
A Quest for Quality Reporting in Aromatic Research



Aromatic Research Quality Appraisal Task Force (ARQAT)

2022 WHITE PAPER



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INTRODUCTION	3
PROBLEM STATEMENT	3
FORMATION OF ARQAT	4
INITIAL BRAINSTORMING	5
FIGURE 1. ARQAT TIMELINE	6
RESOURCES USED BY ARQAT	7
CURRENT AROMATIC LITERATURE (BOOKS)	7
CURRENT AROMATIC RESEARCH PARADIGMS	7
ORGANIZATIONS	7
QUALITY APPRAISAL CHECKLIST RESOURCES	8
REPORTING GUIDELINES & EXTENSIONS (FUTURE PLANNING)	8
TREATS	9
TREATS ITERATION ONE	9
THE NAMING OF TREATS	9
CURRENT TREATS	9
TABLE 1. TREATS PHASES AND ITERATIONS	10
FIGURE 2. THE CYCLE OF CREATION	11
FIGURE 3. TREATS TIMELINE	12
TREATS ITERATIONS AND CHECKLIST ITEMS	12
CONCLUSION	14
ACKNOWLEDGEMENTS	15
CLARIFICATION OF TERMS	16
REFERENCES	21



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; Yildırım 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

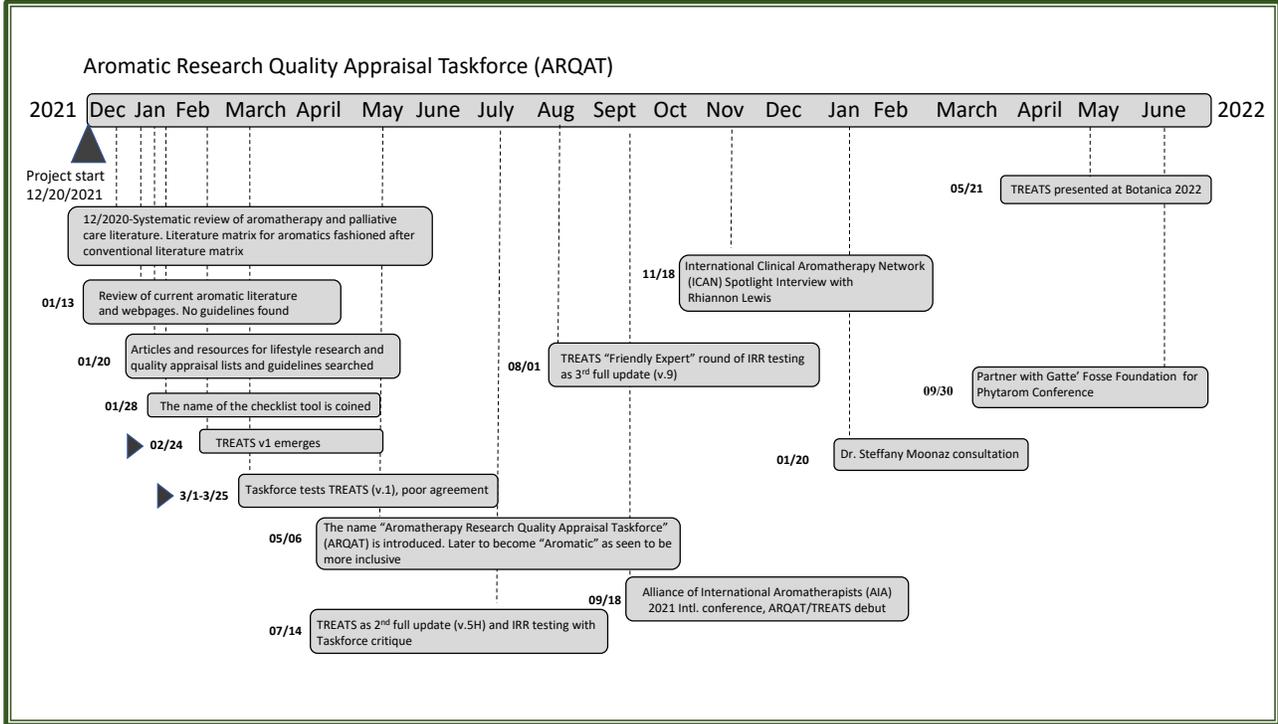
During the first meeting of what is now known as ARQAT, a brainstorming session was held to determine need, focus, and direction. An ARQAT Excel spreadsheet was created to house ideas, information, and data. The task force continues to gather information and data in Excel and use IBM SPSS Statistics 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., 2017)
- 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 (Available upon request).



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 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
	5	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

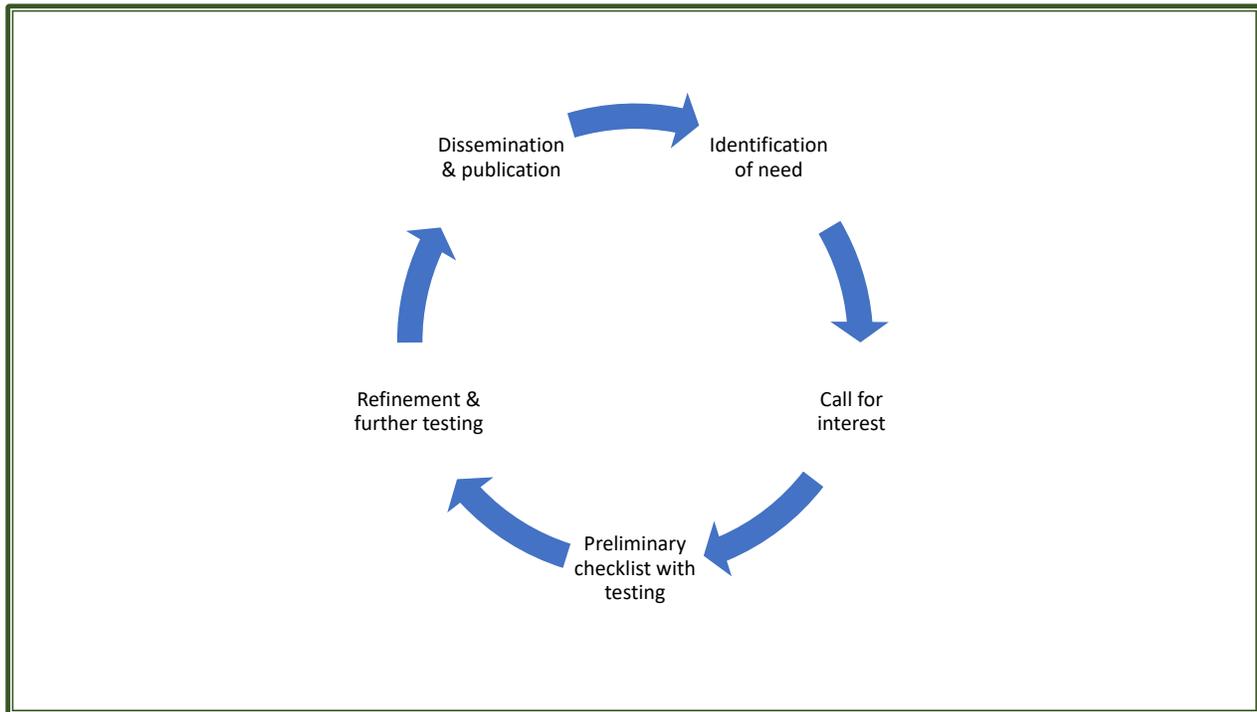
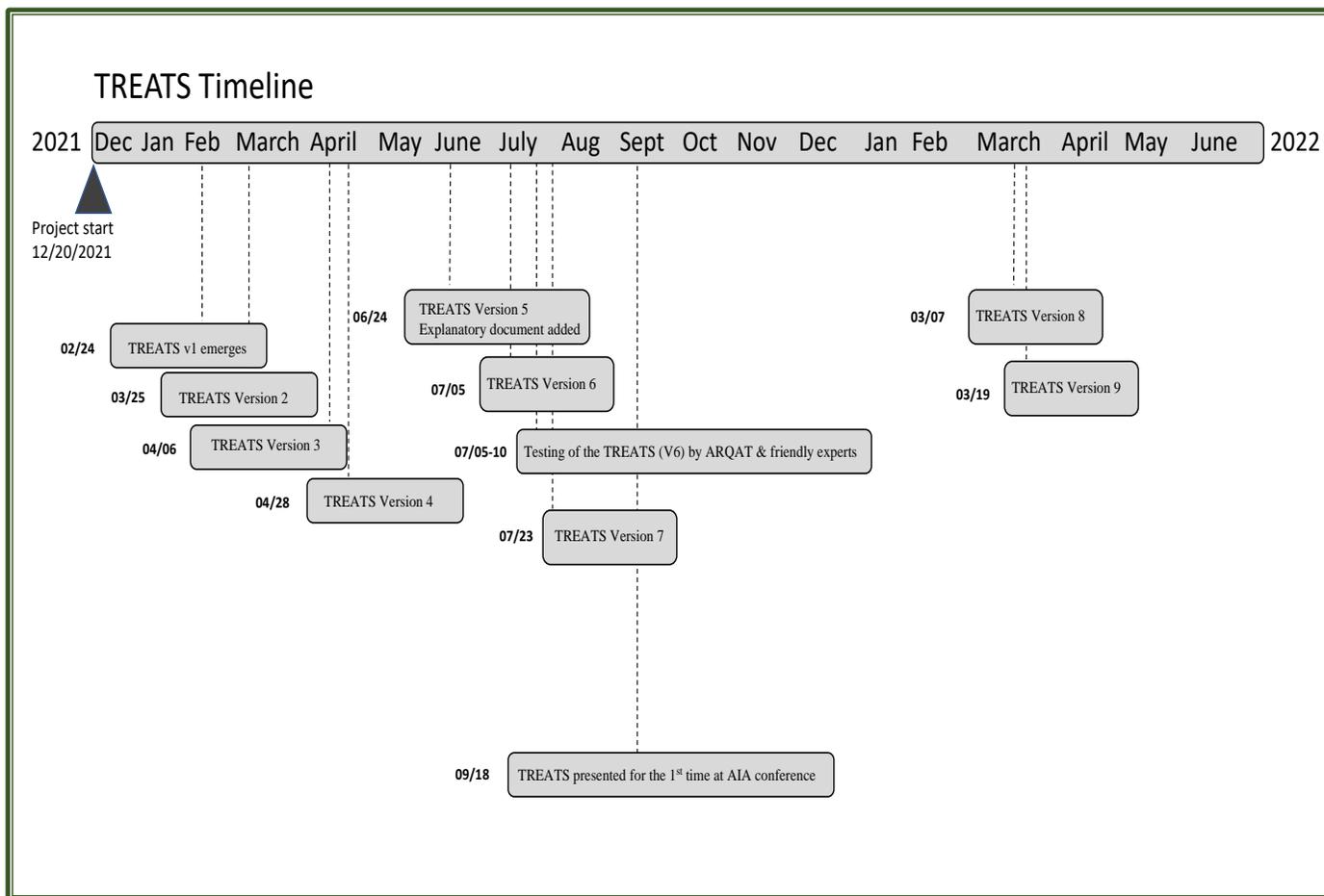


Figure 3. TREATS Timeline

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).

