R., Mallett, S., Simera, I., & Savović, J. (2017). A proposed framework for developing quality assessment tools. *Systematic Reviews*, 6(1), 204. <https://doi.org/10.1186/s13643-017-0604-6>
- Wilcock, A., Manderson, C., Weller, R., Walker, G., Carr, D., Carey, A.-M., Broadhurst, D., Mew, J., & Ernst, E. (2004). Does aromatherapy massage benefit patients with



- cancer attending a specialist palliative care day centre? *Palliative Medicine*, 18(4), 287–290. <https://doi.org/10.1191/0269216304pm895oa>
- Wilkinson, S. (1995). Aromatherapy and massage in palliative care. *International Journal of Palliative Nursing*, 1(1), 21–30.
- Wilkinson, S., Aldridge, J., Salmon, I., Cain, E., & Wilson, B. (1999). An evaluation of aromatherapy massage in palliative care. *Palliative Medicine*, 13(5), 409–417. <https://doi.org/10.1191/026921699678148345>
- Wilkinson, S. M., Love, S. B., Westcombe, A. M., Gambles, M. A., Burgess, C. C., Cargill, A., Young, T., Maher, E. J., & Ramirez, A. J. (2007). Effectiveness of aromatherapy massage in the management of anxiety and depression in patients with cancer: A multicenter randomized controlled trial. *Journal of Clinical Oncology*, 25(5), 532–539. <https://doi.org/10.1200/JCO.2006.08.9987>
- Yıldırım, D., Kocatepe, V., Can, G., Sulu, E., Akış, H., Şahin, G., & Aktay, E. (2020). The Effect of Lavender Oil on Sleep Quality and Vital Signs in Palliative Care: A Randomized Clinical Trial. *Complementary Medicine Research*, 27(5), 328–335. <https://doi.org/10.1159/000507319>
- Zeng, X., Zhang, Y., Kwong, J. S. W., Zhang, C., Li, S., Sun, F., Niu, Y., & Du, L. (2015). The methodological quality assessment tools for preclinical and clinical studies, systematic review and meta-analysis, and clinical practice guideline: A systematic review: Methodological quality assessment tools. *Journal of Evidence-Based Medicine*, 8(1), 2–10. <https://doi.org/10.1111/jebm.12141>
- Zeng, Y. S., Wang, C., Ward, K. E., & Hume, A. L. (2018). Complementary and alternative medicine in hospice and palliative care: A systematic review. *Journal of Pain and Symptom Management*, 56(5), 781-794.e4. <https://doi.org/10.1016/j.jpainsymman.2018.07.016>



Appendix A: Example from Literature Matrix (RCTs)

Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(1995, Wilkinson), United Kingdom	Evaluate; 1) effectiveness of massage in improving QOL for patients with advanced cancer; 2) effectiveness of aromatherapy massage in improving the QOL for patients with advanced cancer; and, 3) patients' perception as to the value of aromatherapy massage in	RCT	N = 51 adults at palliative care day care, referred by GP, consultants or staff within the center. A consecutive series was used. No blinding was discussed.	Data collected at 4 distinct points. Each patient completed the Rotterdam Symptom Checklist (RSCL) before the first massage and 1 week after the last massage. State Anxiety Inventory (SAI) before and after each massage; Trait Anxiety Inventory (TAI) 1 week after the last massage;	In-group and between group comparisons were used. Comparisons of AT massage and massage QOL showed AT massage QOL improved, massage only, QOL did not improve and lower on average than in their pretest. Statistically significant. Lower state anxiety post massage for both groups but reduction of	Attention to instruments—QOL measured with the RSCL which is reportedly a good way to measure cancer patient QOL. STAI is a validated instrument. Stat tests were appropriate. The author did not try to make a lot of assumptions. Small pilot on 10 people to help with design. Feasible to	Did not explicitly state this was a randomized controlled study, had to go looking for this. No report of validation for instruments. Small numbers. No information about blinding or how randomization took place. No info about how stats were calculated.

