Evaluating the Aromatherapy Recommendation for Pain in the Holistic Nurses' Pain Relief Tools for Patients & Self-Care

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Table of Contents

Abstract 6

Evaluating the Aromatherapy Recommendation for Pain in the Holistic Nurses' Pain Relief Tools for Patients & Self-Care 8

Background and Significance 9

What is Pain? 10

Pain Management **11**

What Is Aromatherapy? **12**

What Is the American Holistic Nurses Association (AHNA)? 13

What Is the Holistic Nurses' Pain Relief Tools for Patients & Self-Care? 14

Needs Assessment 15

Global 15

United States 16

New Jersey 16

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis 16

Problem Statement/Clinical Question 17

Aims and Objectives 18

Review of Literature 18

AT is Useful for Pain 19

Systematic Reviews 19

Population 19

Pain Conditions 20

Settings 20

Inpatient. 21

Outpatient. 21

Methods of Administration 22

Essential Oils 22

Adverse Events 23

Theoretical Framework 24

Iowa Model in Action 24

Methodology 26

Setting 27

Study Population 27

Subject Recruitment 27

Consent 28

Risks/Harms 29

Subject Costs and Compensation 29

Study Interventions 29

Outcomes to Be Measured 30

Project Timeline 31

Resources Needed 31

Evaluation Plan 31

Data Analysis 32

Maintenance & Security 32

Results 33

Section I: Demographics 34

Section II: Pain Tool Analysis 35

Discussion 39

Recommendations for AHNA 44

Limitations 46

Implications 48

Clinical Practice 48

Quality and Safety 49

Economics 50

Health Policy 51

Education 52

Sustainability/Future Scholarship 54

Dissemination/Professional Reporting 54

Summary 54

References 56

Appendix A 71

Appendix B 72

Appendix C 106

Appendix D1 107

Appendix D2 108

Appendix E 109

Appendix F 110

Appendix G 111

Appendix H 114

Appendix I 120

Appendix J 121

Appendix K 122

Appendix L 123

Appendix M 124

Appendix N 125

Appendix O 126

Appendix P 127

Appendix Q 128

Appendix R 129

Appendix S 130

Appendix S2 131

Appendix S3 132

Appendix S4 133

Appendix T 134

Appendix U 135

Appendix V 136

Appendix W 137

Abstract

Purpose of Project: The purpose of the study was to evaluate the usefulness of the aromatherapy (AT) recommendation in the American Holistic Nurses Association's (AHNA) *Holistic Nurses' Pain Relief Tools for Patients & Self-Care* (Pain Tool). Survey results were analyzed to make recommendations to AHNA on the current state of the Pain Tool and how it may be improved.

Methodology: An observational survey design was used and a purposeful sample of 55 nurses were invited to a two-part, 15-question survey administered via SurveyMonkey. The demographic data was analyzed with quantitative analysis and the open-ended questions were analyzed via content analysis.

Results: A total of 55 Registered Nurses completed the survey and the mean age of participants was 53 years old. The participants learned about the Pain Tool from the AHNA website (62%; n = 34) and publications (56%; n = 31). Lavender essential oil (EO) was used by 100% (N = 55) of participants. Over half, (65%; n = 17) of participants used EOs for pain relief. The inhalation method was favored (93%; n = 51) due to institutional policy and procedure (67%; n = 6) and ease of use (44%; n = 4). The recommendation was most helpful for educational purposes (29%; n = 16) and to reduce symptoms of pain (21%; n = 8). A majority of participants used the five holistic nursing core values (70%; n = 31) as well as promote more options for pain management (48%; n = 13) to improve outcomes (30%; n =13). More than half of the respondents (54%; n = 19) felt the recommendation did not require changes, but some participants (23%; n =) did recommend that AHNA add more essential oils and safety information (23%; n = 8). Finally, recommendations were made to AHNA based on the outcomes.

Implication for Practice: Nurses who use AT as a safe, cost-effective intervention for pain improve quality outcomes. Clinical practice guidelines may add AT as part of a multi-modal approach to pain management and institutions may use the Pain Tool as an addition to their protocols. Lastly, as more nurses use the Pain Tool and lead institutional policy changes to include AT for pain, nursing education may begin standardizing curricula with AT instruction. Further studies on safe methods of administration in COVID-19 are recommended.

Keywords: AHNA, aromatherapy, essential oils, non-pharmacological interventions, pain, pain management, opioids

Evaluating the Aromatherapy Recommendation for Pain in the Holistic Nurses' Pain Relief Tools for Patients & Self-Care

Pain is the most frequent reason for seeking medical care in the United States (Clarke et al., 2015; National Institutes of Health [NIH], 2020). According to the NIH (2020), an average of 76.2 million people are afflicted with pain and 25 million suffer daily. The Centers for Disease Control and Prevention (CDC, 2020) estimates that one in every four Americans is currently being treated for pain. Consequently, pain has become the leading cause of disability and rising health care costs in the U.S. (NIH, 2020).

Many chronic conditions manifest in pain (Dahlhamer et al., 2018). Approximately 50 million adults in the U.S. have chronic pain and 19.6 million have high-impact chronic pain, described as pain coupled with anxiety, depression, fatigue, and cognitive difficulty (CDC, 2020; Dahlhamer et al., 2018; National Center for Complementary & Integrative Health [NCCIH], 2020). The common practice of prescribing pharmacological interventions for the treatment of pain has increased the abuse of prescription drugs, drug dependence, and health care costs (CDC, 2020; NIH, 2020). Conversely, it has been noted that one in three Americans seek and use complementary and alternative interventions such as aromatherapy (AT) to help manage pain (Johnson et al., 2016). By promoting the use of AT as a non-pharmacological and complementary intervention, clinical outcomes for pain management may be improved.

Nurses are often responsible for assessing, treating, and managing pain (Kumar, 2007). The American Nurses Association (ANA) and the American Holistic Nurses Association (AHNA) recommend that nurses promote non-pharmacological interventions for pain (AHNA, 2020b; ANA, 2013). Aromatherapy, a popular, non-pharmacological intervention, is an effective complementary and alternative modality (CAM) for pain management (AHNA, 2017, 2020b;

ANA, 2013; Buckle, 1997, 2016). To assess the benefits of AT, a Doctor of Nursing (DNP) project will evaluate the usefulness of the AT recommendation listed in AHNA's *Holistic Nurses' Pain Relief Tools for Patients & Self-Care* (AHNA, 2017, 2020b), hereafter referred to as the Pain Tool.

Background and Significance

According to the 2018 United Nations report from the Office on Drugs and Crime (UNODC), chronic pain is experienced worldwide. In the U.S., the management of pain has become costly and complex. Pain is more of a challenge to the health care system than diabetes, heart disease, and cancer combined (NIH, 2020). It is estimated that the medical costs for pain surpass $600 billion per year (CDC, 2020; Gaskin & Richard, 2012; NIH, 2020) with a $60 billion productivity loss to the U.S. workforce (Stewart et al., 2003). The National Center for Complementary and Integrative Health (NCCIH, 2020) observed that pain is the most frequent reason for using CAM.

High-impact chronic pain results in limitations to work, social, recreational, and self-care activities. (Dahlhamer et al., 2018). The anxiety, depression, fatigue, and cognitive difficulty that accompany chronic pain often make it difficult for persons to participate in these usual life activities. American women and adults who are older, unemployed, impoverished, live in rural areas, or have government-funded insurance have a higher prevalence of both chronic and high-impact chronic pain (Dahlhamer et al., 2018). As a result of the unhappiness from suffering chronic pain, health-seeking behaviors for comfort and wellness have increased (Peltzer & Pengpid, 2018). Furthermore, out-of-pocket costs for treatment have become a significant factor in managing chronic pain. Therefore, a cost-effective and multimodal approach, as recommended by many clinical practice guidelines (CPGs) is justified to encompass the complexity of chronic

pain (American Society of Anesthesiologists Task Force [ASATF], 2010; Ernstzen et al., 2017; Kumar, 2007; Oliveira et al., 2018).

What is Pain?

Pain is difficult for providers and clients to define due to its subjective attributes. The International Association for the Study of Pain (IASP) created a taxonomy task force to define the phenomenon. The task force defined pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue injury" (IASP, 2019, *IASP's Proposed New Definition of Pain Released for Comment*, para. 6). Other definitions include "unpleasant thoughts, emotions, and behaviors that accompany nociception" (Hsu et al., 2019, p. e61). As a point of reference, nociception is tissue damage whether real or plausible (Hsu et al., 2019).

The neuromatrix theory of pain characterizes pain as the experience of nerve impulses traveling the neural network called the neuromatrix (Melzack, 2001, 2005). The theory hypothesizes that the neuro-modules that create pain are generated from somatosensory, limbic, and thalamocortical components resulting in the activation of the autonomic nervous system, the stress response system, and the immune system (Melzack, 2001, 2005; Trout, 2004). For example, the olfactory nerve transmits signals from the limbic system to the hypothalamus forming neural connections that affect pain perception (Melzack, 2001; Trout, 2004). Consequently, smells and aromas may affect the experience of pain through this same pathway.

Pain is categorized by health care providers as acute or chronic and assessed via a valid pain assessment tool (The Joint Commission, 2017). Musculoskeletal conditions are the most common cause of chronic pain and disability in the U.S. (Arumugam et al., 2019). A systematic review of clinical practice guidelines found that non-pharmacological interventions for chronic musculoskeletal pain are recommended but were rarely included in the treatment plan (ASATF,

2010; Ernstzen et al., 2017). A recent clinical practice guideline study by Hsu et al. (2019) recommends treating musculoskeletal pain conditions with over-the-counter analgesics such as non-steroidal anti-inflammatory drugs (NSAIDs). However, when pain is acutely severe or chronic, the authors recommend opioids as the treatment of choice.

Pain Management

One of the objectives of the U.S. government's Healthy People 2020 campaign is to decrease the prevalence of adults having high-impact chronic pain (Office of Disease Prevention and Health Promotion [ODPHP], 2010). In conventional medicine, the standard treatment for pain is the administration of pharmacological interventions such as acetaminophen, NSAIDs, and the more potent opioids (Brewer et al., 2019).

Opioids reduce the intensity of pain, but regular use of these drugs may result in many side effects, such as sedation, dizziness, nausea, vomiting, constipation, physical dependence, tolerance, addiction, and respiratory depression (Benyamin et al., 2008; CDC, 2020; National Institute on Drug Abuse [NIDA], 2020). The CDC (2020) concluded that the costly implications of opioid therapy results in $78 billion per year spent on health care, productivity loss, treatment for addiction, and justice system involvement. Furthermore, approximately one third of the 47,000 Americans who overdosed in 2017 had opioid-related deaths (CDC, 2020).

In response to the pain and opioid epidemic, the Joint Commission (TJC) and the AHNA established new guidelines to assist health care providers (HCPs) in managing pain (AHNA, 2017, 2020b; Johnson et al., 2016; TJC, 2017). The new guidelines promote non-pharmacological treatment modalities for pain (AHNA, 2020b; Johnson et al., 2016; TJC, 2017). Non-pharmacological interventions for pain include acupuncture, meditation, massage, AT and yoga (AHNA, 2020b; Qaseem et al., 2017; Oliveira et al., 2018).

Non-pharmacological treatment modalities are utilized by over 40% of Americans for supplementing pharmacological treatment or as a standalone intervention (Enzman-Hines & McCaffrey, 2016). Aromatherapy, a popular CAM and non-pharmacological intervention is practiced as conventional medicine in many parts of the world and is effective and affordable for different symptoms such as pain, anxiety, and nausea (Buckle, 2016). However, AT remains underutilized in the U.S. (Brewer et al., 2019; Buckle, 2016).

American adults spend an average of $30 billion in out-of-pocket costs for CAM practitioners, materials, and products (NCCIH, 2020), as compared to conventional medicine out-of-pocket costs that reach over $300 billion (NCCIH, 2020). For example, an average of $54 million per year is spent on prescribed pharmaceuticals for pain—more than four times the $12 million spent on natural products (NCCIH, 2020). A weekly prescription for opioids costs approximately $126, or $6,500 per year (NIDA, 2020). Lavender EO costs $10 for a half-ounce bottle (Florihana, 2020). The AHNA recommends administering one to five drops of lavender EO per treatment (AHNA, 2017; Buckle, 2016) and the effect can last for hours (Cleveland Clinic, 2016). One bottle provides up to 45 doses at a modest price. Other complementary modalities such as acupuncture may cost $65-125 per session (Harvard Health Publishing, 2020), making AT the more affordable complementary adjunct for pain management.

What Is Aromatherapy?

Aromatherapy is a mind-body practice that has been utilized for at least 6,000 years (Buckle, 1997, 2016). Aromatherapy uses essential oils (EOs) derived from aromatic plants for therapeutic purposes (Buckle, 1997, 2016) and is pleasant, affordable, and has low rates of side effects (Meghani et al., 2017; Yayla & Ozdemir, 2019). Any nurse can administer AT because it

falls within the scope and standards of nursing practice (ANA, 2013; Johnson et al., 2016; Meghani et al., 2017).

Aromatherapy may be administered topically—where it will be absorbed through the skin and will reach the blood brain-barrier—or by inhalation, where it travels to the olfactory nerve from the nose (Buckle, 2016). The olfactory administration produces the fastest effect, but both topical and inhalation AT trigger a response in the brain's limbic system (Buckle, 1997, 2016). The EO itself may have analgesic properties that release neurotransmitters such as dopamine and serotonin (Efe Arslan et al., 2019; Seyyed-Rasooli et al., 2016). However, it is the synaptic response in the limbic system's neuromatrix that affects the perception of pain (Buckle, 2003, 2016; Melzack, 2001, 2005; Seyyed-Rasooli et al., 2016).

Essential oils are created by the plant's immune system for growth regulation, infection control, and tissue repair (Buckle, 2016). Mechanical pressing or distillation allows the concentrated extract to maintain the natural smell and flavor of the plant (National Institute of Environmental Health Sciences [NIEHS], 2020). Each EO is unique in its chemical composition-affecting smell, absorption, and physical reactions (NIEHS, 2020).

What Is the American Holistic Nurses Association (AHNA)?

The American Holistic Nurses Association (AHNA, 2020a) is a professional nursing organization founded in 1981 to promote holistic healthcare. By 2006, the ANA officially recognized holistic nursing as a nursing specialty when they collaborated with AHNA and published the *Holistic Nursing Scopes and Standards of Practice* (AHNA, 2020a; ANA, 2013). The AHNA currently services 5,500 members through 130 local chapters/networks in the U.S. and abroad (AHNA, 2020a).

By increasing awareness and promoting the education of holism, the AHNA has become a voice for holistic nurses and HCPs around the world (AHNA, 2020a). Holism and holistic nursing are the integration of the conventional/allopathic/western medical system with CAM to improve the physical, mental, emotional, environmental and spiritual health of the whole person (AHNA, 2020a). The AHNA envisions every nurse as a holistic nurse who can transform nursing practice, community, advocacy, research, and education (AHNA, 2020a). Nurses and HCPs can expand their practice to integrate holistic interventions and CAM for pain management through AHNA's resources, tools, and networking opportunities.

What Is the Holistic Nurses' Pain Relief Tools for Patients & Self-Care?

The AHNA (2020b) has been developing a *Holistic Pain Relief Tool Kit*, which is a set of guidelines to help inform and support nurses in their use of non-pharmacological interventions for pain and self-care. The AHNA released the first stage of the toolkit in 2017 as the *Holistic Nurses' Pain Relief Tools for Patients & Self-Care* (Pain Tool). The Pain Tool contains evidence-based recommendations for non-pharmacological CAM for pain management such as relaxation exercises, meditation/imagery, distraction, heat/cold therapies, massage, AT using lavender EO, music, and laughter. The *Holistic Pain Relief Tool Kit* will be released in stages, with the next stage including evidence-informed recommendations on other non-pharmacological CAMs such as mindfulness-based stress reduction, yoga, tai-chi, physical/energetic touch therapies, and other essential oils for AT (AHNA, 2017). The AHNA aims to educate nurses regarding each CAM and how it should be used as well as providing sample protocols that guide implementation in institutions (AHNA, 2017).

The Pain Tool recommends using AT, specifically using lavender EO, as a non-pharmacological intervention for pain. The Pain Tool (2017) instructs the user to:

> 1) Make a 1-5% dilution, which is 1-5 drops (0.05 to 0.25 ml) of pure EO in 5 ml of natural food-grade carrier oil such as coconut oil. 2) Apply mixture to the palms. 3) Cup palms over the nose and breathe deeply. 4) Apply the oil mixture topically only on unbroken skin. Note: Some people are allergic to lavender, so test for sensitivity on a small patch of skin prior to topical use. Use a 1% dilution for infants and persons who are weak or fragile (AHNA, 2017, 2020b).

Though this recommendation is evidence-based, there is little knowledge on how useful it has been to nurses practicing pain management. There is a need to increase the awareness and use of non-pharmacological interventions such as AT to decrease pain, health care costs, dependence, and abuse of pharmacological interventions. Therefore, this project explored the usefulness of the AT recommendation for pain as a quality non-pharmacological intervention.

Needs Assessment

An evaluation of the AT recommendation in the Pain Tool will provide insight on its usefulness as a non-pharmacological nursing intervention for pain. An understanding of the ways that nurses have used the AT recommendation can explore the effectiveness of the different modes of AT administration. Furthermore, the conclusions from the evaluation may guide the AHNA to successful strategies for implementing the next stages of the *Holistic Pain Relief Tool Kit*.

Global

A United Nations report (UNODC, 2018) found that there has been an increase in the use of prescription drugs worldwide. The report estimates that 34.3 million people around the world used prescription opioids in 2016 (UNODC, 2018). In addition, countries in Africa and the Middle East are experiencing a surge in tramadol prescriptions for pain (UNODC, 2018).

Global health requires new models for the management and relief of pain. Nurses will play a significant role in developing and implementing these new models (Dossey, 2016). The AHNA (2020) has shown its commitment to supporting nurses on the global health stage by translating the Pain Tool into several different languages including Spanish and Japanese.

United States

There is a high prevalence of chronic disease in the U.S. (CDC, 2020). Chronic conditions like arthritis affect over 15 million Americans and cause chronic musculoskeletal pain to adults of all ages, sexes, races, and ethnicities (CDC, 2020). Consequently, the North American rate of opioid usage is six to eight times higher than that of Europe (UNODC, 2018). Since the rate of opioid overdoses in 2015 and 2016 resulted in a decline in U.S. life expectancy (UNODC, 2018), it is imperative that health care providers promote, and consumers use, non-pharmacological interventions for pain relief.

New Jersey

No data was found on the prevalence of pain and AT use in New Jersey. However, there is robust data on opioid prescriptions and opioid-related deaths for the state. In 2017, New Jersey was averaging 44 opioid prescriptions for every 100 persons (NIDA, 2020). While this rate is lower than the national average, the rate for opioid deaths in New Jersey is three times higher than the national average (New Jersey Public Media, 2020). There is a need for nurses in New Jersey to understand the usefulness of non-pharmacological interventions for pain such as AT.

Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis

To determine the feasibility of conducting this project on the use of AHNA's recommendation for AT, a strengths, weaknesses, opportunities, and threats (SWOT) analysis of the Pain Tool's recommendation on AT was completed.

Strengths. Strengths of the Pain Tool includes evidence-informed references that AT is simple, safe, and effective. The stakeholders and members of AHNA are champions and pioneers of holistic nursing research. Therefore, nurses and HCPs can be confident in using AHNA's recommendations.

Weaknesses. The Pain Tool is available for the public to purchase on the AHNA website. Due to the *Holistic Pain Relief Tool Kit* having its sections released in phases, the Pain Tool may not be known to the public outside the AHNA community.

Opportunities. Upon release of the Pain Tool, nurses have a chance to collaborate interprofessionally and improve quality of care for pain management as recommended by the Institute of Medicine's Quality Chasm recommendations (IOM, 2001).

Threats. The Pain Tool was released in 2017 and has not been evaluated in the three years it has been made public. Furthermore, there has been no decrease in the pain and opioid epidemic. Most importantly, during a pandemic with the novel coronavirus disease (COVID-19), inhalation AT may not be a feasible intervention. As a result, nurses may not have the ability to adequately evaluate the Pain Tool's AT intervention if they are only able to use the topical administration.

Problem Statement/Clinical Question

The problem driving this project is the need to evaluate the usefulness of the AT recommendation for pain in the Pain Tool. Therefore, this project surveyed nurses who have used the AT recommendation. The clinical question guiding this proposed project is: "In what ways have nurses used the Pain Tool's AT recommendation for pain and does it need to be improved"?

Aims and Objectives

This project aimed to evaluate the usefulness of the AT recommendation in the Pain Tool for nursing practice. There were two objectives for this DNP project. The first objective was to administer and analyze an online survey, designed by the DNP student, to evaluate the usefulness of the aromatherapy (AT) recommendation in the Pain Tool. The second objective was to make recommendations to the AHNA on the usefulness of the Pain Tool in practice and how the AHNA may improve their recommendations to promote a useful non-pharmacological nursing intervention for pain.

Review of Literature

To identify current literature relevant to the project, a search was conducted in the PubMed, Medline, CINAHL, and Cochrane Library databases. The search strategy was developed using the Medical Subject Headings (MeSH) terms of "pain" and "aromatherapy." "Aromatherapy" is a subheading of "complementary modality." A manual search was also performed using the snowball technique from article reference sections.

The literature search identified over 700 unique references. Of these, about 350 studies were excluded for being over 10 years old. The remaining 350 studies were screened, and any duplicates or articles not written in English were removed. The remaining 150 article abstracts were assessed for eligibility and over 100 studies that included animals, children, and adults with cancer were removed. Of the remaining 50-plus articles, six pertained to musculoskeletal pain specifically, whereas all other articles addressed other types of pain such as dysmenorrhea and headaches. See Appendix A for a flow diagram of the literature search. A total of 25 articles was assessed for methodological quality using the Johns Hopkins Nursing Evidence-Based Practice

Evidence Appraisal Tool (Poe & Costa, 2012). All 25 studies were appraised as being either of high or good quality. See Appendix B for a Table of Evidence.

AT is Useful for Pain

The review of the literature found evidence that AT is useful for pain relief. All 25 articles promoted the use of AT. The evidence from all the literature reviewed either displayed a confidence interval (CI) of 95% or a probability value equal to or less than 0.05 ($p \leq 0.05$). Some of the evidence demonstrated not only a reduction in pain scores but also a reduction in anxiety ($p = 0.007$) and nausea ($p = 0.001$) (Buckle, 2016; Joswiak et al., 2016; Karaman et al., 2016; Meghani et al., 2017; Seyyed-Rasooli et al., 2016; Yayla & Ozdemir, 2019).

Systematic Reviews

In one systematic review with meta-analysis (Lakhan et al., 2016), AT was shown to decrease pain ($p < 0.0001$). The authors found that AT had the greatest power to reduce postoperative ($p < 0.0001$) and obstetrical and gynecological pain ($p < 0.0001$) (Lakhan et al., 2016). In a systematic review of 19 randomized controlled trials (RCT), the authors found AT to be effective in reducing dysmenorrhea pain ($p < 0.00001$) (Lee et al., 2018). Another systematic review examined the effect of AT on pain when different surgical procedures, anesthesia types, modalities, patient factors, demographics, and variety of oils and concentrations were used (Dimitriou et al., 2017). The authors found that the variability in the above elements added significant variability to the conclusions. Nevertheless, an increase in patient satisfaction scores led the authors to conclude they would promote AT in the postoperative setting due to the noted increase in patient satisfaction scores (Dimitriou et al., 2017).

Population

A review of the evidence demonstrated that there were six AT studies conducted in North America (Cino, 2014; Johnson et al., 2016; Joswiak et al., 2016; Khanna et al., 2014; Lakhan et al., 2016; Meghani et al., 2017). The study by Cino (2014) was conducted in seven long-term care facilities in a suburban area in the mid-Atlantic region of the United States. Johnson et al. (2016) evaluated nurse-led AT programs in 10 of 12 Allina Health hospitals in Minneapolis, Minnesota. Joswiak et al. (2016) evaluated the development of the nurse-led AT program at Allina Health in Minnesota. Khanna et al. (2014) and Lakhan et al. (2016), both in California, conducted systematic reviews on the effectiveness of AT for pain but Khanna focused on peppermint oil for irritable bowel syndrome (IBS). Lastly, Meghani et al. (2017) in Minnesota performed an integrated review of AT for critically ill patients.

Pain Conditions

There were many different types of pain conditions observed in the AT studies. In the inpatient setting, pain conditions included: fractured limb pain, renal colic pain, burn pain, postsurgical pain (total knee replacement, open heart surgery, and caesarean section), venous cannulation pain, chronic pain (long-term care) and headaches (Ayan et al., 2013; Biçer et al., 2015; Bikmoradi et al., 2016; Cino, 2014; Ghods et al., 2015; Heidari Gorji et al., 2015; Hekmatpou et al., 2017; Karaman et al., 2016; Meghani et al., 2017; Olapour et al., 2013; Seyyed-Rasooli et al., 2016). In the outpatient setting, the different types of pain included rheumatoid arthritis (RA) and osteoarthritis (OA) knee pain, lower back pain, hemodialysis fistula access pain, and venous cannulation pain for chemotherapy (Efe Arslan et al., 2019; Gok Metin & Ozdemir, 2016; Nasiri et al., 2016; Ou et al., 2014; Sritoomma et al., 2014; Yayla & Ozdemir, 2019).

Settings

A multitude of different settings were described in the literature.

Inpatient. A study by Cino (2014) found lavender EO hand massage effective for chronic pain in the elderly in a long-term care setting ($p < 0.002$). An RCT conducted in the emergency room (ER) demonstrated orange EO to significantly reduce fractured limb pain scores ($p=0.0001$) (Hekmatpou et al., 2017) while another ER study completed by Ayan et al. (2013) concluded that rose EO inhalation was effective for renal colic pain ($p = 0.002$). There were two RCTs in the acute care setting that evaluated the effects of AT on burn pain. Seyyed-Rasooli et al. (2016) noted effective burn pain relief with inhaled lavender and rose EO ($p < 0.001$) and Bikmoradi et al. (2016) observed that inhaled rose EO decreased burn pain scores (1st day VAS at 15 min: $p= 0.010$ and 1st day VAS at 30 min: $p= 0.001$). Heidari Gorji et al. (2015) found that inhaled lavender EO lowered sternotomy pain scores for post open heart surgery ($p = 0.001$) and Olapour et al. (2013) found evidence that inhaled lavender EO decreases caesarean section pain ($p = 0.008$). In an inpatient hemodialysis unit, Biçer et al. (2015) found that lavender and rosemary EO massage was effective for headaches ($p= 0.018$). There were two studies that demonstrated AT lowered pain scores during venous cannulation. Ghods et al. (2015) found that lavender EO decreased pain during cannulation in the dialysis unit ($p = 0.001$), and Karaman et al. (2016) found that inhalation of lavender EO lowered scores in a medical surgical unit ($p = 0.01$). Lastly, while an integrated review (Meghani et al., 2017) found that AT reduced pain scores in the critical care setting, it did not provide any statistical data.

Outpatient. In the rheumatoid arthritis (RA) and osteoarthritis (OA) outpatient clinics, AT also reduced pain scores. Efe Arslan et al. (2019) found that a blend of lavender, eucalyptus, and ginger EO massage diminished OA knee pain ($p < 0.001$) and morning stiffness while augmenting physical functioning. Gok Metin and Ozdemir (2016) concluded that an EO blend of

lavender, juniper, cananga, and rosemary administered via massage reduced RA knee pain ($p = 0.009$). Nasiri et al. (2016) found evidence that lavender EO massage reduced OA knee pain ($p < 0.001$). Sritoomma et al. (2014) found ginger EO massage effective for back pain in a massage clinic ($p < 0.05$). Yayla & Ozdemir (2019) found that inhaled lavender decreased pain scores during venous cannulation in the outpatient chemotherapy setting ($p < 0.05$). Lastly, Ou et al. (2014) recruited subjects in the local community and university for a study that found a blend of marjoram, black pepper, lavender, and peppermint EO to be effective for neck pain ($p < 0.05$).

Methods of Administration

The studies explored the two recommended (AHNA, 2017; 2020; Buckle, 2016; Dossey & Keegan, 2016) methods of AT administration: inhalation or topical. However, one systematic review found that ingesting peppermint EO was more likely to cause heartburn compared to the inhalation and topical administration method (Khanna et al., 2014). Nevertheless, all the literature reviewed found that any method of AT administration was useful for pain.

There were, however, two studies that compared inhalation AT versus AT massage. In the randomized controlled trial by Seyyed-Rasooli et al. (2016), inhaling lavender and rose EO reduced pain comparably to AT massage ($p < 0.001$). Furthermore, a systematic review by Lee et al. (2018) demonstrated inhalation AT as having superior effects over massage in the alleviation of pain ($p <0.00001$).

Essential Oils

A systematic review by Khanna et al. (2014) found peppermint EO to be effective for the treatment of irritable bowel syndrome (IBS) pain ($p < 0.00001$). Jun et al. (2013) evaluated eucalyptus EO on knee pain and found that pain scores were significantly reduced ($p < 0.001$). Sritoomma et al. (2014) found that ginger EO reduced back pain scores ($p < 0.05$). Hekmatpou et

al. (2017) concluded that orange EO reduced scores for fractured limb pain ($p < 0.0001$). Ayan et al. (2013) investigated the effect of rose EO for renal colic and found statistically significant differences in pain scores ($p = 0.002$). Rose EO was noted as effective in the Bikmoradi et al. (2016) and Lee et al. (2018) RCTs. However, rose EO was administered in these two studies for burn pain and dysmenorrhea ($p = 0.001$ and $p < 0.00001$, respectively).

There were five studies that evaluated combinations of EO. Combinations included lavender with rosemary for headaches (Biçer et al., 2015); lavender and rose for burn pain (Seyyed-Rasooli et al., 2016); lavender, eucalyptus, and ginger for OA knee pain (Efe Arslan et al., 2019); lavender, juniper, cananga, and rosemary for RA pain (Gok Metin & Ozdemir, 2016); and marjoram, black pepper, lavender, and peppermint for neck pain (Ou et al., 2014).

All combinations included lavender EO. Two articles on nurse-led AT programs in the U.S. promoted lavender's effectiveness for pain relief (Johnson et al., 2016; Joswiak et al., 2016). Lavender EO (Lavandula angustifolia) is considered to be the most popular and cost-effective EO and has been shown to reduce pain (Cleveland Clinic, 2016; Dossey & Keegan, 2016; López et al., 2017).

Adverse Events

The literature was analyzed for evidence of adverse events. The literature review found that AT is associated with little to zero side effects (Dimitriou et al., 2017; Dossey & Keegan, 2016; Joswiak et al., 2016; Lakhan et al., 2016; Meghani et al., 2017; Nasiri et al., 2016; Olapour et al., 2013; Yayla & Ozdemir, 2019). A systematic review was unable to find estimates of events and concluded that adverse events for AT are rare (Posadzki et al., 2012).

Mild discomfort such as wheezing, headache, or skin rash may be experienced with AT (Buckle, 2016; Cleveland Clinic, 2016). One study found that ingesting peppermint EO was

more likely to cause heartburn compared to the inhalation and topical administration method (Khanna et al., 2014). The AHNA recommends only topical or inhalation AT and discourages the ingestion of EOs (AHNA, 2017, 2020; Buckle, 2016; Dossey & Keegan, 2016).

In conclusion, this analysis of the literature found that AT is helpful in reducing pain. Furthermore, it is safe and affordable. As a result, the AHNA may confidently promote the Pain Tool recommendation for AT as a safe and effective non-pharmacological intervention. See Appendix B for a Table of Evidence.

Theoretical Framework

The DNP project intended to evaluate a holistic, non-pharmacological approach to pain management for nurses. The Iowa Model for Evidence-Based Practice to Promote Quality Care (hereafter referred to as the Iowa Model) was chosen as the conceptual framework to guide implementation of the project. The Iowa Model was developed in 1994 (Titler et al., 1994), revised in 2001 and updated in 2012 when more than 600 users attested to its validity (Buckwalter et al., 2017; White, 2016). This model is ideal as it was designed by nurses to guide the application of research findings to improve quality and can be used in any setting (Titler et al., 1994; White, 2016). Furthermore, academics and health care organizations frequently use this model (Brown, 2014; White & Spruce, 2015). See Appendix C for a diagram of the Iowa Model as permitted by the University of Iowa Hospitals and Clinics, copyright 1998.

Iowa Model in Action

The first step in the model was to select a topic from problem-focused triggers (Brown, 2014; Ram & Wilson, 2018; Titler et al., 1994; White & Spruce, 2015). For this project, the problem selected was "pain." Pain is a concern because it is one of the major reasons' clients

seek pharmacological interventions for pain relief. Determining if the topic was a priority for the setting is an essential part of the selection process (Brown, 2014; Titler et al., 1994).

Next, a team was formed that is committed to appraising the evidence and implementing an evaluation of the recommendations (Brown, 2014; Titler et al., 1994; White & Spruce, 2015). The team for the project consisted of a project chair as the principal investigator, the DNP student as the co-investigator, and a team member as the holistic content expert. The team identified key terms to direct the search for evidence (Brown, 2014; Titler et al., 1994; White & Spruce, 2015). The following search terms were fundamental to the project: "aromatherapy," "complementary and alternative medicine," "non-pharmacological interventions," "pain," and "pain management."

Once the evidence was collected, another decision was required to conclude if the research is sufficient (Brown, 2014; Titler et al., 1994). To make this decision, the team examined clinical practice guidelines for the management of pain (Ernstzen et al., 2017) as well as assessed the quality of the evidence with an appraisal tool such as the Johns Hopkins Nursing Evidence-Based Practice Evidence Appraisal Tool (Poe & Costa, 2012). Clinical practice guidelines based on comprehensive systematic reviews were helpful here because they helped inform decisions and diagnose inconsistencies in the evidence (White & Spruce, 2015). In addition, the team reviewed the AHNA's (2016) recommendations on the interventions and CAM for pain relief in the *Holistic Nursing Handbook*.

The team took into consideration that the review of clinical practice guidelines for musculoskeletal pain in primary care by Ernstzen et al. (2017) found that 11 out of the 12 clinical practice guidelines recommended non-pharmacological options such as superficial heat, massage, exercise, multidisciplinary rehabilitation, spinal manipulation, tai chi, yoga,

progressive relaxation, and biofeedback before considering pharmacological therapy. Also, three of the 12 clinical practice guidelines directly recommended CAM for acupuncture (Ernstzen et al., 2017). Although there was adequate evidence to implement non-pharmacological interventions for pain, there was no mention of using AT as recommended by the AHNA (AHNA, 2017; Buckle, 2016). This inconsistency prompted the team to perform a search and rigorous appraisal of the evidence on AT for pain.

The next step in the Iowa Model was to begin the implementation of the evaluation (Brown, 2014; Titler et al., 1994). The team selected "evaluation of the Pain Tool recommendation for AT" as an achievable outcome. Baseline data were collected from a survey. The team analyzed the data and made recommendations to AHNA based on the outcomes (Titler et al., 1994; White & Spruce, 2015).

The final step in the Iowa Model was to disseminate the findings (Titler et al., 1994; White & Spruce, 2015). The team distributed the results of the project to Rutgers University and the AHNA after project completion.

The Iowa Model was successful in assisting the team to organize and develop the project to evaluate the Pain Tool recommendation on AT for pain. The Iowa Model helped to decrease the gap between evidence and practice and created a strong foundation for a quality project.

Methodology

This project used an observational survey design to accomplish its objectives. A purposeful sample of nurses who utilized or purchased the Pain Tool was invited to a two-part survey administered via SurveyMonkey that collected respondents' demographic information and included open-ended questions. The demographic data was analyzed with quantitative analysis and the interview questions were analyzed via content analysis. This mixed-method

survey was the most appropriate to achieve the aim of evaluating the usefulness of the AT recommendation because there was valuable insight obtained besides the statistical analysis of the demographics (Castleberry & Nolan, 2018). See Appendix D1 and D2 for a copy of the Pain Tool.

Setting

The survey was designed and made available on SurveyMonkey, an online survey platform. A link was sent via email to members of the AHNA that used the Pain Tool in their practice for pain management. Additionally, AHNA promoted the survey in its bimonthly electronic newsletter for those who may have downloaded it from the website or received it in their new member mailing.

Study Population

This project included a purposeful sample of nurses who utilized the Pain Tool's AT recommendations for pain. Inclusion criteria included nurses between the ages of 18-89, who took care of adults experiencing pain, and who have used the AT recommendation from the Pain Tool. For this study, the term "nurses" will include: Licensed Practical Nurse (LPN), Registered Nurse (RN), and Advanced Practice Registered Nurse (APRN). The exclusion criteria included non-nurses, nurses without an active license, and those who have never used the AT part of the Pain Tool created by the AHNA. It was anticipated that the study would enroll 200 participants. There was no formula that determined the best sample size in qualitative research (Patton, 2002). If redundancy was reached before 200 participants responded, the DNP student would note that the data were saturated and additional data would not provide any new information (Patton, 2002).

Subject Recruitment

The participants were recruited from an email list provided by the AHNA. The DNP student is a member of the AHNA and received approval for accessing the email list. In addition, the AHNA promoted a link to the survey in its bimonthly electronic newsletter for those who may have downloaded the Pain Tool from the website or received it in their new member mailing.

Emails were sent with an invitation to complete the survey and a link. The link lead to the SurveyMonkey site, which contained the consent and survey. The survey was available to participants for 2 weeks. A copy of the email invitation can be found in Appendix E. A copy of the AHNA newsletter announcement can be found in Appendix F.