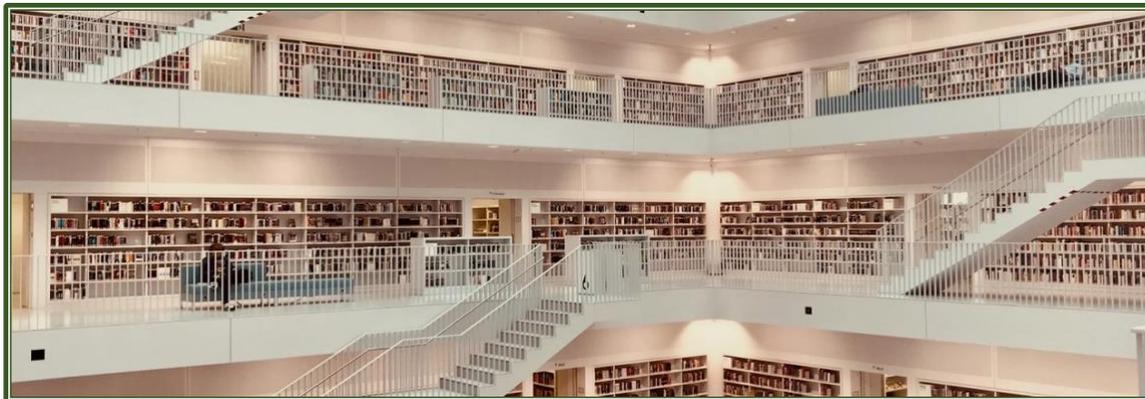
Section 4

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](#). 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.

The ARQAT wishes to thank those who contributed to the foundation and creation of the ARQAT and TREATS:

Creation of the TREATS manuscript

Roger Carpenter and Steffany Moonaz

Publication of the TREATS manuscript

The Gattefossé Foundation

Guidance for creation of the TREATS

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

Critiqued to provide data and feedback during the Friendly Expert round of testing (July – December 2021)

Shannon Becker, Agnes Beleznai, Nicole Boukhalil, Kim Connelly, Yasmine Elghamwary, Katherine Gentil, Linda Halcon, Margo Halm, Fiona Hedigan, Sylvie Kirsch, Tammy Lile, Tracey Olivier, Laraine Pounds, Judy Ratliff, Mien Lin Tan, Colleen Thompson, and Jennifer Wilson

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

Earlier Task force members

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Logo

Molly Messmer

Webpage

Emma Steele Creative



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.

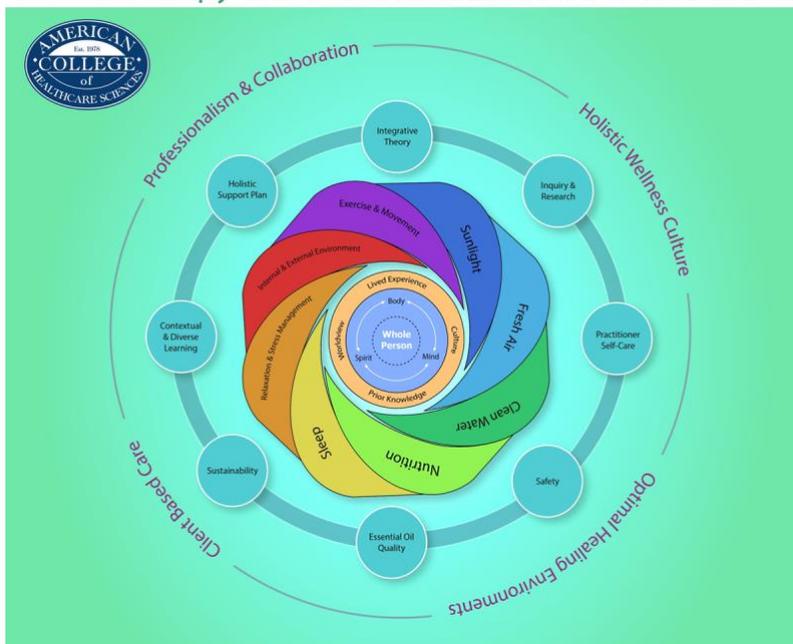
TREATS- Transparent Reporting for Essential oil and Aroma Therapeutic Studies is the title for the appraisal checklist created by the ARQAT with the aim to improve reporting of nonpharmacologic aromatic essential oil studies.

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)

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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>