	improving their QOL.			Semi-structured questionnaire was sent to patients 2 weeks after last massage at their home, returned by prepaid post.	state anxiety was greater in AT massage group, statistically significant (Z=-2.25, p ,.05).	recruit. People enjoyed and no one dropped out of this study. Good info about why EO was chosen, Why carrier oil was chosen, and how therapists were trained.	No info about COI, No info about essential oil—where purchased. No info about kind of massage—just “full body”, degree of pressure of massage, effort to give massage only group a chance to have AT massage.
Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(1999, Wilkinson et al.) United Kingdom	The aims of the study were to evaluate: the effectiveness	RCT	N = 103 All cancer Dx (90% female, 49% breast CA) Sampling method: Each	8 data collection points including (RSCL wk 1 & wk 4 = 2; SAI	The results of this study suggest that massage either with or without an essential oil is	The authors provide rationale for choice of essential oil, Roman	Company providing essential oil or details about how regular



	<p>of massage in improving the quality of life of patients with advanced cancer; the effectiveness of aromatherapy massage in improving the quality of life of patients with advanced cancer; patients' perceptions of massage.</p>		<p>consenting patient was randomly allocated to one of two groups and received three full body massages over 3 consecutive weeks.</p>	<p>before & after each massage = 6, TAI with RSCL 1 week after last massage = 0, semi-structured interview 2 weeks post = 1)</p>	<p>beneficial for reducing levels of anxiety in patients with advanced cancer. Generally, complementary therapy is a neglected area of research and this study has shown that it is feasible to evaluate the effects of complementary therapies on patient care. Recruitment to the study and randomization to one of the two groups created no major difficulties and the questionnaires</p>	<p>chamomile and use of sweet almond oil. The authors also gave necessary detail about massage therapists training, and auditing of techniques. RSCL and STAI are reliable measures.</p>	<p>massage and aromatherapy massage patients were separated during the time of experiment was not shared. Waiting two weeks after last massage in such an ill population for final questionnaire. Sample was predominantly female (n=79/ 90%), all cancer Dx (49% breast CA). The self-administered, semi structured questionnaire</p>
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					<p>used were acceptable to the patients, although 16 of the 103 patients failed to complete the study due to deterioration or death, illustrating how difficult it can be for palliative care researchers to accrue acceptable sample sizes. Overall, the results of the study suggest that aromatherapy massage may improve patients' quality of life.</p>		<p>was designed to assess patients' views on the positive and negative aspects of massage and used closed and open-ended questions (Unable to find this as an example). No exclusion criteria.</p>
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Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2004, Soden et al.) United Kingdom	Few studies have looked at the longer-term effects. This study was designed to compare the effects of four- week courses of aromatherapy massage and massage alone on physical and psychological symptoms in patients with advanced cancer.	RCT	N = 42 patients randomly allocated to one of three test arms, AT massage, no intervention. 16 AT massage, 13 massage, 13 control group.	All 1 before, no intervention did weekly and 1 final = 6, those in massage groups did 1 before, 1 at end, HADS and VSH 2 x weekly = 10	This study aimed to determine if there were lasting positive effects primarily on pain from massage or AT and massage. This was not found. Secondary outcome of sleep showed improvement. The authors posited that if the massages had been provided later in the day, there may have been more benefit seen in sleep improvement. Some statistical	Tisserand institute provided the essential oils. Reliable instruments used. Exclusion criteria specific. Control group utilized.	Authors note: recruitment was slow and difficult, relatively high attrition rate. The scales were valid and reliable for cancer patients, however, unsure how valid they are with complementary therapy assessment. NEED FOR RESEARCH METHODS allowing evaluation of the many interacting



					<p>significance was found in depression scores but only in massage group. The massage group had significantly more “cases” (defined by a HADS combined cut-off threshold of 19) and that these people with high psychological distress are more likely to respond to treatment. There were few criteria for inclusion— future refinement may help to show benefits with more reliability.</p>		<p>factors present in such therapies. No explanation of inclusion and exclusion criteria, and a very vague statement about participants having varying levels of distress. No psychometrics were provided for scales used. Enhancing internal consistency of pain assessment was mentioned— the</p>
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							<p>researchers chose to use VAS and the Tursky. 42 patients recruited—it really never mentions how.</p> <p>VERY CONFUSING: Three arms of study are introduced (AT + massage, massage only, no intervention) but 4 are evaluated— (AT, massage, massage +AT, and no intervention).</p>
Year, Author(s),	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses



Location							
(2004, Wilcock et al.) United Kingdom	The aim of this pilot study was to examine the feasibility of assessing the effect of aromatherapy in addition to day care attendance at a specialist palliative care unit on mood, quality of life and physical symptoms using a randomized controlled design.	RCT pilot	N = 46 patients Sampling method: patients were approached on their third visit to the center and invited to enter the study. Excluded if unable to give informed consent, were already taking part in other studies, or were too frail. Randomized 1:1	5 points, baseline and weekly intervals, plus a comment card at the end about desire to continue with therapy.	No statistically significant improvement was seen in any outcome measure. However attrition was particularly high in the intervention group. Aromatherapy massage was well received. All patients continued to choose to receive aromatherapy massage after completion of study. Comments about feeling comforted, relaxed, and	A qualified aromatherapist provided guidance and administered Tx. Use of a statistician, blinding. The research team was blinded to randomization. Block randomization was used to keep the numbers in each group balanced. Demographics medication, and prior use of complementary therapies was noted.	Limited discussion of how and where intervention was administered. High attrition not accounted for. No explanation about the use of the 7 point scale and measuring two symptoms most burdensome to patient. This seemed quite random. How could one compare? 11 of 23 (48%)



					<p>invigorated were seen. Although challenging, studies that explore the role of aromatherapy are feasible in a specialist palliative care setting.</p> <p>For patients completing the study, change in POMS, physical symptoms and quality of life over the four weeks were expressed as slopes using linear regression and compared between the two groups using the Mann Whitney U test. Differences in scores from</p>		<p>AT group, 18 of 23 (78% completed all four weeks. 29 of 46 completed, 63% attrition</p>
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					baseline to week four were analyzed using the Wilcoxon test. A value of P5/0.05 was considered statistically significant. A statistician independently verified the results.		
Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2006, Kyle) United Kingdom	Determine feasibility of delivering aromatherapy to patients in aromatherapy in order to	RCT, pilot feasibility. Three arms, aromatherapy massage, plain massage,	N = 750 patients. Patients were assessed for suitability (inclusion) prior to	All therapists were trained, spot-checked, and given much instruction on how to do the	In the main the aims of the pilot study were achieved. The study tested the robustness of the data	A pilot study of 80 patients was planned to give each of the 18 therapists time to consider the	Pilot RCT took over 2 years to complete 34 interventions. 60% attrition (original was



	reduce levels of anxiety.	aromatherapy via an aromastone .	commencing the study: able to complete the State–Trait Anxiety documentation, well enough to receive a full leg massage, intact skin, no ulcers, scratches, blisters or bruising, no evidence of lower limb lymphedema, no diagnosis of psoriasis or eczema, no signs or symptoms of inflammation of the legs, no recent history of deep vein	VAS—was used to measure anxiety. STAI was done at beginning and at end. An aromatherapist was present during completion of this incase any question caused emotional distress. The results of the State/ Trait anxiety scores mirrored the VAS scores, which suggested consistency in the data collection.	collection tools and it highlighted the logistical problem of a higher than previously estimated attrition rate. The therapists maintained consistency in their massage technique throughout the pilot study but not all the aromatherapists treated 4–5 patients. The results of the pilot study were encouraging and support the view that Sandalwood essential oil may have a sustained effect in	full impact and highlight problems with massage techniques. Aromatherapists really had input in this study. Choice of oil, music. Even if people did react to patch test or were very weak and could not be in the RCT, they were offered AT and or massage in acceptable ways. Use of the STAI means there is a reliable and valid tool. All three arms of study had the	calculated at 25%).
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			thrombosis, no anti-coagulant therapy, any other dermatological condition affecting the legs.	Bloomfield & Hanks caution that the length of the scale changes when photocopied, hence the use of a laminated tool.	reducing anxiety.	same music playing during all sessions. This helped keep therapist talk to minimum, limiting this confounder. The music chosen by the therapists was Keeper of Dreams by Phillip Chapman.	
Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2007, Wilkinson et al.) United Kingdom	To test the effectiveness at 10 weeks of supplementing usual	Pragmatic randomized controlled two arm clinical trial.	N = 288, cancer patients, referred to complementary therapy	Primary outcome, anxiety and depression. Structured clinical	Patients who received aromatherapy massage had no significant improvement in	The important issue from the therapeutic point of view is the difference in	Did not incorporate the "Trait" part of the state-trait inventory,