Consent

If participants were interested in the study after reading the email invitation or the newsletter announcement, they were able to click on a link that took them directly to the SurveyMonkey site. This step led them directly to the consent form. If they did not wish to continue, they would simply close the website address or click “I do not agree” and immediately exit the survey. If the participant decided to continue, they would click “I agree” and the survey would appear. Potential participants were advised that the co-investigator was available to answer questions or concerns during the consenting process via telephone or email. Potential participants were informed that participation in the project was voluntary and they could end the survey at any time. Lastly, the consent informed potential participants that the AHNA would not know who did or did not take part in the study because no identifiers or links to protected health information were kept beyond the recruitment phase. Therefore, declining to participate in the study would not affect their relationship with the AHNA in any way. See Appendix G for a copy of the consent form.

Risks/Harms

There was a minimal risk from taking part in the online survey such as that information may be inadvertently shared and cause a breach of confidentiality. To minimize these risks, participants were advised that they can stop the survey at any time, that data will not be recorded and that it would not affect their relationship with the AHNA in any way. Only the DNP student had access to the SurveyMonkey link, and the data were stored on the student's password-protected encrypted computer.

Subject Costs and Compensation

There was no cost to participate in this project. Subjects did not receive monetary compensation for their participation in the project. Participants were contributing to the knowledge of holistic nursing and the use of AT to reduce pain.

Study Interventions

There were no interventions for this project. It was an observational survey design. The study plan included the steps of administering the survey and collecting the data for analysis. After approval from the Rutgers University electronic Institutional Review Board (eIRB), the survey was conducted via SurveyMonkey, an electronic survey platform. The AHNA provided a list of their members who were email candidates, and they also included a link to the survey in their bimonthly newsletter. The DNP student sent an email inviting potential participants to the survey. Upon opening the email, participants were provided with general information about the survey. The risks, benefits, and potential harms were included in the email. If the participant consented to proceed, they would click on the link to the survey, which included the consenting documentation included. This step confirmed their consent and they proceeded to the survey. If they did not wish to continue, they could have simply closed the website address or clicked "I do

not agree," and they would have immediately exited the survey. An online survey/questionnaire consent form was downloaded into SurveyMonkey as part of the consent documentation. A copy of the email invitation can be found in Appendix E, a copy of the newsletter announcement can be found in Appendix F, and a copy of the consent documentation can be found in Appendix G.

The survey consisted of 15 total questions divided into two sections: a demographic section and a section about the participants use of the AT tool. The eight demographic questions were collected using multiple choice answers or checkboxes to select all the answers that apply. The second section had seven questions, in which five were either multiple choice, checkbox, drop-down menu, and/or free text answers and two were open-ended questions with a comment field to input the text answers. The second section explored questions about the use of the AT tool such as methods of AT administration, how it has changed their nursing practice, and if there was any room for improvement in the Pain Tool. See Appendix H for a copy of the survey.

Upon completion of the data collection by the DNP student, the data were analyzed by the project team: the principal investigator, the co-investigator (DNP student), and the team member who is an expert on holistic content. Descriptive analysis of the demographic data took place on a Microsoft Excel spreadsheet, version 2006 for Office 365, on the co-investigator's password-protected, encrypted computer. Content analysis was used to analyze the data. The principal investigator and the co-investigator worked collaboratively on the analysis and interpretation of the open-ended questions. The co-investigator completed the final writing of the findings.

Outcomes to Be Measured

The demographic data were evaluated for correlations and the sample was described using descriptive statistics. Content analysis was used to categorize the text data. The analysis

was focused on identifying answers that described the following outcomes: usefulness of the AT recommendation, what AT implementation method was used and if it was effective, how it may have changed nursing practice, and whether there was room for improvement. These outcomes were drafted as recommendations for the AHNA.

Project Timeline

The project proposal was presented to the team at the end of May 2020. Submission to the Rutgers eIRB was completed by June 2020. Once approved by the eIRB, recruitment commenced in July 2020 and the survey was implemented on July 16, 2020. Data collection continued for two weeks until July 31, 2020 and was analyzed by the end of August 2020 with an evaluation of findings. Presentation of the final project was completed on August 31, 2020. Throughout September, the co-investigator disseminated the findings to Rutgers University and to the AHNA. To continue disseminating the findings, the co-investigator will submit the final paper for publication in the professional holistic nursing journal. See Appendix I for a copy of the timeline.

Resources Needed

The costs associated for this project were the sole responsibility of the co-investigator (DNP student). Costs included those necessary to open and conduct a survey on the SurveyMonkey platform and designing a poster to disseminate the findings. The advertisement in the AHNA bimonthly newsletter will be donated in kind by the organization. There were also research expenses that were included, such as a consultation with a statistician and a subscription to Microsoft Office software. A consultation with an editor was also procured. A copy of the budget is located in Table 1 (Appendix J).

Evaluation Plan

The co-investigator (DNP student) evaluated the process of recruitment by examining how many actually participated in the survey. The evaluation also included a review as to how many participants answered all the questions and how many left questions incomplete.

Data Analysis

The demographic differences, as well as the reported usefulness of the Pain Tool, were evaluated at project completion. Descriptive statistics were used to describe the sample of participants. This included a frequency analysis and measures of central tendency (mean, median, and mode). A Microsoft Excel spreadsheet was used for completion of the data analysis.

The survey data were analyzed for credibility, transferability, dependability, and confirmability. According to Guba & Lincoln (1982), these are the four benchmarks for assessing quality in qualitative research, which is comparable to reliability and validity in quantitative research (Cypress, 2017). The DNP student used the outline recommended by Yin (2011) to compile, disassemble, reassemble, interpret, and conclude the data (Castleberry & Nolen, 2018). Upon completion of data analysis, the DNP student made recommendations to the AHNA about the usefulness of their Pain Toolkit. The DNP team reviewed and approved the final recommendations.

Maintenance & Security

The survey's anonymous data results were stored on the co-investigator's password-protected, encrypted computer. Data were shared over the Rutgers University secure storage platform. Only the co-investigator had access to the SurveyMonkey link and the data. Upon completion of the data collection and analysis, the aggregate data werestored with the Project Chair, Dr. Percy, at the Rutgers University School of Nursing (11th floor, Room 1116), located at 65 Bergen Street in Newark, New Jersey, 07107. Upon closure of the eIRB, completion of the

project, and final writing of the manuscript, all data will be destroyed by the team chair after five years or five years from the publication of the results, whichever is later. A copy of the final project will be housed at the Rutgers School of Nursing for its archives.

Results

The survey was divided into two sections, a demographic section and a section about the use of the aromatherapy (AT) recommendation as described in the American Holistic Nurses Association (AHNA) *Holistic Nurses' Pain Relief Tools for Patients & Self-Care*, hereafter referred to as the Pain Tool. Once the email and notice in AHNA's bimonthly newsletter was sent out, there was an immediate response of Registered Nurses (RNs) who were interested in participating. The target sample size of 45 RNs was reached quickly, and the study was closed until a modification request could be sent to the Rutgers electronic Institutional Review Board (eIRB) asking to increase the sample size to 200. This was promptly approved, and the study was re-opened to additional participants for a total of two weeks.

The survey was closed to all new enrollments after 131 participants responded, and the data were imported from SurveyMonkey to an Excel spreadsheet, version 2006 for Office 365. Descriptive statistics were used to analyze the survey data. Content analysis was the method used to analyze open-ended questions. The DNP project team reviewed the free text answers and created the categories used for the analysis. Once categories were created the free text answers were reanalyzed using descriptive statistics.

A total of 131 RNs responded to the survey. Many of the participants did not use the AT recommendations of the Pain Tool (N = 76). They were deleted from the sample, leaving the final sample size at 55 (N = 55) participants. These participants spent an average of nine minutes answering the survey.

Section I: Demographics

The median age for the participants was 51-61 years old with a mean age of 53 and a mode of 51 to 61 years (N = 55). A majority of participants was female (89%; n = 49) with a small percentage of participants identifying as nonbinary (4%; n = 2), leaving male representation at 7% (n = 4). See Table 2 in Appendix K for characteristics of age and gender in this sample demographics.

A total of 98% of participants answered the questions for education and nursing licensure. Nurses with bachelor's degrees represented a majority of the participants (47%; n = 26) followed by those with master's degrees at 35% (n = 19). Most participants were RNs (87%; n = 48), though Advanced Practice RNs (APRNs) were 11% (n = 6) of the population. See Table 3 in Appendix L for characteristics of education and nursing licensure.

For the certification question, 78% (n = 43) of the participants responded. A total of 53% (n = 29) of participants had one certification and 25% (n = 14) had multiple certifications. A mix of professional certifications was noted with the highest number of participants (22%; n = 12) identifying as Holistic Nurse Baccalaureate – Board Certified (HNB-BC). The Advanced Holistic Nurse – Board Certified (AHN-BC) population represented 16% (n = 9) of participants. A variety of other certifications was noted; see Table 4 in Appendix M for characteristics of certifications.

All 55 participants responded to the question regarding membership in a professional organization. A total of 76% (n = 42) of participants have memberships at multiple professional organizations. Only 24% (n = 13) hold a membership with one organization. Over 96% (n = 53) of the participants identified as members of the AHNA. The American Nurses Association (ANA) was represented by 36% (n = 20) of the participants. A variety (42%; n = 23) of different

organizational memberships was identified; see Table 5 in Appendix N for characteristics of professional organization membership.

All 55 participants responded to the demographic question for professional role. It was noted that 55% (n = 30) held multiple professional roles and 45% (n = 25) held only one role. Among the RNs included in the analysis, 75% (n = 41) were staff nurses. In addition, 16% (n = 9) labeled their professional role as "academia," 13% (n = 7) as "self-employed" and 13 % (n =7) as "nurse educators." A variety (24%; n = 13) of other roles was identified; see Table 6 in Appendix O for characteristics of the professional role.

All 55 participants responded to the demographic question for work setting. It was recognized that 67% (n = 37) work in one setting and 33% (n = 18) work in multiple settings. A majority (60%; n = 33) work in an acute care/hospital setting, followed by outpatient facilities at 18% (n = 10) and private practice at 16% (n = 9). Other work settings were identified (18%, n = 10). See Table 7 in Appendix P for characteristics of the work setting.

Section II: Pain Tool Analysis

In section two of the survey, the first question asked participants how they learned about the Pain Tool, and 98% (N = 54) of participants responded. It was found that 62% (n = 34) of the participants learned about the Pain Tool from the AHNA website and 56% (n = 31) from AHNA publications. A total of 22% (n = 12) of the participants received the Pain Tool from AHNA in their new member packet and 2% (n = 1) of participants learned about it from their employer protocol.

All 55 participants answered the question on which essential oils (EOs) were used. Lavender was by far the most popular EO with 100% (N = 55) of the participants answering that they used it. Peppermint EO came in second with 71% (n = 39) of participants, followed by

orange at 47% (n = 26), ginger at 45% (n = 25), and rosemary at 24% (n = 13). A variety of other EOs was used. A sample of all EOs used by the participants can be found in Table 8 in Appendix Q.

Participants were asked why they selected those EOs. Almost half (47%; n = 26) of participants answered this question. A total of 44% (n = 24) indicated they used multiple EOs and only 4% (n = 2) used one EO. Over half (65%; n = 17) of participants used EOs for pain relief, 62% (n = 16) used EOs to induce relaxation, 46% (n = 12) to decrease nausea, and 35% (n = 9) to decrease anxiety. See Table 9 in Appendix R for a list of why the EOs were chosen.

When asked to explain why different EOs were used, participants responded that different EOs were used for different problems. Forty-four participants indicated that lavender was noted to help induce relaxation and decrease pain, stress, anxiety, and more. Peppermint (n = 31) was used for pain and nausea, among other reasons. Orange (n =18) was used to stimulate energy and focus/concentration as well as induce relaxation. Ginger (n = 17) was used to decrease nausea and pain, and for all types of digestive issues. Over 25 EOs were mentioned. Seven participants identified other EOs but did not specify their uses. See Table 10a-10d in Appendix S1-S4.

All 55 participants answered the question about the method of administration they used for AT. A little over half, (53%; n = 29), responded they used one method only and 47% (n = 26) used multiple methods. Almost all of the participants (93%; n = 51) used inhalation as the method of administration and 55% (n = 30) used the massage method. It was noted that 38% (n = 21) of participants used both inhalation and massage.

A total of 22% (n = 12) explained how they administered AT. A total of 16% (n = 9) described one mode of administration and 5% (n = 3) described multiple modes. It was noted

that for inhalation, 33% (n = 4) used diffusers, 8% (n = 1) used a nebulizer, 8% (n = 1) used aroma sticks and 8% (n = 1) used nasal inhalers. For massage and topical administration, 33% (n = 4) of participants indicated the mode was a patch, 8% (n =1) applied oil to specific points, 8% (n = 1) used the M technique of administration, 8% (n = 1) used roller balls, and 8% used oil-infused lotions.

When asked why they chose their method of administration, only 16% (n = 9) of participants responded. A total of 67% (n = 6) of those respondents reported that their employer's protocols dictated their choice, while 44% (n = 4) indicated they chose that method for ease of use and 11% (n = 1) stated they liked the affordability of the method.

A majority of participants (76%; n = 42) responded to the question on how they could tell if the method was effective. Almost half of participants (49%; n = 27) provided multiple responses and 27% (n = 15) provided one response. A total of 93% of participants (n = 9) indicated they evaluated for effectiveness by verbal report, 69% (n = 29) by decreased pain scores, 7% (n = 3) by observing if relaxation or sleep was induced in the recipient, and 5% (n = 2) by changes in vital signs. See Table 11 in Appendix T.

The next question asked whether the AT recommendation in the Pain Tool was helpful and 71% (n = 39) of participants answered. A total of 90% (n = 35) found the AT recommendation helpful to their practice and 10% (n = 4) answered that it was not helpful. When asked in what ways the AT recommendation in the Pain Tool was helpful, 71% of participants (n = 39) responded and 29% (n = 16) did not. Almost half of participants (40%; n = 22) provided multiple responses and 31% (n = 17) provided one response. A total of 29% (n = 16) found the AT recommendations were helpful to educate those that were not holistic RNs. The participants who determined it was helpful for education reported they used it to teach patients/clients,

families, colleagues/peers, and management (50%; n = 8), and 25% (n = 4) said they found it helpful as a visual aid when educating patients. In addition, 21% of participants (n = 8) found that using the Pain Tool helped them find new ways to reduce symptoms and 18% (n = 7) found value in an evidence-informed tool. A total of 15% (n = 6) found that it gave them confidence, and 15% (n = 6) felt it provided support, especially when discussing AT with peers and administrators. Likewise, 15% (n = 6) of participants said it provided them with more options for pain management than they had before. The AT recommendation in the Pain Tool was found to be helpful in several other ways; see Table 12 in Appendix U.

When asked how their practice had changed since using the Pain Tool's AT recommendation, 80% (n = 44) of participants responded. A total of 49% (n = 27) of participants provided multiple responses and 31% (n = 17) provided one response. In general, 70% (n = 31) of participants felt the AT recommendation helped change their practice by emphasizing the use of the five holistic caring values in the Pain Tool and 20% (n = 9) found it had no impact on their practice. A total of 48% (n = 21) of participants found that they promoted more options for pain management, 30% (n = 13) were able to improve their patient outcomes by using the AT recommendations, and 9% (n = 4) had less of a need for pharmacological medications. See Table 13 in Appendix V.

Finally, for the last question, participants were asked what changes they thought should be made about the AT in the Pain Tool. Only 64% (n = 35) of participants answered this question. Multiple responses were provided by 13% (n = 7) of participants and 51% (n = 28) provided one response. A total of 54% (n = 19) of the participants felt the recommendation required no changes or improvements. However, 23% (n = 8) asked that more safety information on the use of EOs be included and another 23% (n = 8) asked for detailed information about

using a variety of EOs. A total of 6% (n = 2) requested that more non- pharmacological interventions be added to the Pain Tool, and 6% (n = 2) felt that each non-pharmacological recommendation should have its own tool because there is so much information in the Pain Tool. Several other recommendations were noted; see Table 14 in Appendix W for a description of the recommendations.

Discussion

The participants' demographic data were comparable to a national sample of RNs (Smiley et al., 2018; U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis, 2019). Similar to the national data, participants were mostly female, over the age of 40, and were staff nurses working in the acute-care hospital or outpatient setting. However, the sample size was small, and conclusions could not be formulated from the data. Additional research is warranted to examine how gaps in demographic data affect the clinical practice on AT for pain.

All RNs should strive for certification as a means to validate the education and skills that effectively improve outcomes (Enzeman et al., 2016). The survey sample demonstrated diversity in professional certifications. Over half of the participants have some type of holistic certification and a quarter held multiple certifications. Due to the small sample size, conclusions could not be formulated as to why the participants held multiple certifications in diverse specialties. Additional research that explores the usefulness of holding multiple specialty certifications may help answer how this affects the clinical practice on AT for pain.

It is important to distinguish that holistic interventions like AT are part of the broad independent practice promoted by the ANA (Mariano, 2016). Although there is a scope of practice for holistic nurses, it was designed in collaboration with and from ANA's *Nursing:*

Scope and Standards of Practice (ANA, 2015b; Mariano, 2016). Therefore, the practice of holistic nursing is appropriate for all RNs and could be the reason why it is widely disseminated in nursing specialties.

Diversity was also found in professional organization memberships. Membership in professional organizations helps nurses focus their practice and advocate for policy changes that transform health care (RegisteredNursing.org, 2020). Although a majority of participants were members of AHNA, over 75% indicated they were also members of multiple organizations including ANA, Sigma Theta Tau, and the American Association for Critical Care Nurses. The practice of holistic nursing, as established previously, may also be widely disseminated in nursing organizations because it is suitable for all RNs.

In section two of the survey, the participants were asked how they learned of the Pain Tool. The responses from the participants established that they were proactive in the development of their clinical practice for pain management. This was demonstrated by participants staying abreast with evidence-informed practice through the AHNA website and association publications. The AHNA (2020) publishes the *Journal of Holistic Nursing*, a peer-reviewed quarterly publication; *Beginnings* magazine, which is a forum for its members; and a bimonthly online newsletter.

Next, the survey outcomes confirmed how popular lavender EO is for AT. Lavender EO (Lavandula angustifolia) is considered the most popular and cost-effective EO (Cleveland Clinic, 2016; Dossey & Keegan, 2016; López et al., 2017). Aromatherapy as an effective therapy for pain is well supported by the literature (Buckle, 1997, 2003, 2016; Lakhan et al., 2016; Lee et al., 2018). For example, lavender, peppermint, orange, ginger, and rosemary EOs have analgesic properties (Buck, 2016; Efe Arslan et al., 2019**;** Gok Metin & Ozdemir, 2016**;** Johnson et al.,

2016; Joswiak et al., 2016; Khanna et al., 2014; Hekmatpou et al., 2017; Sritoomma et al., 2014). Participants also confirmed that, besides lavender, they used black pepper, geranium, ginger, Helichrysum, mandarin, oil cloves, orange, peppermint, and sweet marjoram to provide pain relief. A 2014 study by Ou et al. also established that black pepper and marjoram are effective for pain relief.