	supportive care with aromatherapy massage in the management of anxiety and depression in cancer patients	Prospective longitudinal	services with clinical anxiety and/or depression, were allocated randomly to a course of aromatherapy massage or usual supportive care alone. Patients had to have greater than 3 month prognosis. Patients were randomly assigned using random number sequence, stratified by disease stage (early/advanced) and trial center, and balanced in	interview (SCID) to determine anxiety and depression at baseline. The SAI, the CES-D, and the EORTC were used to assess secondary outcomes. Reliable and valid instruments. Blinding of researchers completing initial assessment was assured and results of interviews audited for potential bias.	clinical anxiety and/or depression compared with those receiving usual care at 10 weeks postrandomization (odds ratio [OR], 1.3; 95% CI, 0.9 to 1.7; <i>P</i> .1), but did at 6 weeks postrandomization (OR, 1.4; 95% CI, 1.1 to 1.9; <i>P</i> .01). Patients receiving aromatherapy massage also described greater improvement in self-reported anxiety at both 6 and 10 weeks postrandomization (OR, 3.4; 95%	the trajectory of the improvements between the patients in the two arms of the trial. The patients receiving aromatherapy massage experienced a significant improvement in anxiety and depression at 2 weeks after intervention and this was maintained at 6 weeks after intervention. By contrast, the rate of improvement in the mood of the patients in the usual-care	this could have shown tendencies. Clinical relevance is evident but not discussed. There was benefit at 6 weeks, unclear why researchers felt the need to show 10 week outcomes with such a fragile population. Literature review was very limited, though this could be related to the large body of work by the researcher
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			randomly sized blocks.		CI, 0.2 to 6.7; <i>P</i> .04 and OR, 3.4; 95% CI, 0.2 to 6.6; <i>P</i> .04), respectively.	arm was slower.	and availability of lit reviews in other studies. Using 20 EOs without any explanation is also concerning.
Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2011, Lai et al.) Hong Kong, China	The purpose of this study was to verify the feasibility and effect of aroma massage on constipation in advanced cancer patients.	RCT, pilot feasibility, prospective	N = 45. Three n = 15 arms including aromatherapy massage, plain massage, and control group	2 data collection points. Day 1 and day 5.	The constipation assessment scale consists of 8 items. In the aroma massage group, total scores improved from 5.62 (Day 1) to 1.46 (Day 5).	validity and reliability of Constipation Assessment Scale was provided reliability = 0.86, validity = 0.83 and McGill quality of life for Hong Kong Chinese reliability ranges from 0.81 to 0.92, overall, 0.87	No determination of effect size for future intervention. The researcher does not indicate where credentialing in massage and aromatherapy comes from. No indication



Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2012, Serfaty et al.) United Kingdom	Cognitive Behavior Therapy (CBT) is one of the most effective psychological treatments. Complementary therapies,	RCT pilot feasibility	N = 39, recruitment from outpatient oncology clinics and screening 8 or more for anxiety on the HADS*, randomized to	Longitudinal, prospective. Baseline, 3 months, and 6 months—phone and mail were accepted ways to collect this data.	Baseline data suggest that both intervention groups were balanced. The POMS-TMS fell in both groups. EuroQol scores suggested an improvement	Clear and well thought out. Feasible. Recruitment was feasible; the interventions acceptable and engagement with	and validity 0.83 in local context. of where essential oils were purchased. I think everyone should have received massage—not have a full no intervention control group. No blinding.



	<p>especially aromatherapy massage (AM), are also popular and alleviate anxiety. No studies have directly compared these two treatments.</p>		<p>treatment as usual (TAU) plus up to 8 sessions weekly of either ATM or CBT, offered within 3 months. The POMS was collected at baseline and 3 and 6 months post baseline. *HADS baseline was increased to 11, 4 months into the study.</p>		<p>with both interventions and showed a similar trend. The Psyclops identifies the problem area ranging from 'felt much better' 5 0 to 'felt much worse' 5 14. Half of respondents (19/39) specified a cancer-related issue as the main problem (e.g. cancer: causing pain, mobility problems, worrying about re-occurrence, etc.). Concerns were psychological in over 80% (16/19), usually</p>	<p>treatment was high. Improvements with both interventions were observed. The beneficial effects on depression with CBT appeared to be sustained. The first aim, to test the feasibility of recruitment, found that 8% (39/490) of those approached were recruited. It is possible to recruit cancer patients to a trial of CBT versus AM.</p>	<p>"standard" EOs, massage, qualifications for the aromatherapy arm of this.</p>
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					related to existential issues. An advantage (F 5 8.12, df 5 1, P<0.01) was found for AM in the way in which people felt generally in the last week.	Interventions were well received and follow-up was high. Both CBT and AM may be beneficial for anxiety in the short term, but CBT may have an advantage over AM for treating depression in the longer term. A full-scale trial is now required to compare CBT with AM.	
Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2017, Goepfort	The aim of this pilot study is to	Prospective randomized	N = 30. 20 palliative care patients	Before, during, and after stim. Appears to be	Healthy individuals do react in a	Documented why they chose	No indication of using an aromatherapi



<p>et al.) Germany</p>	<p>analyze the reactions of healthy test persons and conscious as well as unconscious palliative patients to aroma stimuli.</p>	<p>controlled open study</p>	<p>recruited from the palliative care ward of a university hospital with 15 conscious and consented and 5 unconscious with caregiver consent. 10 healthy probands for comparison.</p>	<p>24 measurements in all during each 90-minute session.</p>	<p>different way to aromas compared to those in palliative care. Significant physiological reactions were measured after simulation with aroma oils in all three groups in this study. Healthy probands showed different reactions than palliative patients irrespective to their conscious state. All in all, these data point to the conclusion that one may have certain</p>	<p>inhalation, to avoid any chance of reaction. Much was backed up by previous research, made choices based on evidence available. To test whether the same exposure leads to the same effect, we analyzed the data from the repeated exposure of the control group to the same stimulus (retest reliability) using the paired</p>	<p>st, specific essential oil company, or refusal or attrition rates.</p>
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					<p>physiologic reactions to certain aroma oils, but those reactions may differ for healthy and ill persons as well as for persons with different diseases. There was no difference of the physiologic reactions between the first and the second exposure in the control group.</p> <p>In the control group, there was a significant reaction to lemon with respect to breathing rate (increase by 2</p>	<p>student-test. As there was no difference in the control group, together with the ethic committee we decided that to minimize burden to the patients and their visitors, we would omit the repetition in the patient groups.</p>	
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Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2020, Kawabata et al.), Kyoto, Japan	To investigate the effects of a 30-minute single session of aromatherapy massage at nighttime on quality of sleep and fatigue in palliative care.	RCT	N = 74 adults: Stratified by sex. 286 assessed for eligibility, 212 excluded (23 refusal) 33% attrition, 27 intervention, 30 control	Two consecutive days	A single aromatherapy massage session is no more effective than not having a massage in improving sleep quality in palliative care settings. However, older patients and those in poor health conditions may benefit from	The participating massage therapist had been certified by the International Federation of Professional Aromatherapists and the Aroma Environment Association of Japan. Medical grade essential oils and jojoba oil (as the	No theory or conceptual framework. This phenomenon not being reflected in the results may be partially because of the patients being raised or to their being talkative because it seemed like a



					<p>aromatherapy massage.</p>	<p>carrier oil) were purchased from the Mont Saint Michel, Aromatherapy Massage Center in Osaka, Japan. Japanese version of the Richards-Campbell Sleep Questionnaire (RCSQ) and the Brief Fatigue Inventory (BFI). Both had validation data included with high Cronbach alpha scores RCSQ Cronbach's alpha = 0.90. BFI = 0.96 respectively.</p>	<p>somewhat exciting special event to them. That was not necessarily a negative reaction given that it was in a palliative care setting. However, the session timing might be better if the massage was administered early in the evening rather than just before bedtime.</p>
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Year, Author(s), Location	Aim	Design	Sample Size	Data Collection	Results	Strengths	Weaknesses
(2020, Yildirim et al.) Istanbul, Turkey	To investigate the effect of lavender oil on sleep quality and vital signs in palliative care patients	RCT	N = 68 adults Male = 30 intervention, 26 control	Data collected 3 times (before intervention, post intervention day 1, and post intervention day 2)	Lavender has no effect on the vital signs of palliative care patients but is an effective and reliable approach to enhance their sleep quality.	Lit search reveals lavender eo has short duration of action and so researchers set up a container at a set distance from the intervention group. Used a reliable instrument to measure sleep and reported Cronbach's alpha score of RCSQ = 0.82 (American version & 0.91 Turkish version) respectively.	No theoretical or conceptual framework. No information about blinding to reduce bias. No information about how intervention group and control were separated.