Participants' responses revealed they were also utilizing EOs for a variety of different reasons. Although pain was the biggest reason for using EOs, participants were also using them to induce relaxation and relieve nausea and anxiety. If anxiety is a symptom of high-impact chronic pain (Dahlhamer et al., 2018), then EOs are helpful not only for pain but for the complexity of symptoms that surround pain.

The next question asked participants about their method of AT administration, the rationale for that choice, and how effectiveness was appraised. Almost all of the participants responded that they used inhalation AT, although almost half indicated they used multiple methods. A systematic review by Lee et al. (2018) found that inhalation AT has superior effects over massage in the alleviation of pain. It is important in the age of COVID-19 to utilize the most appropriate method since inhalation may not always be feasible if the recipient is wearing a mask. Although the olfactory administration produces the fastest effect, both topical and inhalation AT trigger the same nervous system response (Buckle, 1997, 2003, 2016). This is confirmed by a study that found inhalation AT to reduce pain comparably to AT massage **(**Seyyed-Rasooli et al., 2016).

It is of note that less than 11 participants completely answered this multi-layered question. Therefore, it was difficult to infer if there was a significant difference for using

methods such as diffusers and nebulizers versus patches and the M technique. Similarly, one cannot determine if participants chose methods based on ease of use or employer direction. Nevertheless, it was interesting to note there was only one mention of avoiding the inhalation method in the COVID-19 pandemic. If the recipient of AT is wearing a mask to protect from COVID-19, the inhalation technique may not be the most appropriate form of intervention.

The Joint Commission (TJC) recommends evaluating pain by virtue of a valid pain assessment tool (TJC, 2017). However, a majority of participants confirmed that they used verbal report. These two options could mean the same thing and should have been made clearer by an option that stated instead "decreased pain scale scores" and the other option as "verbal report that did not include a pain scale score." Although more than half of participants evaluated the effectiveness of the method of intervention from decreased pain scores, it was not used as commonly as a verbal report. A solution to this concern is the Visual Analog Scale (VAS). The VAS pain assessment tool consists of one question that instructs the participant to place a line perpendicular to the VAS line at the point that represents their pain intensity and is available to the public at no cost (Hawker et al., 2011).

The next question asked if the AT recommendation in the Pain Tool was helpful. In general, the participants found the recommendation to be useful especially for educating others about AT. Although AT is attracting more and more attention, many patients/clients and their families, colleagues, or peers may not have heard of AT. Therefore, they would benefit from education on the intervention. Furthermore, participants stated they used the Pain Tool to help them explain AT to their management team. The participants noted that supplying the Pain Tool to recipients of AT education was particularly helpful and the visual aid was also used to explain

the use of AT. Participants also found it helpful as an evidence-informed tool and for reducing symptoms that surround pain and increasing confidence in practice.

The next question asked participants how their practice changed since implementing the Pain Tool's AT recommendation. It is interesting to note that almost three quarters of the participants responded with themes from holistic nursing's five core values (CVs) to integrate a scientific and artistic approach to pain management (ANA, 2013; Mariano, 2016). Not only did participants comment on how the Pain Tool strengthened their underlying philosophical and theoretical approach to pain management (CV-1), but it also helped to improve the therapeutic healing environment (CV-3) through enhanced communication (CV-3) and education (CV-4) on the research for AT (CV-4). In addition, the Pain Tool strengthened participants' use of the holistic caring process (nursing process) to implement the holistic modality (CV-2) of AT, as well as transform their self-reflective (CV-5) practice for pain management. Fundamentally, all nurses could recognize holistic nursing's five core values. The core values were designed with and from ANA's *Scope and Standards of Practice for Nursing* (ANA, 2015b; Mariano, 2016). Therefore, the practice of using the five core values to administer AT for pain management is helpful to all RNs.

The compatibility of the Pain Tool with the scope of holistic nursing's core values *(*ANA, 2013; Mariano, 2016) was not the only way participants considered how their practice changed. A multimodal approach to pain management is recommended by many clinical practice guidelines (CPGs) (ASATF, 2010; Ernstzen et al., 2017; Kumar, 2007; Oliveira et al., 2018). Almost half of the participants felt the Pain Tool afforded them the opportunity to promote more options for pain management besides pharmacological medications. Participants noted they were improving outcomes with recipients requesting less medications for pain.

Finally, the last survey question asked participants what changes should be made to the information provided about AT in the Pain Tool. Over half of participants felt the AT recommendation required no changes or improvements. However, some did request that AHNA add more information. Participants also asked for more recommendations on other non-pharmacological interventions besides what is already on the Pain Tool, as well as a separate tool for each intervention.

The participants felt that more EOs should be added to the Pain Tool as well as information on safety precautions. Safety information would be immensely helpful, especially since there are over 100 components that give EOs their properties (Boyce & Natschke, 2019; Buckle, 2016). This means that there are a variety of chemical components within EOs that elicit different responses and it is important to know which components are the most appropriate for the recipient. Furthermore, to practice ethically, nurses must be mindful of providing safe, cost-effective interventions (ANA, 2010). With the survey outcomes confirming the popularity of inhalation administration, it would be useful to reflect on the safest, most effective way to administer AT (ANA, 2010). Many recipients are currently wearing masks for the COVID-19 pandemic.

When AHNA releases the next stage of the *Holistic Pain Relief Toolkit*, the participants' recommendations will be addressed. The *Holistic Pain Relief Toolkit* will include evidence-informed recommendations for other interventions such as mindfulness-based stress reduction, yoga, tai-chi, physical/energetic touch therapies, and other essential oils for AT (AHNA, 2017). From the survey outcomes, the AHNA has valuable data to consider for the next stage of the *Holistic Pain Relief Toolkit* and how to enrich the Pain Tool as well.

Recommendations for AHNA

A set of recommendations was made to AHNA from the survey outcomes. It was noted that many participants were older than 40 years of age and had diverse nursing specialty certifications. However, since the sample size was small, and conclusions could not be formed from the data. Additional research is warranted to examine how the gaps in demographic data and multiple specialty certifications affect the clinical practice of AT for pain.

The AHNA's mission is to provide support to all holistic caregivers. All of the participants were nurses and almost all were members of the AHNA. Another research focus for AHNA could be on usefulness of the Pain Tool for HCPs outside of the organization's specialty.

Many participants were staff RNs in the hospital setting. To institute policy changes that include AT for pain management, staff RNs need to be encouraged to move into areas of leadership. The AHNA Pain Tool is a set of evidence-informed guidelines that can assist leaders in redesigning policy or piloting new initiatives for pain management. Additional studies on how RNs could manage this venture on such busy schedules could also be conducive to, and validate holistic nursing research on, self-care. Confirming the *Holistic Pain Relief Toolkit* (AHNA, 2020b), including the Pain Tool, with validity and reliability studies will be a valuable resource for these initiatives.

Participants commented they would like to see more evidence-based information on a broader range of EOs and their safe use. The Pain Tool only provides information for the commonly used lavender EO. However, the survey outcomes confirmed that holistic nurses are using EOs other than lavender. Furthermore, it was important to participants that they practice AT ethically and safely. Further study and dissemination of the safety and benefits of topical administration in the age of COVID-19 may be advantageous to clinical practice. The AHNA may want to add more safety information to the Pain Tool and the *Holistic Pain Relief Toolkit*,

especially since it is being used to educate patients, nurses, administrators, and other HCPs who are not holistic nurses.

Participants used more than one method of AT administration and expressed that the Pain Tool should have more information about other methods and modes of administration. Participants also asked for a separate Pain Tool for AT as well as a separate tool for each holistic non-pharmacological intervention. Because the participants mentioned how they appreciated using the Pain Tool for educational purposes, AHNA may want to consider if it will be beneficial to design the Pain Tool and the upcoming *Holistic Pain Relief Toolkit* to be compatible with the four types of learning styles. Recipients of education learn in different ways and adjusting teaching styles may improve learning outcomes (Elrick, 2018). Ensuring understanding of how to administer AT safely and effectively will be crucial to minimizing risks and improving outcomes (Conlon et al., 2017).

The AHNA will be addressing these recommendations with the upcoming release of the *Holistic Pain Relief Toolkit.* The *Holistic Pain Relief Tool Kit* will be released in stages, with the next stage including evidence-informed recommendations on other non-pharmacological interventions such as mindfulness-based stress reduction, yoga, tai-chi, physical/energetic touch therapies, and other essential oils for AT (AHNA, 2017). Nevertheless, the survey outcomes provide AHNA with practical evidence to consider for the next endeavor.

Limitations

The survey used a convenience sample of AHNA nurses who have used the Pain Tool and self-selected to participate in the survey. Answers were subjective and therefore may be biased, especially by those participants already certified in AT. Moreover, the sample was small, and many people did not answer all of the questions. Also, participants were not able to talk

about their entire experience, so focus groups would be more useful. The homogenous sample consisted of mostly females and may limit the generalizability of the results. A survey with a larger sample size that explored multiple clinical specialties may be more generalizable and have less bias. Overall, longitudinal studies would provide a wider understanding of the Pain Tool's usefulness over time.

A questionnaire that collects quantitative data may be analyzed for generalizability, thereby increasing external validity (Poe & Costa, 2012). Equally important in making a survey reliable is the consistency to produce the same results (Poe & Costa, 2012). Not all questions were multi-part; therefore, the survey questions were not consistent. In retrospect, breaking complex, multi-part questions into separate, simpler ones may have improved clarity and therefore the validity and reliability of the study.

An example of this was the question that asked participants how they administer AT, why they use that method, and how they could tell if the method was effective. The choices were inhalation, massage, decreased pain scores, verbal report, and other. Participants were able to select all that apply and enter free text in the comment section to answer the multiple parts of the question. Only a few people answered this question in its entirety, and it may have been that it was not clear. Firstly, this particular question should have had an option for topical instead of massage. Many participants chose only inhalation and then commented on using topical modes of administration. Topical would have been more inclusive of the many modes of administration used, including massage. In this same multiple-part question, participants were given the option to select decreased pain scores, verbal report, or all that apply with a comment section to enter free text to explain their answers. Many participants may have interpreted patient/client verbalizing a decrease in pain score as verbal report. These two options could mean the same

thing and should have been made clearer by an option that stated instead “decreased pain scale scores” and the other option as “verbal report that did not include a pain scale score.”

Implications

The DNP project successfully achieved its objectives of creating and evaluating a survey on the usefulness of the AT recommendation in the Pain Tool. In addition, the survey findings led to the creation of recommendations to the AHNA. These recommendations will help the AHNA design successful AT strategies and protocols to guide nurses, HCPs, and institutions in improving pain management with non-pharmacological interventions. With the final release of the *Holistic Pain Relief Tool Kit*, the AHNA is empowering and transforming nurses, HCPs, and institutions with valuable guides and tools that can potentially improve healthcare outcomes. The following describes how the findings from this project may impact our healthcare system and/or the AHNA.

Clinical Practice

The findings demonstrated that the AT recommendation in the Pain Tool positively impacts nursing practice. The Pain Tool is an evidence-informed document created by the AHNA (2017) for HCPs to use as CPGs for pain in any clinical practice setting. Recognizing that non-pharmacological interventions and holistic modalities are not only for certified holistic nurses, all nurses can improve their clinical practice by administering AT to improve outcomes for pain (ANA, 2013; ANA, 2015b; Mariano, 2016).

The Pain Tool may assist nurses and HCPs with managing their time. Having to interrupt work tasks to critically appraise literature for an evidence-informed intervention takes a tremendous amount of time—something most nurses and HCPs do not have. The Pain Tool enhances time management by providing the dose and instructions for both inhalation and topical

administration of lavender EO, as well as the references that support the intervention. Since effective time management has been shown to empower nurses and increase nursing competence (Hamzehkola & Naderi, 2019), the Pain Tool is a valuable one for HCPs to have in their arsenal.

The AHNA Pain Tool describes pain interventions for both patients *and* self-care. Nurses and HCPs work long hours in a stressful environment. It is no surprise that many nurses and HCPs are suffering from pain themselves. Self-development, self-reflection, and self-care are core values of holistic nursing (ANA, 2013; Mariano, 2016) and help to increase resilience. A resilient HCP is healthy and fully present, manifesting optimal holistic care that improves outcomes (Hickey, 2019). Experiencing the benefits of AT for self-care directly increases the chances of nurses and HCPs recommending the modality to others (Boyce & Natschke, 2019). When more HCPs use AT as a part of self-care, our healthcare system is exposed to a modality that has the potential to enhance resilience in the workplace as well as improve clinical outcomes.

Quality and Safety

Nurses and HCPs are aware that most pharmacological interventions for pain have long lists of side effects. Aromatherapy has been shown to carry a minimal risk for adverse events (Buckle, 2016; Dossey & Keegan, 2016). HCPs may administer AT, while monitoring for side effects, as is normally done when administering an over the counter pain reliever.

Survey outcomes illustrated that AT enhances the pain management experience overall. Pain and the management of pain—especially high-impact chronic pain—is complex, and many CPGs are being revised to include multi-modalities to improve outcomes (Ernstzen et al., 2017; Oliveira, 2018). When modalities such as AT increase the relaxation response and help with the secondary effects of pain such as nausea, insomnia, and emotional strain, the outcomes for pain

management are improved as well (Buckle, 2016; Joswiak et al., 2016; Karaman et al., 2016; Meghani et al., 2017; Seyyed-Rasooli et al., 2016; Yayla & Ozdemir, 2019). Understanding which interventions are most effective for pain is important to nursing because pain outcomes are considered a nurse-sensitive indicator (Beck et al., 2019). Therefore, improving outcomes for pain will also improve quality indicators.

The survey results found that the inhalation administration method was favored by nurses because of its quick and effortless technique. However, the U.S. is in the throes of a pandemic and inhalation AT may not be a feasible approach to pain management when everyone must wear masks for safety (CDC, 2020). This pandemic is an emerging challenge that calls on the AHNA to re-design the Pain Tool and their upcoming *Holistic Pain Relief Toolkit* to be COVID-19 friendly. Perhaps suggesting other topical methods, such as the patches and the M technique (Buckle, 2016), will provide HCPs and institutions with a more appropriate method of administration during this time.

Economics

Due to the low cost of most EOs, AT may drastically reduce the cost of pain management for patients and clients. In addition, this can help to offset the nation's costs associated with pain as well as assist in mitigating the opioid epidemic.

The Affordable Care Act contains reimbursement codes for health care services that include complementary and alternative modalities (CAM) (Thompson & Nichter, 2016). This has persuaded many institutions to adopt holistic modalities into their culture as evidenced by Conlon et al.'s pilot study (2017) that introduced EOs at an academic medical center. As this trend continues, we will see a greater number of institutions adopting these protocols. With the release of the *Holistic Pain Relief Toolkit* and future validation of the Pain Tool, more

institutions will look to the AHNA for guidance on how to use holistic modalities as a cost-effective approach to pain management.

For those organizations that do not qualify for federal and state reimbursement, nurse leaders may seek grant funding. Grant funding is necessary to continue supporting nursing research, especially AT and holistic nursing research. Although securing grant funding is a challenging task, it is nonetheless essential to conducting large studies that create a strong, supportive foundation to AT practice (Delaney et al., 2018).

Hospitalized patients may be happy to learn that receiving AT as part of their plan of care will not incur any additional costs (Conlon et al., 2017). Adding AT to tasks such as bathing is an effective intervention that complements the pain management experience at little to no cost. Even if the institution is purchasing the EOs for providers to administer, it constitutes part of the nursing budget and the patient will not be charged as they would for an aspirin (Conlon et al., 2017). Nevertheless, nurses and HCPs in other work settings may note the affordability of EOs and resolve to provide the intervention as part of their standard practice. To summarize the economic implications, it is cost effective to allow nurses to work within their full scope of practice and provide modalities that improve outcomes (Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, 2011).

Health Policy

Due to the opioid epidemic, CPGs for pain management are continually being developed and revised (Ernstzen et al., 2017; Oliveira, 2018). This is an opportunity for nursing and the AHNA to collaborate interprofessionally and improve quality of care as recommended by the IOM report released in 2001. The AHNA may promote their Pain Tool and upcoming *Holistic*

Pain Relief Toolkit to task forces assigned to guideline development, or it may collaborate in the development of holistic modalities in the guidelines.

We have learned that the integration of AT into clinical practice affords institutions a cost-effective approach to pain management. As the number of organizations utilizing the Affordable Care Act for reimbursement of CAM (Thompson & Nichter, 2016) grows, holistic modalities such as AT will increasingly become part of the health care culture. This trend was noted in the state of Minnesota, where six major health care systems have adopted an AT program as policy and procedure in their clinical practice areas (Ash, 2014). Nurses and HCPs who work for institutions that do not have an AT policy for pain management can drive this trend by actively working with their leaders to institute an AT pilot project within their work setting.

Nurses are a driving force in policy change, whether it be at the institutional, local, state, and/or federal level. Nurses account for the majority of the healthcare workforce (Daniel & Smith, 2018), and the collective voice of nurses in the profession can positively impact the U.S. healthcare system. As the awareness of the benefits of CAM increase, nurses can lead beneficial changes in the system including innovative solutions to the challenges involved with the ongoing opioid epidemic and COVID-19 pandemic. Since advanced holistic nurses are educated and trained on these modalities, they are poised to collaborate directly with AHNA, their communities, as well as their local, state, and federal leaders and legislators to be a positive voice of transformation.

Education

For successful results, it will be imperative to train HCPs to administer AT safely. Nurses and HCPs will need to be trained on the properties of each EO as well as their safety

implications. Learning to expertly customize the right prescription to address a specific condition, taking the patient or client preferences into consideration, is crucial to implementing a safe and effective intervention (Conlon et al., 2017). It will be necessary to expand both the Pain Tool and AT education in general to include a variety of EOs that provide a strong evidence base for practice. Due to the COVID-19 pandemic, it may not be safe to administer AT via inhalation. Topical administration is usually administered by way of massage, which may be time consuming to HCPs who already have insufficient time for all their tasks. Quick and effective topical administration techniques, such as the M technique (Buckle, 2016), are essential alternatives to inhalation but require training.

The findings of this survey, as well as those from nurse-led AT programs in U. S. patient care settings, may lead academic nursing programs to include education and training on AT in nursing curricula (Boyce & Natschke, 2019; Conlon et al., 2017; Johnson et al., 2016; Joswiak et al., 2016). In typical foundations of nursing courses, students are encouraged to administer a hand or back massage during care. Adding a couple of drops of EOs to these nursing tasks will enhance the overall experience. For an introduction to AT, nursing curricula can include the option to attend the 12-hour continuing education course offered by R.J. Buckle Associates entitled *Aromatherapy for Hospitals* (R.J. Buckle Associates, 2020). This course is peer-reviewed and endorsed by the AHNA (2020). Learning AT as part of nursing education will prepare our future nurses to provide a quality, non-pharmacological, complementary cost-effective intervention for pain.

In summary, when educating patients and clients about pain management, HCPs are in a unique position to raise awareness of the cost-effective AT modality. This simple modality is easier to administer than costly pharmacological medications and/or biotechnologies.

Sustainability/Future Scholarship

The Pain Tool recommends that AT be administered topically or via inhalation. The sustainability of this project lies in continued evaluation for the safest, most effective mode of AT administration. This is especially true in the age of COVID-19. The survey findings demonstrated that nurses look to the whole Pain Tool for the most current, evidence-informed CAM and holistic interventions for pain. Future scholarship can improve on the survey to increase generalizability and validate the Pain Tool. As a result, the Pain Tool and the upcoming *Holistic Pain Relief Toolkit* can be evaluated for validity and reliability as a whole, rather than on a piecemeal basis.

Dissemination/Professional Reporting

The DNP student disseminated the findings to Rutgers University via oral and poster presentation in order to meet the graduation requirements, and to the stakeholders at the AHNA. In addition, the DNP student intends to submit the project's final paper to the *Journal of Holistic Nursing* to disseminate the findings to all AHNA members. A poster presentation will be given by the student at the June 2021 AHNA conference in Florida.

Summary

The purpose of the project was to explore how nurses view and use the AT recommendation in the Pain Tool. The DNP project succeeded in achieving its objectives and the findings are promising. Although further studies are warranted, the DNP project found AT to be a safe and effective non-pharmacological and complementary intervention that can be immediately administered to improve the quality of the treatment for pain. Nurses and interprofessional HCPs may feel confident that the Pain Tool's recommendation for AT is useful and will improve their practice, thereby achieving the project's aim.

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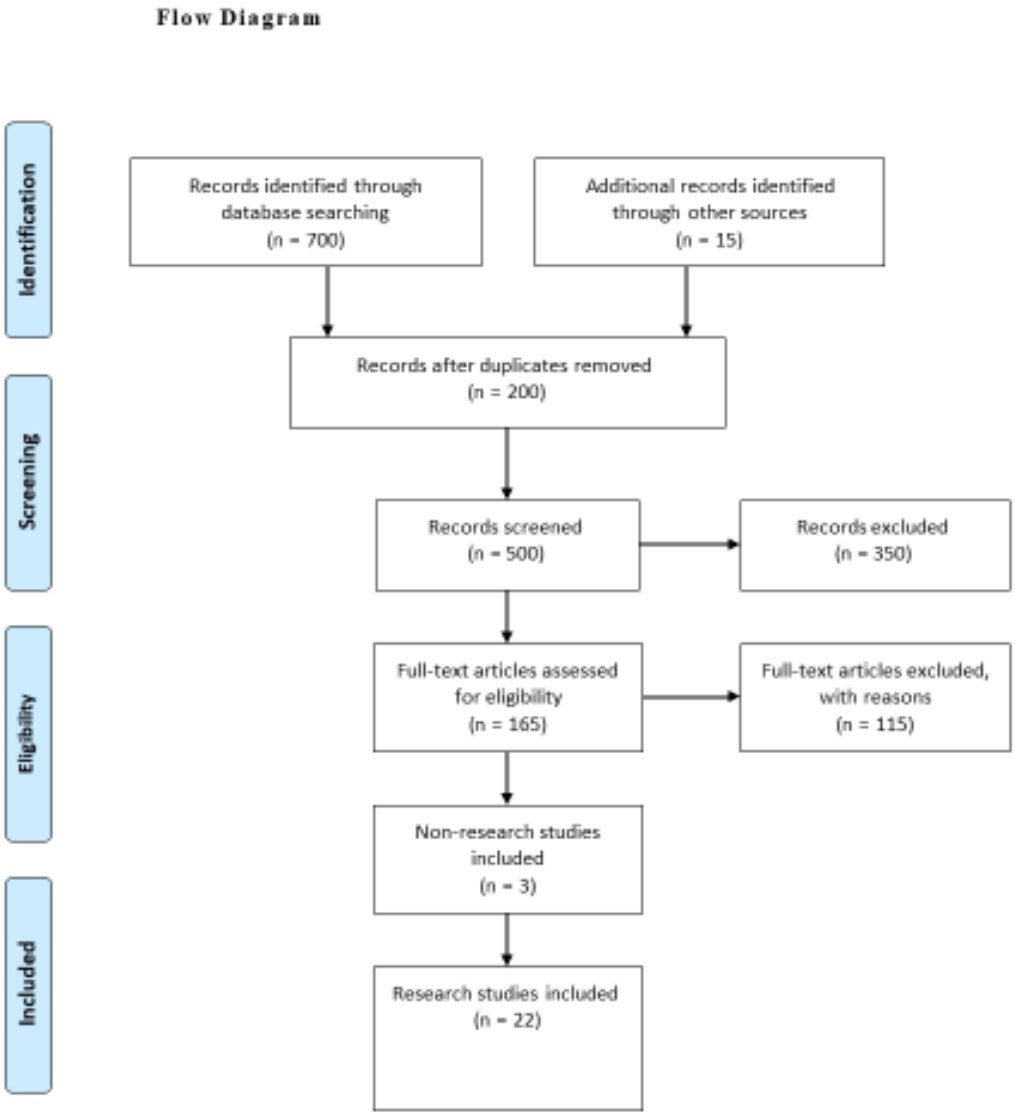
Appendix A

Flow Diagram



Appendix B

Table of Evidence

The clinical question guiding this project is: "How have nurses used the AT recommendation for pain from the Pain Tool and does it need to be improved"?

Article	Author, Date	Evidence Type	Sample, Sample Size, Setting	Study Findings that help answer EBP question	Limitations	Evidence Level & Quality
#1	Ayan, M., Tas, U., Sogut, E., Suren, M., Gurbuzler, L., & Koyuncu, F. (2013) Investigating the effect of aromatherapy in patients with renal colic. *The Journal of Alternative and Complementary Medicine, 19*(4), 329–333.	Double blind randomized control trial (RCT)	A total of 80 patients diagnosed with renal colic (39 males, 41 females) ages 19-64 from an Emergency Room (ER) in Istanbul, Turkey. Average age = 36. N = 40 patients received diclofenac sodium (conventional	There was a statistically significant difference in pain scores 10- and 30-minutes post AT intervention. P Values: Initial VAS: p= 0.223 VAS at 10 min: p= 0.002 VAS at 30 min: p= 0.000 This study was chosen because the intervention was inhalation aromatherapy (AT) with Rose essential oil (EO). The objective was to study Rose EO as an adjunct and not a stand-alone intervention for pain management. There were no significant differences between groups in terms of age and sex (AT: +/- 8.86, placebo: +/- 9.32)	There is no discussion of power calculation for sample size and only a brief description of randomization. The authors did not discuss limitations. This study was performed in Turkey and may not be generalizable to the population sample in the United States.	Research Level I B, Good quality

			therapy) with AT. N = 40 patients received diclofenac sodium (conventional) with NaCl as the placebo.		The authors felt that the initial scores that resulted in no statistical significance could have been affected by the stress of entering the ER for the first time. Therefore, reduction of stress that comes with assessment and treatment by a provider may have affected the values. Further studies are needed with larger sample sizes. This study used Rose EO, the most expensive EO on the market. Rose EO is not	

					feasible for a student project.	
#2	Biçer, S., Ünsal, A., & Demir, G. (2015) The effect of aromatherapy massage applied to facial area upon headache severity among patients who suffered from headache during hemodialysis. *International Journal of Caring Sciences*, *8*(3), 722–728.	RCT	A total of 50 patients (25 females and 25 males) undergoing hemodialysis (HD) over age 30 from a HD unit of [redacted] Average age = 56.5. N = 25 patients received AT massage with lavender and rosemary EO.	Although there were no statistically significant differences in the average pain scores between the groups before the intervention and after the first week of massage AT, there was a difference in pain scores in the following weeks. P Values: First week: p= 0.888 Second week: p= 0.018 Third week: p= 0.000 Time and frequency of massage AT made a difference. The authors mention that AT is an inexpensive intervention that had no side effects. This study was chosen because the EO blend included lavender and rosemary (most studies are on lavender alone).	The study was performed in Turkey and may not be generalizable to a U.S. sample. The authors mention that the method had limitations in that there was no blinding or placebo group. Larger sample and longer follow up period are needed to support the study. There was no mention if the control group	Research Level I A, High quality

			N = 25 patients received massage only.	For sufficient power, 18 subjects were required in each group. There were no significant differences between groups in terms of demographics ($p > 0.05$).	received usual care or a massage without AT. This study evaluated massage AT, and the project will explore inhalation AT.	
#3	Bikmoradi, A., Harorani, M., Roshanaei, G., Moradkhani, S., & Falahinia, G. (2016) The effect of inhalation aromatherapy with damask rose (Rosa damascena) essence on the pain intensity after dressing in patients with burns: A clinical	RCT	A total of 50 patients (22 females and 28 males (ages 18-65 with 2nd- and 3rd- degree burns in a burn ward of Hamadan, Iran. Average age= 33.2 yrs. N = 25 subjects were randomized by coin toss to inhale rose EO.	There were significant decreases in mean pain scores. The statistical tests showed significant differences between the severity of pain in the two groups at 15 min and 30 min after treatment on the first and second days. Comparison of mean pain intensity of both groups: 1st day VAS at 15 min: = 0.010 1st day VAS at 30 min: p= 0.001 2nd day VAS at 15 min: p= 0.001 2nd day VAS at 30 min: p= 0.001 VAS for both groups before and after 1st and 2nd day demonstrated pain in experimental group had	The authors used convenience sampling. Discussion on limitations was brief, stating only that variables were controlled through uniformity and homogeneity. The study was performed in Iran and may not be	Research Level I A, High quality

	randomized trial. *Iranian Journal of Nursing and Midwifery Research*, *21*(3), 247–254.		N = 25 inhaled distilled water.	lower increase compared to control: p= 0.010. This study was chosen because it tests inhalation AT on patients with severe burns which is described as excruciating and the worst kind. The authors promote AT as a complementary therapy and not a standalone intervention. Minimum calculated size was 23 per group (for 80% statistical power and 95% CI). There were no significant differences between groups in terms of demographics (p > 0.05).	generalizable to a U.S. sample. This study used rose EO, the most expensive EO on the market. Rose EO is not feasible for a student project. It was noted that patients were treated (as per conventional therapy) with morphine and diazepam one hour before and after dressing changes (pain assessment was taken 30 minutes before changes. Although there was no significance, the authors did note that there were	

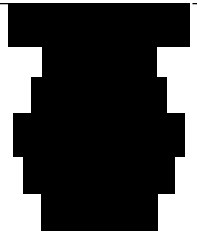
					more males in each group.	
#4	Cino, K. (2014) Aromatherapy hand massage for older adults with chronic pain living in long-term care. *Journal of Holistic Nursing*, *32*(4), 314–315.	Prospective, randomized, three control group trial	A total of 118 residents (89 females and 29 males), who were 60 years or older, of seven long-term care facilities in a suburban area in the mid-Atlantic region of the U.S. Average age = 83 years. There were 3 groups consisting of 39-40 residents each. The experimental group received AT massage	It was noted that the hand massage of the M technique with or without AT significantly reduced pain scores. It was noted that all 3 groups had decreased scores over time with a P value < 0.002 One of the very few nursing studies on AT performed in the U.S.	There was no power analysis for sample size. The potential bias from one primary investigator who also provided intervention should be considered: the nurse performed all 20-minute interventions twice a week for eight weeks. Less generalizable due to more females than males.	Research Level I A, High quality

			with lavender EO and M technique hand massage. The control group received M technique hand massage. The third group received nurse presence intervention of attentive conversation without touch.		It was noted that 70% receive daily pain meds (38% narcotic) and 70 % never had massage before. The lack of significant differences in AT hand massage and hand massage groups alone may be due to normal aging changes. (sense of smell decreases with age). The author concluded the following limitations: the intervention may have been too frequent, creating limited follow up, lack of blinding, and lack of	

					generalizability to residents with chronic pain and cognitive dysfunction. This study evaluated massage AT, and the project will explore inhalation AT.	
#5	Dimitriou, V., Mavridou, P., Manataki, A., & Damigos, D. (2017) The use of aromatherapy for postoperative pain management: A systematic review of randomized controlled trials. *Journal of PeriAnesthesia*	Systematic review (SR)	Nine (9) RCT from 2006-2014 were included in the review.	The authors confirmed that the studies demonstrated high patient satisfaction scores and that AT is a low-cost intervention that has a modest rate of adverse effects—only one patient out of 644 was noted to have a reaction. The Jadad Scale for RCT was used to assess the methodology quality. In conclusion, the authors did promote AT as a promising intervention.	The number of RCT and patients were small. Four of the RCT were low quality. Limited to post-operative pain. Different surgical procedures, anesthesia types, and demographics added significant	Research Level I A, High quality

	Nursing, 32(6): 530-541.				variability to the conclusions. Different oils and concentrations were found to add to the variability, especially if they were chosen without expert consultation. Studies using AT with other complementary modalities were excluded. Review was completed by physicians in Greece.	
#6	Dossey, B., & Keegan, L. (2015) *Holistic nursing: a handbook for*	Non research: Expert opinion	N/A	Published studies on aromatherapy for pain suggest that both the inhaled and topically applied EO can affect the perception of pain.	This textbook is used in undergraduate and graduate holistic nursing studies.	Non-research Level IV A, High quality

	practice (6th ed.). Burlington, MA: Jones & Bartlett Learning.				There is one dedicated chapter to AT that includes history, theory, research, identification and properties of EO, methods, adverse reactions, drug interactions, administration (prescriptions), credentialing, suppliers, how to use the nursing process for an AT intervention, and case studies with evaluations.	
#7	Efe Arslan, D., Kutlutürkan, S., & Korkmaz, M. (2019) The effect of aromatherapy massage on knee pain and functional status	Quasi-experimental	A total of 95 patients (83 females and 12 males) ages 35-64 who were referred to the [redacted]	The analysis found that AT massage diminished knee pain and morning stiffness while augmenting physical functioning. The authors found a statistically significant reduction in pain scores and recommend the routine use of AT in the physical therapy setting	Although there were 3 arms, there was no randomization. The study was performed in Iran and may not be	Research Level II A, High quality

	in participants with osteoarthritis (OA). *Pain Management Nursing*, *20*(1), 62–69.		 Average age = 58.1. N = 33 assigned to AT massage of lavender, eucalyptus, and ginger EOs in a base of sweet almond and apricot oil. N = 30 were assigned to conventional massage with olive oil only. N = 32 were assigned to the control group with no intervention.	P values: AT massage: $p < 0.001$ Massage only: $p < 0.001$ Control: $p > 0.05$ A total of 30 patients per group were required for sufficient power. There was no significant difference between the groups in terms of demographics ($p > 0.05$).	generalizable to a U.S. sample. Less generalizable due to more females than males. The AT blend used three different EOs, all having different properties. The study was limited only to those having OA pain. One investigator collecting the data and providing the intervention was listed as a limitation. OA is chronic and further research that	

					involves 6 months or longer was recommended. This study evaluated massage AT, and the project will explore inhalation AT.	
#8	Ghods, A. A., Abforosh, N. H., Ghorbani, R., & Asgari, M. R. (2015) The effect of topical application of lavender essential oil on the intensity of pain caused by the insertion of dialysis needles in hemodialysis patients: A randomized clinical trial.	Quasi-experimental, open cross-over study	A total of 34 hemodialysis patients (16 females and 18 males) over age 18 from a dialysis unit of Semnan [redacted] Average age = 59.6. All the participants were tested at 3 different states: before intervention,	There was a significant difference in intensity of pain among the lavender, placebo, and no intervention groups. P values: AT: p= 0.001 Placebo: p= 0.001 Although the participants weren't randomized, the authors attempted to randomize the intervention. The interventions were randomly determined through randomized block design with a minimum of 72 hours (wash out period) interval between interventions. There were no significant differences in terms of demographics except for a negative	The sample was chosen by convenience with no mention of a power calculation. The study was performed in Iran and may not be generalizable to a U.S. sample. The authors felt that the psychological condition of participants affected response to pain. They also	Research Level II A, High quality

	Complementary Therapies in Medicine, *23*(3), 325–330.		topical lavender at puncture site, and placebo application of water on puncture site.	correlation with duration of hemodialysis: p= -0.426 and p= 0.012.	felt that more than one nurse inserting the needles may have added variability. This study evaluated massage AT, and the project will explore inhalation AT.	
#9	Gok Metin, Z., & Ozdemir, L. (2016) The effects of aromatherapy massage and reflexology on pain and fatigue in patients with rheumatoid arthritis (RA): A randomized controlled trial. *Pain Management*	RCT	A total of 51 subjects aged 21-89 (45 females and 6 males) with Rheumatoid Arthritis (RA) referred from [redacted] Average age = 54.4. N = 17 received an effleurage	The authors concluded that AT massage and reflexology considerably reduced pain. A total of 50 subjects were required for sufficient power. There were no significant differences between groups in terms of baseline parameters ($p > 0.05$). P values: Baseline: p=0.610 1st week: p= 0.009 2nd week: p= 0.001 3rd week: p= 0.003 4th week: p= 0.001 5th week: p= 0.001	The study was performed in Turkey and may not be generalizable to a U.S. sample. The potential bias from one primary investigator who also provided intervention should be considered.	Research Level I A, High quality

	Nursing, *17*(2), 140–149.		technique massage to both knees for 30 minutes, three times a week for six weeks. N = 17 received 40 minutes of reflexology to both feet weekly. N = 17 received no intervention.	6^{th} week: p= 0.001	Interventions were performed during home visits and data collected via phone calls at times. Each group had 15 females and 2 males. Less generalizable due to more females than males. Only those with RA pain were included and can decrease generalizability. This study evaluated massage AT, and the project will explore inhalation AT.	

#10	Heidari Gorji, M. A., Ashrastaghi, O. G., Habibi, V., Charati, J. Y., Ebrahimzadeh, M. A., & Ayasi, M. (2015) The effectiveness of lavender essence on sternotomy-related pain intensity after coronary artery bypass grafting. (Brief Report). *Advanced Biomedical Research*, *4*(1), 127–127.	RCT (mono-blinded)	A total of 50 patients (24 females and 26 males) who underwent open-heart surgery at [redacted] Average age = 61. Purposive sampling. N = 25 received inhalation lavender with supplemental oxygen via face mask. N = 25 in received only supplemental oxygen.	The results demonstrated lowered pain scores after the AT intervention. P values: Before: p= 0.316 5 min: p= 0.001 30 min: p= 0.002 60 minutes: p=0.001 This study was chosen because it evaluates post-operative pain. The project site may have participants experiencing post-op musculoskeletal pain. For sufficient power, 25 subjects were required for each group. The characteristics of the demographics were not significantly different ($p > 0.05$).	Limited to open heart surgical pain. The study was performed in Iran and may not be generalizable to a U.S. sample. More than one investigator may add variability to the results. The authors did not discuss limitations. Similar to the proposed project, this study evaluated inhalation AT, however the oxygen administration method is different.	Research Level I B, Good quality

#11	Hekmatpou, D., Pourandish, Y., Farahani, P. V., & Parvizrad, R. (2017) The effect of aromatherapy with the essential oil of orange on pain and vital signs of patients with fractured limbs admitted to the emergency ward: A randomized clinical trial. *Indian Journal of Palliative Care*, *23*(4), 431–436.	RCT	60 patients over age 18 years (20 females and 40 males) visiting the ER for a fractured limb who must undergo orthopedic surgery. Average age = 31.9. N =30 received four drops of orange EO that was poured onto a pad and attached to the participants collar with a plastic pin, about 20 centimeters from the face. It	Results showed that pain scores in the group receiving inhalation AT decreased significantly over the control group: P values: Start: p= 0.729 1 hour: p= 0.101 2 hours: p= 0.0001 3 hours: p=0.0001 4 hours: p=0.0001 This article was chosen because it evaluates orange EO (most studies evaluate lavender). Method of AT intervention is similar to project. A total of 30 subjects in each group was estimated for sufficient power. There was no significant difference in both groups in terms of the demographics (p > 0.0001). There were no statistically significant changes to VS:	A table shows that the study was randomized but there was no discussion on how randomization took place besides "controlled by blocking". The study was performed in India and may not be generalizable to a U.S. sample. Brief discussion on data analysis, methods, and limitations.	Research Level I A, High quality

			was replaced every hour PRN. N = 30 received common standard treatment for pain per ER protocols. Vital signs (VS) and VAS scores were checked hourly for six hours.	P values of mean diastolic: Start: p= 0.841 1 hour: p= 0.640 2 hours: p= 0.694 3 hours: p=0.786 4 hours: p=0.766 P values of mean heart rate: Start: p= 0.603 1 hour: p= 0.134 2 hours: p= 0.09 3 hours: p=0.021 4 hours: p=0.105 P values of mean respiratory rate: Start: p= 0.915 1 hour: p= 0.945 2 hours: p= 0.925 3 hours: p=0.502 4 hours: p=0.733	Authors listed subjects lack knowledge on AT to be a limitation to the VS results. There was no discussion on what the usual care is for the control group. More than one investigator may add variability to the results. Some phrases are grammatically incorrect and hard to understand. The study may have been translated incorrectly or the author speaks English as a second language.	

#12	Johnson, J. R., Rivard, R. L., Griffin, K. H., Kolste, A. K., Joswiak, D., Kinney, M. E., & Dusek, J. A. (2016) The effectiveness of nurse-delivered aromatherapy in an acute care setting. *Complementary Therapies in Medicine*, *25*, 164–169.	Retrospective observational study	All inpatients 18 years of age or older that received nurse provided AT from 2/1/2012 to 6/30/2014. Setting: 10 of 12 Allina Health hospitals in Minneapolis, MN (2 do not offer nurse-delivered AT). Females = 7,487 Males = 2, 775	The authors concluded that EO generally resulted in significant clinical improvements for pain, anxiety and nausea. The average pain change was at -3.31 units (95% CI: -4.28, -2.33), average anxiety changes at -2.73 units, and nausea at -2.02 units (95% CI: -2.55, -1.49). Sweet marjoram contributed to the largest single EO average improvement in pain at -3.31 units (95% CI: -4.28, -2.33), while lavender and sweet marjoram had equivalent average anxiety changes at -2.73 units, and ginger had the largest single oil average change in nausea at -2.02 units (95% CI: -2.55, -1.49). Explored a nurse-delivered AT intervention in a real word U.S. setting.	No a priori power calculation was done. The AT training for nurses was wide ranging. Less generalizable due to females and those reporting white race were the majority that received AT intervention. Nurses did not always record the EO or mode of administration requiring an analysis of two groups (one as EO defined and one as EO undefined). Results may not be generalizable	Research Level III A, High quality

					to other settings with different demographics.	
#13	Joswiak, D., Kinney, M. E., Johnson, J. R., Kolste, A. K., Griffin, K. H., Rivard, R. L., & Dusek, J. A. (2016) Development of a health system-based nurse-delivered aromatherapy program. *JONA: The Journal of Nursing Administration*, *46*(4), 221–225.	Non-research: Program evaluation	A total of 3, 357 nurses trained in AT	The authors concluded that the data collected from the electronic health record demonstrate that nurse-provided AT improves pain, anxiety, and nausea. Aromatherapy is a safe, low-cost, and nonpharmacological option for patient care that may also improve patient satisfaction and outcomes. After 28 months, 3,357 nurses have been trained in AT and provided 25,000 therapeutic interventions.	The authors claimed the data conclude that AT provides improvement in pain, anxiety, and nausea. However, no outcome data or cost benefit analysis component was listed or discussed. Results may not be generalizable to other settings with different demographics. Non-research article.	Non-research Level VA, High quality

#14	Jun, Y. S., Kang, P., Min, S. S., Lee, J. M., Kim, H. K., & Seol, G. H. (2013) Effect of eucalyptus oil inhalation on pain and inflammatory responses after total knee replacement: A randomized clinical trial. *Evidence-Based Complementary and Alternative Medicine*, *2013*, 7.	RCT-double blinded	A total of 52 subjects (48 females and 4 males) diagnosed with osteoarthritis (OA) who underwent Total Knee Replacement (TKR) at [redacted] Average age = 68.2 N = 25 inhaled eucalyptus EO. N = 27 inhaled almond oil only.	Visual analog scale (VAS) pain scores were significantly lower in the AT intervention group ($p < 0.001$ on 1st, 2nd, and 3rd day). Sample, setting, and method similar to proposed project. No significant differences between the groups in terms of demographics ($p > 0.05$).	Limited to those diagnosed with OA who had total knee replacement. The study was performed in Korea and may not be generalizable to a U.S. sample. Less generalizable due to more females than males. The authors did not discuss limitations.	Research Level I B, Good quality
#15	Karaman, T., Karaman, S., Dogru, S., Tapar, H., Sahin, A., Suren, M., Arici, S., & Kaya, Z.	Prospective, single blind RCT	A total of 101 subjects (47 females and 54 males) undergoing surgery at [redacted]	Pain scores were significantly lower in intervention AT group ($p = 0.01$). Anxiety scores were significantly lower in intervention AT group ($p < 0.001$).	Subjects were not completely blinded due to the smell of lavender EO. Limited to those experiencing PVC pain.	Research Level I A, High quality

	(2016) Evaluating the efficacy of lavender aromatherapy on peripheral venous cannulation (PVC) pain and anxiety: A prospective, randomized study. *Complementary Therapies in Clinical Practice,* 23, 64–68.		[redacted] Average age = 43 N = 53 subjects inhaled lavender EO from a gauze for 5 min before and during peripheral venous cannulation (PVC). N = 53 subjects inhaled pure water from a gauze 5 min before and during PVC.	Patient satisfaction scores were significantly higher for AT group ($p < 0.001$). For sufficient power, the minimum number required for each group was 26. There were no significant differences between both groups in terms of demographics and diseases ($p > 0.05$).	The study was performed in Turkey and may not be generalizable to the U.S. population. Pain from venipuncture may not be generalizable to project sample. A total of 48 subjects per group were required for sufficient power. Five subjects were excluded for protocol violation. This study evaluated massage AT, and the project will explore inhalation AT.	

#16	Khanna, R., MacDonald, J. K., & Levesque, B. G. (2014) Peppermint oil for the treatment of irritable bowel syndrome (IBS): A systematic review and meta-analysis. *Journal of Clinical Gastroenterology*, *48*(6), 505–512.	Systematic review (SR) with meta-analysis (MA)	A total of nine (9) studies that evaluated 726 patients.	Peppermint EO demonstrated a global improvement in IBS symptoms ($p < 0.00001$) and reduces IBS abdominal pain ($p < 0.00001$). The authors conclude that peppermint EO is safe and effective for short term IBS treatment. Cochrane risk of bias tool was used to assess methodological quality.	SR with MA is limited to IBS abdominal pain and may not be generalizable to sample in the project. Four of the fives studies were a cross-over design that may have carry-over effects. Ingested peppermint was significantly more likely to cause heartburn.	Research Level I A, Good quality
#17	Lakhan, S. E., Sheafer, H., & Tepper, D. (2016) The effectiveness of aromatherapy in reducing pain:	Systematic review (SR) with meta-analysis (MA)	A SR of 42 qualitative and 12 quantitative studies.	The SR concluded that AT decreases pain considerably ($p < 0.0001$). The MA found that AT is more dependable for addressing nociceptive and acute pain ($p < 0.0001$) versus inflammatory and chronic pain.	The studies had various modes of administration and were performed on different populations and settings.	Research Level III A, High quality

	A systematic review and meta-analysis. *Pain research and treatment*, *2016*, 8158693.			AT was found to have the greatest power to reduce postoperative and obstetrical and gynecological pain ($p < 0.0001$). No adverse events were reported in any of the studies. The data on different EOs, such as lavender, eucalyptus, lemon, clary sage, and marjoram, are helpful to determine a specific EO for the project.	The authors conclude there is no uniform measure of pain assessment. There were no studies that investigated AT for neuropathic or functional pain. The studies reviewed are mostly from other countries and may not be generalizable to a U.S. sample.	
#18	Lee, M. S., Lee, H. W., Khalil, M., Lim, H. S., & Lim, H. J. (2018) Aromatherapy for managing pain in primary dysmenorrhea: A systematic review of randomized	Systematic review (SR)	The authors reviewed 382 studies but only 19 met inclusion criteria.	All of the RCT demonstrated that AT has exceptional effects in reducing pain ($p < 0.00001$). The sub-analysis for inhalational AT also showed superior effects in the alleviation of pain ($p < 0.00001$). For massage, AT was encouraging for reducing pain over placebo ($p < 0.0001$).	Korean databases were also searched, but Korean studies may not be generalizable to a U.S. sample. Only generalizable to females.	Research Level II A, High quality

	placebo-controlled trials. *Journal of Clinical Medicine*, *7*(11).			Statistical analysis was done via the Cochrane Collaboration's software program: Review Manager. Authors also searched Korean databases.	The RCT reviewed in this SR utilized only two EOs: lavender and rose. Rose is one of the most expensive EOs on the market and therefore not cost effective for the project. Most of the studies reviewed were from the Middle East or East Asia. The SR found two instances of adverse reactions reported from the studies.	

#19	Meghani, N., Tracy, M. F., Hadidi, N. N., & Lindquist, R. (2017) The effects of aromatherapy and guided imagery for the symptom management of anxiety, pain, and insomnia in critically ill patients: An integrative review of current literature. *Dimensions of Critical Care Nursing, 36*(6):334-348.	Integrated review	There were six studies from 2013 to 2017 that met criteria for inclusion.	This is an integrated review that summarized and synthesized evidence on AT and guided imagery (GI) for pain, anxiety, and insomnia in critically ill patients. AT and GI are separated into two sections within the article. All studies found positive effects of AT on pain, anxiety, and sleep (no data listed). Sweet marjoram found to be most effective for pain relief (no data listed). The evidence demonstrated safety with no adverse events noted (no data listed).	No statistical analysis of results was listed to base conclusions on. May be only generalizable to critical care units. Only two of the six studies reviewed were on AT for pain. Difficult to discern if positive outcomes are from AT or massage itself. Limited to those 18 years and older and for short term use only.	Research Level III B, Good quality

#20	Nasiri, A., Mahmodi, M. A., & Nobakht, Z. (2016) Effect of aromatherapy massage with lavender essential oil on pain in patients with osteoarthritis of the knee: A randomized controlled clinical trial. *Complementary Therapies in Clinical Practice*, *25*, 75–80.	RCT-single blinded	A total of 90 patients with osteoarthritis (OA) of the knee (59 females and 21 males, aged 18-65) referred from the outpatient rheumatology clinics affiliated with [redacted] Average age = 56 N = 27 received lavender diluted in almond oil. N = 27 received placebo of almond oil. N = 26 received a control of no intervention.	Pain scores in the lavender group were considerably reduced immediately and one-week post intervention. P Values : Intervention : ($p < 0.001$) Placebo:($p < 0.001$) Control: ($p = 0.01$) Sample and setting very similar to the project's sample and setting. For sufficient power, 22 subjects in each group were required. There were no significant differences between the groups in terms of demographics ($p > 0.05$).	Unable to double blind due to the smell of lavender. The AT blend or almond oil was placed in a syringe and given to the intervention and placebo group subjects at each session. The subjects themselves massaged their knees with effleurage strokes for 20 minutes (different settings and techniques possible confound the variables). Less generalizable due to more	Research Level I A, High quality

			AT = lavender EO diluted in sweet almond oil.		females than males. Four weeks post intervention, there was no statistically significant differences between groups. May be only generalizable to individuals with OA knee pain. This study evaluated massage AT, and the project will explore inhalation AT.	
#21	Olapour, A., Behaeen, K., Akhondzadeh, R., Soltani, F., Al Sadat Razavi, F., & Bekhradi, R. (2013) The effect of inhalation of	Triple blind RCT	A total of 60 pregnant women admitted for cesarean section at [redacted]	The subjects in the AT intervention group had higher satisfaction scores (p= 0.001). Subjects in AT group had lower pain scores: Initial: p= 0.353 4 hours: p=0.008 8 hours: p=0.024 12 hours: p=0.011	There is no discussion of a power analysis for sample size. This study used only pregnant women and may not be generalizable to project sample.	Research Level I B, Good quality

	aromatherapy blend containing lavender essential oil on cesarean postoperative pain. *Anesthesiology and Pain Medicine*, *3*(1), 203–207.		[redacted] Average age = 26. N = 30 received three drops of lavender essence blend (prepared by a pharmaceutical company to inhale from cotton pad for 5 minutes. N = 30 received three drops of placebo blend without lavender (also prepared by pharmaceutical company) to inhale from cotton pad for five minutes.	No reported side effects. Possible participants of the study may also be experiencing post-operative pain. There were no significant differences in demographics between the groups ($p > 0.05$). Same method as proposed project.	This study was performed in Iran and may not be generalizable for the U.S. population. The authors did not discuss limitations.	

#22	Ou, M. C., Lee, Y. F., Li, C. C., & Wu, S. K. (2014) The effectiveness of essential oils for patients with neck pain: A randomized controlled study. *The Journal of Alternative and Complementary Medicine*, *20*(10), 771–779.	RCT	A total of 60 subjects aged 20-65 (50 females and 10 males) at [redacted] Average age = 28. N = 30 received an AT blend manufactured cream (marjoram, black pepper, lavender and peppermint) and were instructed to apply two teaspoons to neck and upper trapezius muscles daily after bathing. N = 30 received an unscented cream that contained no	Pain scores decreased in both groups ($p < 0.05$). After 4 weeks, the experimental group experienced decrease in pain and increase in range of motion-ROM ($p = 0.02$). The experimental group increased pain tolerance in the upper right and left trapezius and upper right trapezius as calculated by the threshold of PPT-pressure pain (mean +/- SD, 2.96 +/- 2.54) Discusses other oils besides the usual lavender. A total of 44 subjects needed for medium effect size. There were no significant differences between groups in terms of demographics ($p > 0.05$).	The study had more females than males and was done in Taiwan, making it less generalizable to a U.S. sample. Reliability and validity were only discussed for the ROM tests and not the visual analog scale (VAS). There was no discussion about blinding. This study evaluated massage AT and the project will explore inhalation AT. The authors mention that the subjects had minor neck pain symptoms so	Research Level I B, Good quality

			EO from same manufacture.		study may not be generalizable for those with moderate to severe pain. The authors also felt that four weeks may not be enough to determine the effects and that more studies are needed to confirm results after stopping the intervention.	
#23	Seyyed-Rasooli, A., Salehi, F., Mohammadpoorasl, A., Goljaryan, S., Seyyedi, Z., & Thomson, B. (2016) Comparing the effects of aromatherapy massage and inhalation aromatherapy on anxiety and	RCT-single blind	A total of 90 female patients, aged 15-55, from the women's burn ward of [redacted] Average age = 35.5.	The authors found that both inhalation and massage AT interventions were effective for a reduction in both anxiety ($p= 0.007$) and pain ($p< 0.001$). This study evaluated the same method as the proposed project. There were no significant differences between the groups in terms of demographics ($p > 0.05$).	There was no discussion on power analysis for sample. This study was performed in Iran and cultural limitations allowed the researcher to only study females; therefore, it may not be	Research Level I A, High quality

	pain in burn patients: A single-blind randomized clinical trial. *Burns*, *42*(8), 1774–1780.		N = 30 received a 30-minute back massage (effleurage and deep stroking) with a blend of three drops of lavender oil in 15 mL of almond oil. N = 30 received inhalation AT consisting of seven drops of lavender oil and three drops of Rosa damascene on a piece of cotton placed about 20 centimeters away from the patient's nose for 30 minutes. N = 30 received no intervention.		generalizable to the project sample. The subjects had acute pain whereas in the outpatient setting pain may be both acute and chronic.	

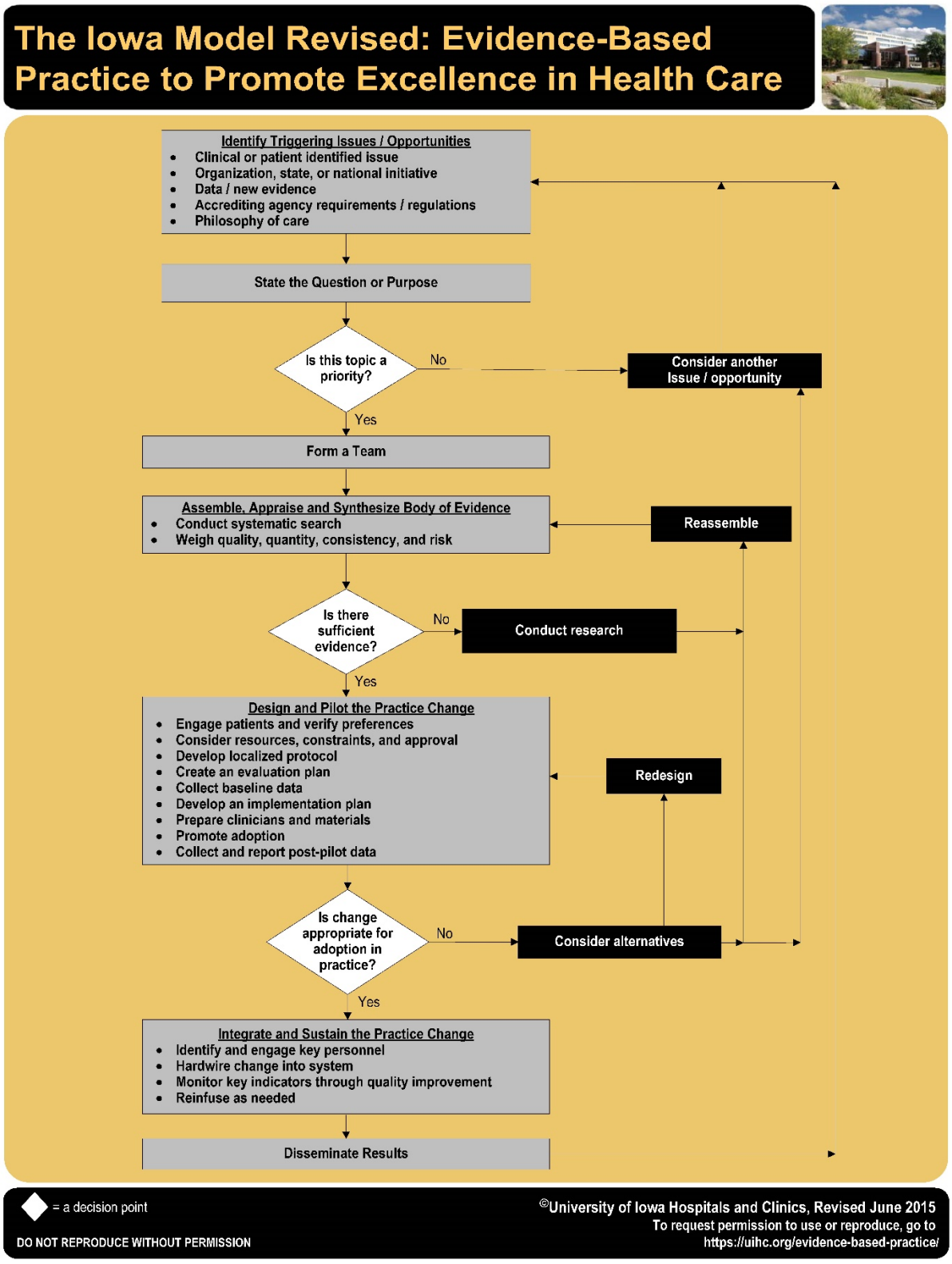
#24	Sritoomma, N., Moyle, W., Cooke, M., & O'Dwyer, S. (2014) The effectiveness of Swedish massage with aromatic ginger oil in treating chronic low back pain in older adults: A randomized controlled trial. *Complementary Therapies in Medicine*, *22*(1), 26–33.	RCT	A total of 140 clients aged 60 and older (112 females and 28 males) from a massage clinic in Ratchaburi, Thailand were recruited. N = 70 received Swedish massage with ginger oil (SMGO). N = 70 received traditional Thai massage (TTM). Massage was 30 minutes two times a week for five weeks.	Both SMGO and TTM reduced pain scores and disability but SMGO was more effective at reducing pain ($p < 0.05$). This study evaluates ginger EO as opposed to the usual lavender. The study's sample is very similar to the potential project sample in regard to back pain. A total of 128 subjects was required for sufficient power. There were no significant differences between groups for demographics and pain characteristics ($p > 0.05$).	This study was performed in Thailand and had mostly women so it may not be generalizable to the project's sample. The median age was not disclosed. The authors felt that not having a placebo group is a limitation. This study evaluated massage AT, and the project will explore inhalation AT.	Research Level I A, High quality
#25	Yayla, E. M., & Ozdemir, L. (2019) Effect of inhalation aromatherapy	Quasi-randomized control pilot study	A total of 123 cancer patients aged 26-79 (84 females and 39 males) with implantable venous port	The lavender group's pain levels were substantially lower than the control group ($p < 0.05$). There were no significant differences in the pain scores for the eucalyptus group ($p > 0.05$).	The authors were unable to blind the subjects due to the smell from the EO.	Research Level I B, Good quality

	on procedural pain and anxiety after needle insertion into an implantable central venous port catheter: A quasi-randomized controlled pilot study. *Cancer Nursing*, *42*(1), 35–41.		catheters in an outpatient chemotherapy unit of an oncology hospital in Ankara, Turkey. Average age = 53.7. N = 41 received inhalation AT before needle insertion via three drops of lavender on cotton swab placed 10 cm from nose for three (3) minutes. N = 41 received inhalation AT before needle insertion via three drops of eucalyptus on cotton swab placed 10 cm from nose for	There were no differences in anxiety scores between the three groups ($p > 0.05$). A total of 123 subjects was required for sufficient power. There were no significant differences between groups in terms of demographics ($p= 1.000$). Same method as proposed project.	Study was conducted in Turkey and may not be generalizable to a U.S. sample. The authors felt that the characteristics of the sample may have influenced results. The subjects are receiving chemo and may already be under stress.	

			three (3) minutes. N = 41 received no intervention.			

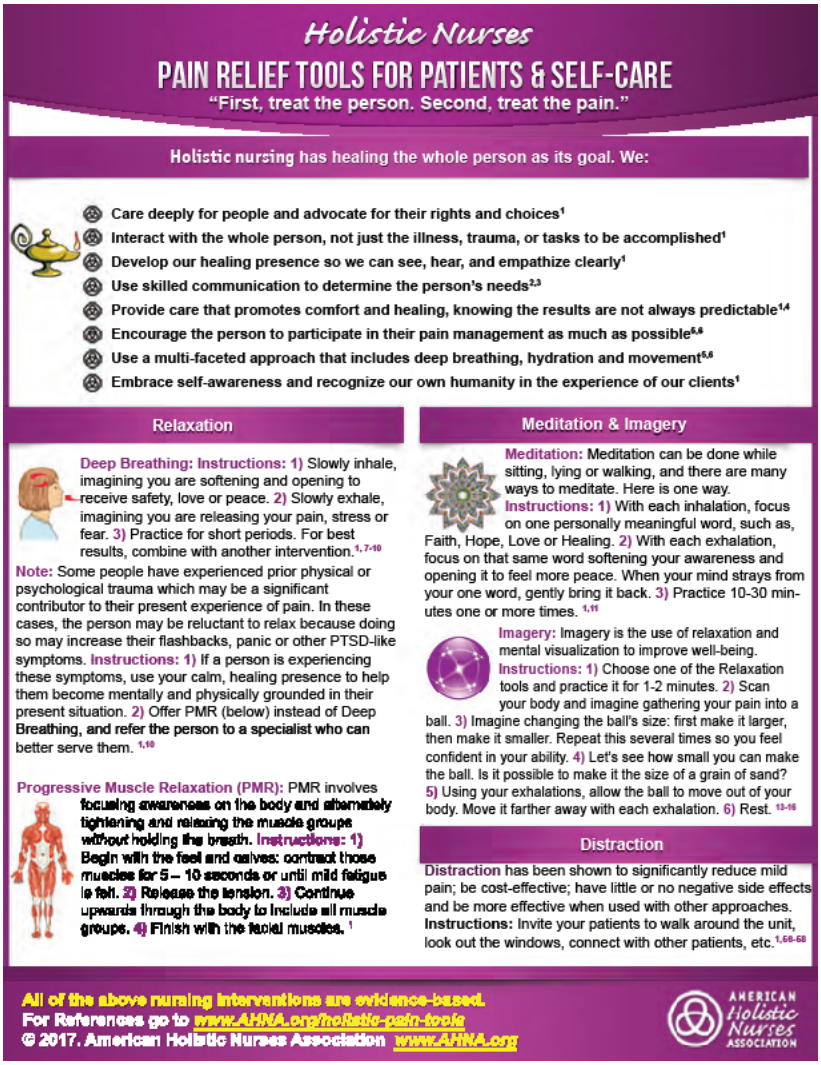
Appendix C

Theoretical Framework



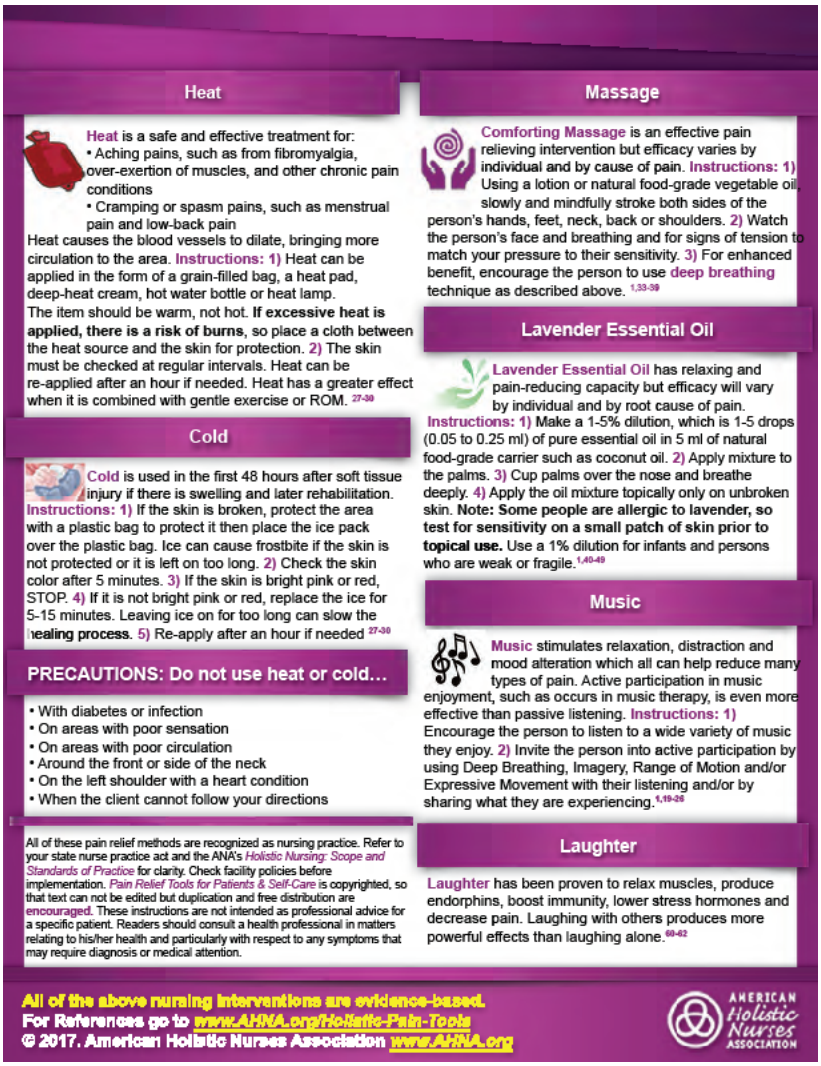
Appendix D1

Pain Tool



Appendix D2

Pain Tool



Appendix E

Email Invitation

RUTGERS
School of Nursing

Date
Greetings,

My name is Anabela Santos. I am a Doctor of Nursing Practice student from the School of Nursing at Rutgers University and a member of the American Holistic Nurses Association (AHNA).

I received your contact information from the AHNA because you may have used the Holistic Nurses' Pain Relief Tool for Patients and Self-Care (Pain Tool). If you are a nurse (LPN, RN, APRN) between the ages of 18-89, who is taking care of adults who are in pain and have used the aromatherapy (AT) recommendation for pain included in the AHNA's Pain Tool, then you are invited to take part in an online research study.

Non-nurses, nurses without an active license, and those who have never used the AT part of the Pain Tool created by the AHNA should not take this survey. There are 15 questions on the survey, and it will take you approximately 15-20 minutes to complete it.

By participating in this survey, you will be contributing to the knowledge of holistic nursing and the use of AT to reduce pain. This study will help us to understand how the AT recommendations are being used. Your contact information is not needed, and all of the data gathered will be anonymous. Your participation is voluntary, and your answers will be kept confidential. You can stop the survey at any time if you are uncomfortable and do not want to complete the answers. Participating or not participating in this study will not affect your relationship with the AHNA in any way.

If you are interested and would like to join us, please click here: https://www.surveymonkey.com/r/PMN2LCK.

Thank you for your time and interest!

Sincerely,
Anabela Santos, MSN, RN, AHN-BC, HWNC-BC

Footer:
Protocol Title: Evaluating the Aromatherapy Recommendation
Protocol Version Date : v1 06.11.2

Appendix F

AHNA Newsletter Announcement

RUTGERS
School of Nursing

[redacted]

Are you a nurse (LPN, RN, APRN), between the ages of 18-89, and have used the AHNA's *Holistic Nurses' Pain Relief Tool for Patients and Self-Care* (Pain Tool)? If so, you are invited to take part in an online research survey that evaluates the aromatherapy (AT) recommendation for pain.

My name is Anabela Santos. I am a Doctor of Nursing Practice student from the School of Nursing at Rutgers University and a member of the American Holistic Nurses Association (AHNA). This survey is being conducted as part of the requirements for my Doctor of Nursing Practice degree. The survey has 15 questions and will take about 15-20 minutes of your time.

(Non-nurses, nurses without an active license, and those who have never used the aromatherapy part of the Pain Tool created by the AHNA should not take this survey).

This study will help us to understand how the AT recommendations are being used. By taking part in this survey, you will be contributing to the knowledge of holistic nursing and the use of AT to reduce pain. Your participation is voluntary, and your answers will be kept confidential. You can stop the survey at any time if you are uncomfortable and do not want to complete the answers. Participating or not participating in this study will not affect your relationship with the AHNA in any way.

If you want to take the survey now, click here to consent and take the survey:

https://www.surveymonkey.com/r/PMN2LCK.

Footer:
Protocol Title: Evaluating the Aromatherapy Recommendation
Protocol Version Date : v1 06.11.20

Appendix G

Consent Form

RUTGERS
School of Nursing

CONSENT TO TAKE PART IN A RESEARCH STUDY

Title of Study: Evaluating the Aromatherapy Recommendation for pain in the Holistic Nurses Pain Relief Tool for Patients and Self-Care
Principal Investigator: Melanie Percy PhD, RN, CPNP, FAAN

This online consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in the study. It is your choice to take part or not. Ask questions if there is anything in the form that is not clear to you. If you decide to take part, instructions at the end of document will tell you what to do next. Your alternative to taking part in the research is not to take part in it.

Who is conducting this research study and what is it about?

You are being asked to take part in research conducted by Dr. Melanie Percy who is a Professor and co-investigator Anabela Santos, who is a Doctor of Nursing Practice (DNP) student in the School of Nursing at Rutgers University. This study is being conducted as a requirement of her DNP degree.

The purpose of this study is to evaluate the Holistic Nurses Pain Relief Tool for Patients and Self-Care recommendation on aromatherapy for pain. We plan to enroll 200 subjects in this study.

We are looking for 200 nurses (LPN, RN, APRN) between the ages of 18 and 89 years, who have used the Aromatherapy part of the Pain Tool created by the American Holistic Nursing Association (AHNA) in their care of adults who are experiencing pain.

(Non-nurses, nurses without an active license, and those who have never used the aromatherapy part of the Pain Tool created by the AHNA should not take this survey).

What will I be asked to do if I take part?

You will be asked to take an online survey one time. There are 15 questions on the survey, and it will take you approximately 15-20 minutes to complete it. The study will be open for two (2) weeks.

What are the risks and/or discomforts I might experience if I take part in the study?

A breach of confidentiality is a risk of harm, but a data security plan is in place to minimize such a risk. Also, some questions may make you feel uncomfortable. If that happens, you can skip those questions or withdraw from the study altogether. If you decide to quit at any time before you have finished the survey your answers will NOT be recorded.

Are there any benefits to me if I choose to take part in this study?

There no direct benefits to you for taking part in this research, except for the knowledge that you will be contributing to holistic nursing and the use of aromatherapy to reduce pain.

Will I be paid to take part in this study?

You will not be paid to take part in this study.

How will information about me be kept private or confidential?

All efforts will be made to keep your responses confidential, but total confidentiality cannot be guaranteed. We will use Survey Monkey to collect and forward your anonymous responses to us. We will not receive any information that can identify you or other subjects. We will download your responses to a secure file that requires a password to access. Only study staff will have access to the password. Responses will be deleted 5 years after analysis is completed and study findings are professionally presented or published.

No information that can identify you will appear in any professional presentation or publication, as only aggregate data will be presented.

What will happen to information I provide in the research after the study is over?

The information collected about you for this research will not be used by or distributed to investigators for any other research.

What will happen if I do not want to take part or decide later not to stay in the study?

Your participation is voluntary. If you choose to take part now, you may change your mind and withdraw later. In addition, you can choose to skip questions that you do not wish to answer. If you do not click on the 'submit' button after completing the form, your responses will not be recorded. However, once you click the 'submit' button at the end of the form, your responses cannot be withdrawn as we will not know which ones are yours. If you decide not to participate or to withdraw from the survey, it will not affect your relationship with the AHNA in any way.

Who can I call if I have questions?

If you have questions about taking part in this study you can contact the co-investigator: Anabela Santos email: [redacted]: You can also contact the Principal Investigator; Dr. Melanie Percy at: [redacted]; Address: 65 Bergen Street (11th floor, Room 1116), Newark, New Jersey, 07107; [redacted]

If you have questions about your rights as a research subject, you can contact the Rutgers IRB Director at: Newark HealthSci IRB, 65 Bergen St., SSB 511, Newark, NJ 07107, (973)-972-3608; or the Rutgers Human Subjects Protection Program at (973) 972-1149, email us at humansubjects@ored.rutgers.edu.

Please print out this consent form if you would like a copy of it for your files.

If you do not wish to take part in this survey, you can simply close this website address or click *"I do not agree",* and you will immediately exit the survey. If you wish take part in the research, follow the directions below:

By beginning this research, I acknowledge that I am 18 years of age or older and have read and understand the information. I agree to take part in the research, with the knowledge that I am free to withdraw my participation in the research without penalty.

Click on the "I Agree" button to confirm your agreement to take part in the research and proceed to survey.

I Agree I Do Not Agree

Footer:

Protocol Title: Evaluating the Aromatherapy Recommendation
Protocol Version Date : v1 06.12.20.20

Appendix H

Survey

RUTGERS
School of Nursing

Introduction: There is a need to increase the awareness and use of non-pharmacological interventions such as aromatherapy to decrease pain, health care costs, dependence, and abuse of pharmacological interventions. Aromatherapy (AT) is a safe and effective non-pharmacological intervention for pain management. However, it is underutilized in the United States. The American Holistic Nurses Association (AHNA) has released the *Holistic Nurses Pain Relief Tools for Patients and Self-Care* hereafter referred to as the Pain Tool, with recommendations for non-pharmacological interventions for pain. This survey will evaluate the usefulness of the AHNA's Pain Tool.

Instructions: There are two sections to the survey. The first section provides you multiple choice answers or checkboxes so that you can select all the answers that apply. The second section provides you checkboxes so that you can select all the answers that apply, a drop-down menu for your yes or no answers, and a comment field to input your text answers. If you do not know an answer to any question or it does not apply to you, please skip the question, and go to the next one.

Section One – Demographics

Please circle one answer to each question below.

1. Your current age is:

A. 18-28 yrs

B. 29-39 yrs

C. 40-50 yrs

D. 51-61 yrs

E. 62-72 yrs

F. over 72 years

2. Do you identify as:

A. Male

B. Female

C. Transgender

D. Nonbinary

E. Prefer not to respond

F. Other (please specify) _____

3. Highest nursing degree or level of education:

A. Diploma

B. Associates

C. Bachelors

D. Masters

E. DNP

F. PhD

G. Other (please specify) _____

4. Highest nursing licensure obtained:

A. LPN

B. RN

C. APRN

D. Other (please specify) _____

5. Professional certifications (select all that apply):

    A. HN-BC

    B. HNB-BC

    C. AHN-BC

    D. APHN-BC

    E. NC-BC

    F. HWNC-BC

    G. Other (please specify) _____

6. Professional Organization Membership (select all that apply):

    A. American Nurses Association

    B. American Holistic Nurses Association

    C. Other (please specify) _____

7. Professional Role (select all that apply):

    A. Staff nurse

    B. Administration

    C. Research

    D. Academia

    E. Supervisor

F. Manager

G. Other (please specify) _____

8. Work setting (select all that apply):

A. Acute-care / hospital

B. Outpatient facility

C. Clinic

D. Private practice

E. SNF/LTC

F. Homecare

G. Hospice

H. Other (please specify) _____

Section 2 – Use of AHNA's Pain Tool

9. How did you learn about the AHNA Pain Tool (select all that apply)?

A. AHNA website

B. AHNA publications

C. AHNA new member packet

D. Unit protocol

E. Other (please specify) _____

10. Have you used the Pain Tool aromatherapy recommendation in your practice?

A. Yes

B. No

A. Please explain where, when and why you used it?

_____

B. If you have not used it yet, please explain why you have not used it?

_____

11. Which essential oils have you used (select all that apply)?

A. Lavender

B. Peppermint

C. Orange

D. Rosemary

E. Ginger

F. Other (please specify) _____

A. And why did you choose that (those) oil(s)?

_____

12. How do you administer aromatherapy (select all that apply)?

A. Inhalation

B. Massage

C. Other (please specify) _____

A. And why do you use that method?

_____

B. How can you tell if the method was effective?

A. The patient had reduced pain scores at next pain re-assessment

B. Verbal report from patient

C. Other (please specify) _____

13. Was the aromatherapy Pain Tool recommendation helpful to you?

A. Yes

B. No

A. In what ways? _____

14. How has your practice changed since you began using the Pain Tool recommendation for AT?

_____

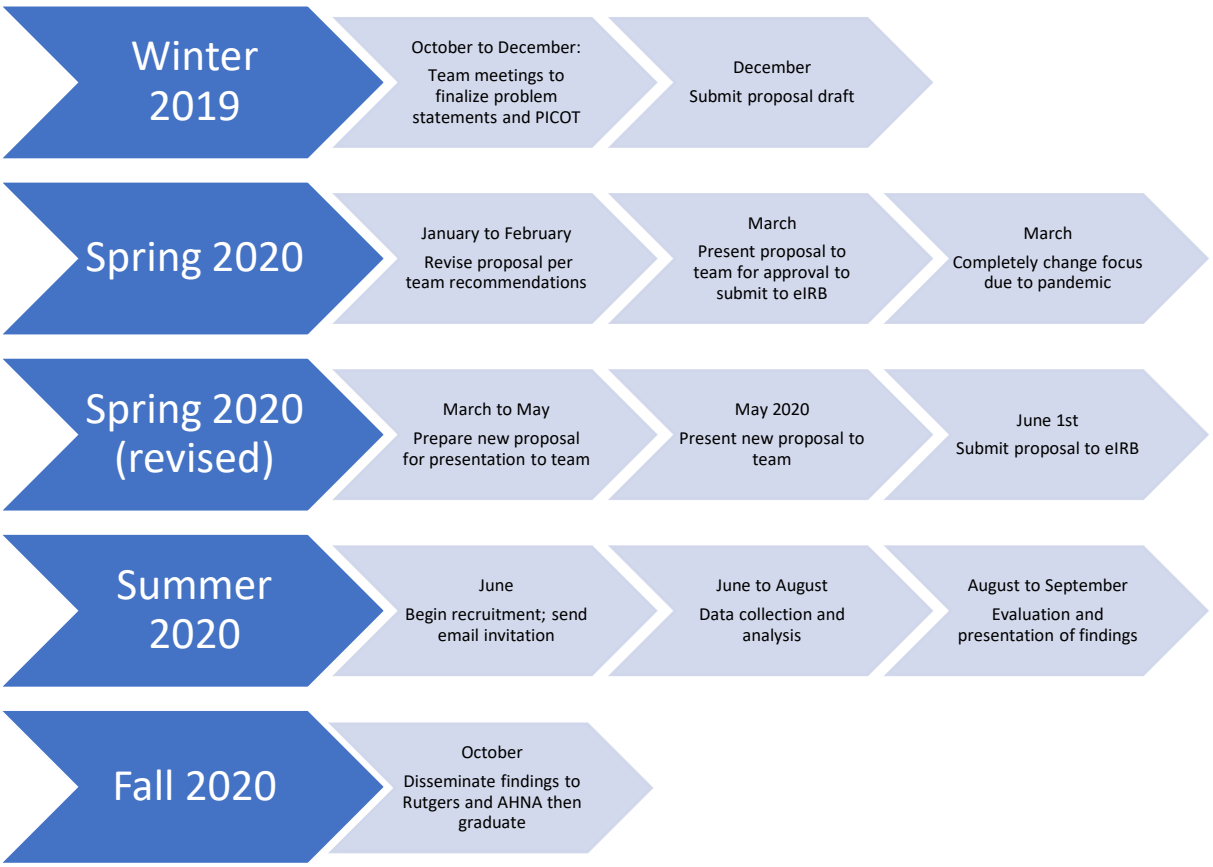
15. What changes do you think should be made to the information provided about AT in the Pain Tool?

_____

Footer:
Protocol Title: Evaluating the Aromatherapy Recommendation
Protocol Version Date : v1 06.11.20

Appendix I

Project Timeline



Appendix J

Table 1

Table 1

Project Budget

Supplies and Materials	Costs
Paper	$26.97
Ink	$173.94
Poster	$295.00
Consultations	
Statistician $40/hour	$200.00
Editor $40/hour	$240.00
Software	
Adobe Acrobat	$191.76
Survey Monkey	$349.00
Microsoft Office	$149.99
Total	$1,626.00

Appendix K

Table 2

Table 2

Characteristics of age and gender demographics

	%	n =
Age		
18-28	2	1
29-39	18	10
40-50	20	11
51-61	31	17
62-72	24	13
Over 72	5	3
Gender		
Female	89	49
Nonbinary	4	2
Male	7	4
Prefer not to respond/other	0	0
Transgender	0	0

Note. N =55.

Appendix L

Table 3

Table 3

Characteristics of education and nursing licensure demographics

	%	n =
Education		
Diploma	2	1
Associates	4	2
Bachelors	47	26
Masters	35	19
DNP	7	4
PhD	4	2
Nursing license		
LPN	0	0
RN	87	48
APRN	11	6

Note. N = 54; DNP-Doctor of Nursing Practice; PhD-Doctor of Philosophy; LPN-Licensed Practical Nurse; RN-Registered Nurse; APRN-Advanced Practice Registered Nurse.

Appendix M

Table 4

Table 4

Characteristics of certifications demographics

	%	n =
Holistic nursing certifications		
HN-BC	5	3
HNB-BC	22	19
AHN-BC	16	9
APHN-BC	2	1
Nurse coach certifications		
NC-BC	4	2
HWNC-BC	5	3
Holistic certifications		
Energy Healing	9	5
Aromatherapy	5	3
RN-BC	5	3
CCRN	4	2
CMSRN	4	2
CNE, CPHQ, NEA-BC, OCN, CPRC, FNP-BC, PMHNP-BC, Childbirth education, Expressive arts, CPAN, NBC-HWC, Public health, Iridology, Integrative Holistic Nurse, HMIP, Pain Management-BC, Certified Caritas Coach, WHNP	2	1
Responses		
Multiple certifications	25	14
One certification	53	29
No response	22	12

Note. N = 43; HN-BC-Holistic Nurse Board Certified; HNB-BC-Holistic Nurse Baccalaureate Board Certified; AHN-BC-Advanced Holistic Nurse Board Certified; NC-BC-Nurse Coach Board Certified; HWNC-BC-Health and Wellness Nurse Coach Board Certified; Energy Healing-Healing Touch, Therapeutic Touch, or Reiki, only certifying body mentioned was Healing Touch Professional Association; Aromatherapy-Institute of Integrative Aromatherapy and one unspecified; RN-BC-Board Certified Registered Nurse; CCRN-Critical Care Registered Nurse; CMSRN-Certified Medical Surgical Registered Nurse; CNE-Certified Nurse Educator; CPHQ-Certified Professional in Healthcare Quality; NEA-BC-Nurse Executive Advanced Board Certified; OCN-Oncology Certified Nurse; CPRC-Community Psychiatric Rehabilitation Center; FNP-BC-Family Nurse Practitioner Board Certified; PMHNP-BC-Psychiatric Mental Health Nurse Practitioner Board Certified; Childbirth education-certifying body not specified; Expressive arts-certifying body not specified; CPAN-Certified Post Anesthesia Nurse Certified; NBC-HWC-National Board Certified Health and Wellness Coach; HMIP-Heart Math Institute Practitioner; Pain Management-BC-Pain Management Board Certified; WHNP-Women's Health Nurse Practitioner.

Appendix N

Table 5

Table 5

Characteristics of professional organization membership

	%	n =
Organization		
AHNA	96	53
ANA	36	20
Other	42	23
Sigma Theta Tau	15	8
American Association of Critical Care Nurses	9	5
Aromatherapy, American Cannabis Nurses Association	7	4
Oncology Nurses Society	5	3
HTPA, ASPAN, NLN	4	2
International Nurses Society on Addictions, School Nurses Association, Therapeutic Touch, AADE, APNA, NAHQ, AANP, Missouri Nurses Association	2	1
Responses		
Multiple organizations	76	42
One organization	24	13
No response	0	0

Note. N = 55; HTPA-Healing Touch Professional Association; ASPAN-American Society of Peri Anesthesia Nurses; NLN-National League for Nurses; AADE-American Association of Diabetic Educators; APNA-American Psychiatric Nurses Association, NAHQ-National Association for Healthcare Quality; AANP-American Association of Nurse Practitioners.

Appendix O

Table 6

Table 6

Characteristics of professional role

	%	n =
Role		
Academia	16	9
Administration	7	4
Manager	5	3
Research	5	3
Staff RN	75	41
Supervisor	7	4
Other	24	13
Holistic Nurse	5	3
Nurse acupuncturist	2	1
Nurse aromatherapist	2	1
Nurse Educator	13	7
Palliative care nurse	4	2
Parish nurse	2	1
Private home care nurse	2	1
Public health nurse	2	1
Self-employed	13	7
Responses		
Multiple roles	55	30
One role	45	25
No response	0	0

Note. N = 55; RN-Registered Nurse.

Appendix P

Table 7

Table 7

Characteristics of work setting

	%	n =
Setting		
Acute care/hospital	60	33
Clinic	9	5
Homecare	5	3
Hospice	9	5
Outpatient facility	18	10
Private practice	16	9
SNF/LTC	4	2
University	4	2
Other	18	10
AHNA, Church, Community program, Corporate, Education, Government (VHA), High school, Medical spa, Simulation lab, Women's hospital (OB)	2	1
Responses		
Multiple settings	33	18
One setting	67	37
No response	0	0

Note. N =55; SNF-Skilled Nursing Facility; LTC-Long Term Care; AHNA-American Holistic Nurses Association; VHA-Veterans Health Administration; OB-obstetrics.

Appendix Q

Table 8

Table 8

Which essential oil(s) have you used?

	%	*n =
Essential oil choices		
Ginger	45	25
Lavender	100	55
Orange	47	26
Peppermint	71	39
Rosemary	23	13
Other oils		
Lemon	13	7
Black pepper, Eucalyptus, & Sweet marjoram	9	5
Frankincense & Spearmint	7	4
Bergamot, Copaiba, Geranium, & Grapefruit	5	3
Lemongrass, Helichrysum, Mandarin, Petitgrain, Roman Chamomile, Vetiver, & Ylang-Ylang	4	2
Oil Cloves, Thieves, & Wintergreen	2	1

Note. N =55.

*Percent is greater than 100 because participants responded with more than one answer.

Appendix R

Table 9

Table 9

Why did you choose that (those) essential oil(s)?

	%	*n =
Reason:		
Decrease anxiety	35	9
Decrease congestion	8	2
Decrease fear	4	1
Decrease infection	8	2
Decrease inflammation	8	2
Decrease insomnia	19	5
Decrease nausea	46	12
Decrease stress	27	7
Digestive issues	12	3
Enhance spiritual connection	4	1
Increase concentration & focus	23	6
Increase energy / to stimulate	27	9
Induce relaxation	62	16
Pain relief	65	17
Pleasant aroma	12	3
Skin disorders	8	2
Soothe sore throat	4	1
Support circulation	4	1
Support urination	4	1
Uplift mood	15	4
Responses		
Multiple EOs	44	24
One EO	4	2
No response	53	29

Note. N =26

*Percent is greater than 100 because participants responded with more than one answer.

Appendix S

Table 10a

Table 10a

Essential oils and their uses

	Bergamot	Black pepper	Eucalyptus*	Frankincense	Geranium	Ginger
N =	1	2	0	9	7	17
Decrease anxiety						
Decrease congestion						X
Decrease fear				X	X	
Decrease infection				X	X	
Decrease inflammation		X		X	X	
Decrease insomnia						
Decrease nausea						X
Decrease stress				X	X	X
Digestive issues						X
Enhance spiritual connection				X		
Increase concentration & focus						
Increase energy / to stimulate						X
Induce relaxation	X					
Pain relief		X		X	X	X
Pleasant aroma						X
Skin disorders					X	
Soothe sore throat						
Support circulation					X	
Support urination						
Uplift mood				X		

Note. N = 26

*Participant(s) mentioned essential oil but did not specify reason.

Appendix S2

Table 10b

Table 10b

Essential oils and their uses

	Grapefruit	Helichrysum	Lavender	Lemon	Lemongrass*	Mandarin
N =	2	1	44	4	0	6
Decrease anxiety			X			X
Decrease congestion						
Decrease fear			X			X
Decrease infection			X			
Decrease inflammation			X			
Decrease insomnia			X			
Decrease nausea	X		X	X		
Decrease stress			X			X
Digestive issues						
Enhance spiritual connection						
Increase concentration & focus	X			X		
Increase energy / to stimulate			X	X		
Induce relaxation			X			
Pain relief		X	X			X
Pleasant aroma			X			
Skin disorders			X			
Soothe sore throat						
Support circulation						
Support urination						
Uplift mood			X			

Note. N = 26

*Participant(s) mentioned essential oil but did not specify reason.

Appendix S3

Table 10c

Table 10c

Essential oils and their uses

	Oil cloves	Orange	Peppermint	Petitgrain*	Roman chamomile*	Rosemary
N =	2	18	31	0	0	6
Decrease anxiety		X				
Decrease congestion			X			
Decrease fear						
Decrease infection	X					X
Decrease inflammation						
Decrease insomnia						
Decrease nausea		X	X			
Decrease stress		X	X			
Digestive issues			X			
Enhance spiritual connection						
Increase concentration & focus		X	X			X
Increase energy / to stimulate		X	X			
Induce relaxation		X	X			X
Pain relief	X	X	X			
Pleasant aroma			X			
Skin disorders						X
Soothe sore throat			X			
Support circulation						
Support urination			X			
Uplift mood		X	X			

*Participant(s) mentioned essential oil but did not specify reason.

Appendix S4

Table 10d

Table 10d

Essential oils and their uses

	Spearmint	Sweet marjoram	Thieves*	Vetiver*	Wintergreen	Ylang-ylang*
N =	2	1	0	0	1	0
Decrease anxiety						
Decrease congestion						
Decrease fear						
Decrease infection						
Decrease inflammation						
Decrease insomnia						
Decrease nausea	X					
Decrease stress						
Digestive issues	X				X	
Enhance spiritual connection						
Increase concentration & focus						
Increase energy / to stimulate						
Induce relaxation						
Pain relief		X				
Pleasant aroma						
Skin disorders						
Soothe sore throat						
Support circulation						
Support urination						
Uplift mood						

Note. N = 26

*Participant(s) mentioned essential oil but did not specify reason.

Appendix T

Table 11

Table 11

How do you administer AT? Why did you choose that method? How can you tell it was effective?

	%	n =
Method of administration		
Inhalation	93	51
Inhalation / massage / topical	38	21
Massage	55	30
How was inhalation administered?		
Aromasticks	8	1
Diffuser	33	4
Nasal inhaler	8	1
Nebulizer	8	1
How was massage / topical administered?		
Lotion	8	1
“M” technique	8	1
Patches	33	4
Roller balls	8	1
Specific points	8	1
Why do you use that method?		
Affordability	11	1
Ease of use	44	4
Protocol from employer	67	6
How can you tell if the method was effective?		
Changes in vital signs	5	2
Decreased pain scores	69	29
Observation	7	3
Verbal report	93	39

Note. What method do you administer AT? N = 55; How do you administer AT? N = 12; Why did you choose that method? N = 9; How can you tell it was effective? N = 42.

Appendix U

Table 12

Table 12

Was the aromatherapy recommendation in the Pain Tool helpful to you? In what ways?

	%	n =
Was the recommendation helpful?		
No	10	4
Yes	90	35
How was it helpful?		
Increased confidence	15	6
Evidence-informed tool	18	7
For self-care	3	1
Gave guidance	8	3
Practical use / applicable	8	3
Provided more options	15	6
Provided reminders	5	2
Provided safety information	3	1
Provided support	15	6
Reduced symptoms	21	8
Used for educational purposes	29	16
Used for recipients* of AT education	50	8
Used as a visual guide for education	25	4
Responses		
Multiple responses	40	22
One response	31	17
No response	29	16

Note: N = 39; RNs-Registered Nurses.
*Recipient = patient/client, family, colleagues/peers, supervisor/manager

Appendix V

Table 13

Table 13

How has your practice changed since you began using the Pain Tool's aromatherapy recommendation?

	%	n =
Administering less medications	9	4
Improved outcomes	30	13
No change	20	9
Promoting more options for pain management	48	21
Used the 5 Core Values (CV) of Holistic Nursing	70	31
CV1: Strengthened philosophy, theory, & ethics	6	2
CV2: Caring process: Used nursing process for holistic modalities	74	23
CV3: Enhanced communication, provided a therapeutic healing environment, & appreciate cultural diversity	42	13
CV4: Augmented education & research	29	9
CV5: Improved nurse self-reflection & self-care	39	12
Responses		
Multiple responses	49	27
One response	31	17
No response	20	11

Note. N = 44.

*Percent is greater than 100 because participants responded with more than one answer.

Appendix W

Table 14

Table 14

What changes do you think should be made to the information provided about aromatherapy in the Pain Tool?

	%	n =
Add information for COVID-19	3	1
Add more oils	23	8
Add more pictures / visuals	3	1
Add more recommendations	6	2
Add more safety information	23	8
Address specific pain conditions	3	1
Create separate tool for each recommendation	6	2
No changes	54	19
Offer additional methods of administration	3	1
Offer continued education	3	1
Responses		
Multiple responses	13	7
One response	51	28
No response	36	20

Note. N = 35.