Appendix B: Aromatic Literature Matrix Example

Example of Literature Matrix Specific to Aromatics and Essential Oils

Year, Author(s), Location	Essential oil(s) & dilution (Source [company, supplier, date purchased], country of origin, Latin name, extraction method [steam, CO2], GC/MS reports)	Carrier oil and method of administration (MOA)	Aromatherapist lead or consulted, qualifications Y/N	Safety consideration, storage, patch testing, adverse reactions reported (Safety Data Sheet (SDS) as applicable)	Control for Hedonics/ Intensity & irritation Expectancies Preferences/ familiarity N/Y	Positive/ Negative of aromatherapy aspect of study
1995, Wilkinson(United Kingdom)	EO – Roman chamomile Dilution- 1% Source- no Country of origin- no Latin name- no Extraction method- no GC/MS- no	Carrier oil- sweet almond MOA-Full body massage	Y 3 nurses total 1 with diploma in aromatherapy 2 with diploma in massage R. chamomile was “prescribed” by the AT	N Storage- no Adverse reactions- not reported SDS- not reported	N	Positive: Major chemical constituents are given though not specific to actual EO used. Rational for choice of carrier oil is provided
1999, Wilkinson et al.	EO – Roman chamomile Dilution- 1% Source- no	Carrier oil- sweet almond	N 4 nurses with recognized	N Storage- no	N	Positive: Major chemical constituents are



(United Kingdom)	Country of origin- no Latin name- no Extraction method- no GC/MS- no	MOA-Full body massage	diplomas in massage	Adverse reactions- not reported SDS- not reported		given though not specific to actual EO used. Rational for choice of carrier oil is provided Negative: no Aromatherapist involved
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Appendix C: Template Document for TREATS Formatting

Research Proposal Review (Courtesy Marnie Reven)

Please complete this review within 2 weeks. Return to Research Committee

Scoring: 3= Exceeds Expectations 2= Meets Requirements 1=Needs Improvement

Minimum Score of 16 required (mean of sub-committee total)

Body of Proposal	
Criteria	Score
Abstract: -Includes aims, research design, subject population, and methods in 200 words	
Specific Aims: -Concise & realistic statement of what the project is intended to accomplish -Aligns with organizational and nursing strategic plans -Research question(s) and/or hypothesis are stated and are consistent with specific aims	
Significance of Project: -Potential for leading to further research or development of methodology or theory -Potential contribution to nursing knowledge or knowledge in other fields -Statement on direction or research	
Literature Review and Theoretical Framework: -Relevant and current literature is briefly reviewed -Strength of analysis and syntheses -Theoretical framework is appropriate for aims -Text citations and reference list included in APA format	
Design and Methods: -Design appropriate to purpose setting -Appropriate sample and sampling procedures (sample size justified by power analysis or other guidelines/sampling procedures adequate) -Method of data collection (appropriate for design/clarity and feasibility of procedures/reliability, validity and sensitivity of instruments) -Study limitation acknowledged	
Data Analysis: -Adequately described and appropriate to specific aims and hypotheses or research questions	
Budget: -Descriptions of budget items are provided with budget justification; only items directly related to conduct of research are included	
Time Frame: -Realistic outline of 12 months is provided; project activities identified can be accomplished in allotted time frame	
Total Score	

Summary:

Strengths:

Weaknesses:

Appendix D: First Iteration of TREATS

Transparent Reporting for Essential Oil & Aroma therapeutic Studies (TREATS): Non-pharmacological (Beta critique tool)

In addition to conventional standards for high quality research, non-pharmacologic aroma-based research involving essential oils and aromatherapy should meet requirements for validity and reliability as follows.

Please complete this review for each article.

Article reviewed:

Category	Meets (yes, N/A)	Does Not Meet	Comments/ Questions
Essential oils (EO)/ Carriers			
Name including botanic (Latin)			
Supplier			
Extraction method			
Country of origin			
Date purchased			
Batch number			
Complete listing of constituents (link or attachment)			
Dilution			
Carrier(s) details on purchase			
Control			
Odor bias questions			
Odor recognition			
Odor preference			
Too strong or weak			
Irritating or non-irritating			
Previous use of EOs/expectations			
Allergic reactions to EO/aromas			
Test for anosmia			
Aromatherapy			
Description of aromatherapy			
Professional aromatherapist consulted (Qualifications)			
Safety considerations			
Storage			



Patch testing (Topical)			
Adverse reaction reporting			
Safety Data Sheets (SDS)			
Other			
Blinding (subjects, personnel, outcomes assessors)			
Study design			
Sample size			

Comments:

