The Effect of Aromatherapy on Insomnia and Other Common Symptoms Among Patients With Acute Leukemia

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Purpose/Objectives: To determine if the use of aromatherapy improves insomnia and other common symptoms in hospitalized patients with newly diagnosed acute leukemia.

Design: A randomized, crossover, washout trial.

Setting: An inpatient acute leukemia unit at the Arthur G. James Cancer Hospital and Richard L. Solove Research Institute of the Wexner Medical Center at Ohio State University in Columbus.

Sample: 50 patients who were newly diagnosed with acute leukemia and hospitalized to receive their initial four weeks of intensive induction chemotherapy.

Methods: Patients were offered a choice of three scents to be used during the trial: lavender, peppermint, or chamomile. Each patient was randomized to receive either the chosen aromatherapy intervention or a placebo intervention during alternate weeks, with a washout period in between. Sleep quality and other common symptoms were measured.

Main Research Variables: Aromatherapy, sleep, insomnia, pain, tiredness, drowsiness, nausea, lack of appetite, shortness of breath, depression, anxiety, and well-being.

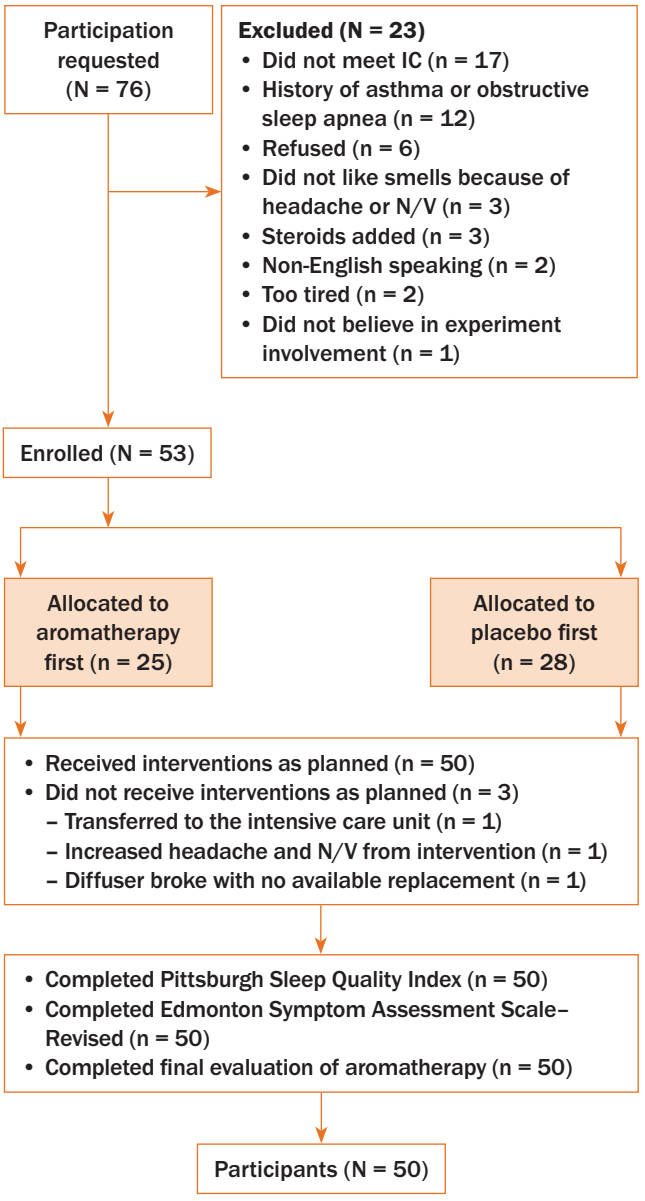
Findings: Most patients reported poor quality sleep at baseline, but aromatherapy had a statistically significant positive impact. Improvements were noted in tiredness, drowsiness, lack of appetite, depression, anxiety, and well-being because of aromatherapy.

Conclusions: Aromatherapy is a viable intervention for improving insomnia and other symptoms commonly experienced by patients with acute leukemia.

Implications for Nursing: Oncology nurses can employ aromatherapy safely and inexpensively, and with minimal training, as an effective tool in decreasing many symptoms that plague patients with leukemia. Patients can exercise a greater sense of control over their treatment environments through the use of aromatherapy.

Chemotherapy is the mainstay of treatment for acute leukemia. Although chemotherapy can have positive effects on the disease, it often is accompanied by many severe symptoms. Debilitating symptoms can be experienced from the disease itself or from its treatment. Individuals with cancer rarely suffer from just one symptom at a time, but rather are faced with symptom clusters, particularly during chemotherapy (Klafke et al., 2016). These symptoms can greatly affect patients' quality of life. Supportive therapies are an integral part of oncology care, and although this science has seen much advancement, optimal symptom management remains elusive for some patients.

Complementary therapies, such as relaxation, guided imagery, massage, and aromatherapy, are now widely used by patients with cancer (Stringer & Donald,



IC—inclusion criteria; N/V—nausea and vomiting

FIGURE 1. Aromatherapy Study Flow Diagram

2011). However, scientific evidence supporting their use is lacking. Some experts have reported that aromatherapy has the potential to improve various symptoms, including insomnia, nausea and vomiting, fatigue, and anxiety. These symptoms plague patients with leukemia, greatly affecting quality of life and, in some cases, successful remission and disease control; their impact on treatment recovery and quality of survivorship is undeniable (Matthews et al., 2014). In general, symptom management in this patient population requires a great deal of dedicated time, expert medication management, and many hospitalizations and outpatient visits. If complementary therapies to control symptoms are proven to be effective, they may serve as a cost-effective method to decrease symptom burden while allowing patients more control over their experience with cancer and its treatment.

The primary aim of this study was to determine if aromatherapy by diffusion of essential oils improves insomnia in hospitalized patients newly diagnosed with acute leukemia. The secondary aims were to determine (a) whether aromatherapy improves other common symptoms in this patient population and (b) whether patients perceive aromatherapy to be a positive experience for symptom management.

Background

Insomnia

Sleep aids in recovery from physical activities as well as helps to maintain strength and health; consequently, obtaining an adequate amount of sleep is essential. However, a lack of sleep can result in a host of negative effects, including fatigue, nervousness, dizziness, attention disorders, and even death (Hwang & Shin, 2015). Periods of sleeplessness because of acute stress or environmental change are common human experiences, whereas chronic insomnia is an abnormal condition that presents a major health burden in the United States (Hwang & Shin, 2015; Sarris & Byrne, 2011). Insomnia is characterized by complaints of difficulty initiating or maintaining sleep or experiencing nonrestorative sleep that lasts for at least one month and causes significant distress or impairment in functioning (Buysse, 2013). More than one-third of patients with cancer experience sleep disturbance during and after active treatment (Savard & Morin, 2001), but it is often viewed as a temporary symptom of stress related to the cancer diagnosis or the treatment itself. However, for about 25% of these patients, their insomnia becomes chronic, continuing even when active treatment has ended (Fleming, Randell, Harvey, & Espie, 2014). This population has reported

TABLE 1. Sample Characteristics (N = 50)

Characteristic	n
Age (years)	
Younger than 30	3
31–40	6
41–50	13
51–60	12
61–70	16
71 or older	–
Gender	
Female	22
Male	28
Smoker	
Previous only	6
Current	1
Never smoked	43

TABLE 2. Sleep Quality and Disturbances in Patients With Acute Leukemia (N = 50)

	Baseline Score		Aromatherapy Score		Placebo Score	
Component	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Daytime dysfunction	1.26	0.88	0.48	0.61	0.6	0.76
Habitual sleep efficiency	3	–	2.9	0.42	3	–
Sleep disturbance	1.7	0.65	1.4	0.61	1.82	0.72
Sleep duration	1.78	1.15	1.28	1.16	1.88	1.14
Sleep latency	1.78	0.99	1.08	0.9	1.7	1.04
Sleep quality	1.88	0.85	1.39	0.84	1.9	0.89
Use of sleeping medication	1.3	1.31	1.18	1.22	1.44	1.34
Global score	12.7	4.11	9.7	3.6	12.34	3.44

Note. The Pittsburgh Sleep Quality Index was used to assess sleep quality and disturbances during a specific time period. For each of the first six components of the Pittsburgh Sleep Quality Index, scores range from 0–3, with higher scores indicating poorer quality. For use of sleeping medication, scores range from 0–3, with higher scores indicating greater need. The component scores are summed to produce one global score ranging from 0 (best sleep) to 21 (worst sleep).

a decrease in functioning, as well as increased pain and fatigue, as a result of insomnia (Fleming et al., 2014). Evidence suggests that insomnia has a consistent negative impact on immune function (Payne, Piper, Rabinowitz, & Zimmerman, 2006) and may have implications for tumor progression (Filipski et al., 2002) and survival after a cancer diagnosis (Innominato et al., 2009).

Conventional approaches to the treatment of chronic insomnia usually involve either the use of medications or psychological interventions. Pharmaceutic hypnotics are the primary firstline pharmacotherapy used to treat chronic insomnia, but also included in the medication arsenal for the fight against insomnia are benzodiazepines, barbiturates, sedating antipsychotics, and sedating antidepressants (Hwang & Shin, 2015; Tariq & Pulisetty, 2008). The use of these drugs has the potential to cause serious adverse effects, including dependency, and most guidelines endorse only short-term use for the treatment of insomnia. Some authorities recommend nonpharmacologic interventions, including behavior modification and sleep hygiene techniques, but many with insomnia find these difficult to consistently implement or altogether unsuccessful (Wang, Wang, & Tsai, 2005).

Oncology care would benefit from knowledge regarding simple measures that could be implemented to improve insomnia and support sleep hygiene in patients with cancer. This knowledge could potentially decrease the cost and symptoms of pharmacologic sleep aids and allow patients to exercise more control over their treatment course.

Complementary and Alternative Medicine

Interest in the use of complementary and alternative medicine (CAM) has grown during the past two decades for a number of reasons. For instance, with CAM, patients are actively involved in their health care. In addition, CAM treats the "whole person" rather than just the symptom, and CAM techniques are safe and comparatively inexpensive compared to the use of multiple medications and the potential for readmissions; they also offer another option for patients for whom conventional techniques have been ineffective. The use of essential oils also meets a growing consumer desire to use natural products that may relieve unpleasant symptoms and reduce their occurrence (Sierpina, Gerik, Miryala, & Micozzi, 2011). For instance, aromatherapy involves the use of essential oils, which are derived from various aromatic plants, to facilitate improvements in quality of life, as well as physical and mental health; the fragrance and therapeutic properties of essential oils depend on the plants' chemical characteristics (Buckle, 2007; Johnson et al., 2016; Lua & Zakaria, 2012).

Aromatherapy

Aromatherapy has been used for thousands of years in countries such as Egypt and India as a form of herbal medicine (Lua & Zakaria, 2012) in which essential oils, interacting with the olfactory system, influence the connection between body and mind (Harris, 2011; Hwang & Shin, 2015). The aromas of essential oils join with receptors in the nasal epithelium, with the resulting neurochemical reaction transmitted to the olfactory bulb in the brain, the limbic system, and the thalamus; the result is a release of endorphins and serotonin (Lane et al., 2012; Stringer & Donald, 2011). A physical effect can be caused through an arousing of smell memory or through transmission of molecules to the brain by the olfactory system (Stringer & Donald, 2011). Specific aromas may work differently, either positively or negatively, for the individual patient, depending on his or her prior experience with that fragrance (Buckle, 2003; Lee & Hwang, 2011). Because aromatherapy may affect patients in emotional and psychologic ways, evaluating its impact is difficult (Hodge, McCarthy, & Pierce, 2014; Lane et al., 2012).

Peppermint is thought to have an emotionally calming effect (Buckle, 2003), whereas lavender, which has been used as a sedative, may reduce stress by inducing relaxation (Buckle, 2003; Varney & Buckle,

2013). Chamomile is known for its soothing effect and is thought to reduce the time needed to fall asleep, as well as nighttime awakenings (Buckle, 2003; Hwang & Shin, 2015).

Lack of rigorous research on aromatherapy and essential oils has been a barrier to their use in the hospital environment (Lane et al., 2012). Sarris and Byrne (2011) conducted a systematic review of the use of complementary medicine for insomnia, finding that many randomized, controlled trials lacked methodologic rigor, as well as had a small sample size or an inadequate control condition. In a retrospective review involving patients with cancer and their experiences with an aromastick (a vapor inhaler), Stringer and Donald (2011) found that 31 of 56 patients experiencing sleep disturbances felt that the aromastick helped them to sleep. Hwang and Shin (2015), in a meta-analysis on the use of aromatherapy to improve sleep, determined, from 12 studies using a random-effects model, that the use of aromatherapy was effective in improving sleep quality (95% confidence interval [0.792, 1.745], z = 3.716). (The z score is equivalent to the effect size, which, compared to statistical significance alone, better quantifies the difference between two groups.)

Few studies have explored the use of aromatherapy to alleviate other symptoms frequently experienced by patients with cancer. Hines, Steels, Chang, and Gibbons (2012), in a study of 12 randomized, controlled trials and controlled clinical trials, determined that aromatherapy with isopropyl alcohol was more effective than saline placebo for reducing postoperative nausea and vomiting (substances other than essential oils have also been used for aromatherapy). Johnson et al. (2016) conducted a retrospective review of more than 10,000 hospital admissions in which nurse-delivered aromatherapy was part of patient care. The use of marjoram resulted in the largest average change in pain intensity, whereas lavender and marjoram had equivalent average anxiety changes, and ginger had the largest single average change in nausea using an oil.

Methods

Because of variability in symptom experience and severity among patients, this research project was designed as a randomized, crossover, washout trial, with the experimental group acting as its own control. This was a three-week trial during hospitalization with patients randomized to begin either placebo or aromatherapy in the first week, followed by a washout period in the second week, and then either placebo or aromatherapy in the third week. Patients were approached for consent at least one week after starting chemotherapy. Randomization was done using a computer-generated table of random numbers. This study took place at the Arthur G. James Cancer Hospital and Richard L. Solove Research Institute of the Wexner Medical Center at Ohio State University in Columbus. Patients were recruited from the acute leukemia unit.

Sample

The sample for this study consisted of 50 patients aged 18 years or older who were newly diagnosed with acute leukemia. Assuming a within-subject variability over time on the Pittsburgh Sleep Quality Index (PSQI) with a correlation of 0.75, a power analysis using a one-sided test with an effect size of 20% and 53 patients demonstrated 91.8% power. Assuming a 20% attrition rate, 60 patients were randomized to allow for attrition. Inclusion criteria for this study included being aged 18 years or older, having a new diagnosis of acute leukemia, and initiating four weeks of intensive induction chemotherapy. Exclusion criteria included having a history of asthma or another reactive airway disease, having sleep apnea, undergoing planned hospitalization for less than three weeks, not completing initial steroids, experiencing confusion and not having the ability to give informed consent, being unable to speak English, and having previous experience with aromatherapy. Participants were removed from the study if they were moved off of the acute leukemia unit during the study. The partially collected data from these patients were not used

TABLE 3. Linear Regression Results for Pittsburgh Sleep Quality Index Scores

Component	$\bar{X}$ Treatment Estimate[a]	Treatment p	$\bar{X}$ Week Estimate[b]	Week p
Daytime dysfunction	−0.28	0.317	−0.34	0.2205
Habitual sleep efficiency	−0.04	0.764	−0.01	0.9252
Sleep disturbance	−0.26	0.109	−0.06	0.7221
Sleep duration	−0.37	0.228	−0.1	0.5479
Sleep latency	−0.43	0.0139	−0.22	0.1961
Sleep quality	−0.31	0.0524	−0.04	0.7935
Use of sleeping medication	−0.17	0.3358	−0.1	0.5721
Global score	−2.53	0.0001	−0.32	0.225

[a] Mean difference in scores between aromatherapy and control conditions
[b] Mean difference in scores between week 1 and week 2 of treatment

TABLE 4. Weekly Average Symptom Burden in Patients With Acute Leukemia (N = 50)

	Aromatherapy		Placebo	
Symptom	$\bar{X}$	SD	$\bar{X}$	SD
Anxiety	1.48	1.75	2.25	2.21
Depression	1.24	1.62	2.08	2.17
Drowsiness	2.98	1.85	3.85	2.37
Lack of appetite	3.67	2.64	4.79	2.77
Nausea	1.63	1.94	2.22	2.07
Pain	2.84	2.23	2.84	2.23
Tiredness	3.79	1.75	4.81	2.45
Shortness of breath	1.22	1.61	1.64	2.19
Well-being	2.64	1.81	3.3	2.17
Average total score	20.93	11.68	27.76	15.36

Note. The Edmonton Symptom Assessment Scale–Revised was used to assess symptom burden. Participants used a visual analog scale ranging from 0 (indicating an absence of the symptom) to 10 (indicating the worst possible symptom) to rate the severity of each symptom. The average total score is the sum of each symptom's mean score and may range from 0–90, with higher scores indicating worse symptoms.

because the patients did not fully experience the placebo and control interventions. Patients were recruited during a 14-month period.

Procedures

At the time of implementation of this study, a guideline had just been crafted and approved regarding the use of aromatherapy at the James Cancer Hospital and Solove Research Institute. As part of this process, the facilities department and the infection control department approved use of the diffusers that were used to diffuse the essential oils used for aromatherapy into the air. All recommendations in this guideline were followed during the project, including required training for staff who were to initiate aromatherapy.

Following approval by the James Cancer Hospital and Solove Research Institute's cancer scientific research committee and the Ohio State University Wexner Medical Center Institutional Review Board, potential participants were screened by the leukemia clinical nurse specialist (CNS) and the multidisciplinary team during daily patient rounds for inclusion and exclusion criteria. If deemed appropriate, patients were approached by the CNS to determine their interest in the study and to obtain informed consent. Obtaining consent for this study was attempted only after any necessary consents for induction treatment were gathered to avoid consent fatigue.

Because of the importance of the patients' scent preference and their previous experience with aromas (either positive or negative), patients were given a choice of three different essential oils: lavender, chamomile, or peppermint. Patients were introduced to the smell with a drop of each essential oil placed on a cotton gauze pad for them to smell. Coffee beans were available for them to smell between each essential oil to clear the previous scent. Rose water was used as the placebo because it does have a scent but is not an essential oil. Essential oils are concentrated extracts taken from the roots, leaves, seeds, or blossoms of plants by means of distillation with either water or steam (Buckle, 2003). The researchers were unsure if the patients would be aware of when they were receiving the actual essential oil just by the aroma, but the scents were blinded to patients and staff so that neither would know whether the essential oil or the placebo was being diffused at a given time. Standard aromatherapy bottles were used for the essential oils and the placebo, and all bottle labels were obscured with tape.

A diffuser with an essential oil or the placebo was placed in a predetermined, measured place within the patient room to ensure that diffusion was standardized for each patient. All bottles were used only by a single patient and were offered to the patient at the completion of the trial. Diffusion began during 9 pm rounds, with eight drops of the essential oil or placebo used, and continued until the solution ran dry and the diffuser automatically turned off about eight hours later. Doors were kept closed during diffusion except when staff were entering and exiting the room.

Measurement and Instruments

Insomnia: The PSQI is a self-rated questionnaire that is used to assess sleep quality and disturbances during a prescribed time interval. The tool takes an average of 15 minutes to complete. Nineteen items produce seven component scores (daytime dysfunction, habitual sleep efficiency [i.e., the percentage of time in bed that a person is asleep], sleep disturbance, sleep duration, sleep latency [i.e., how long a person takes to fall asleep], sleep quality, use of sleeping medication), and the sum of these component scores results in one global score, which ranges from 0 (best sleep) to 21 (worst sleep). Internal homogeneity, consistency (test-retest reliability), and validity of the PSQI have been deemed to be acceptable. In addition, a global score of greater than 5 has shown a diagnostic sensitivity of 89.6% and specificity of 86.5% (kappa = 0.75, $p < 0.001$) in differentiating between good and poor sleepers. In addition, the PSQI's clinimetric and clinical properties demonstrate its use in psychiatric clinical practice and in research endeavors (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Since its initial development, the PSQI has been used in many research studies focused on sleep, including those involving patients with

cancer, and has been translated into more than 40 languages (Ancoli-Israel et al., 2014; Beck, Schwartz, Towsley, Dudley, & Barsevick, 2004; Carpenter & Andrykowski, 1998). The PSQI was completed by participants in this study at baseline and after each intervention week.

Symptom burden: The Edmonton Symptom Assessment Scale–Revised (ESASr) is an 11-point numerical rating scale for self-report of nine common symptoms of cancer. The ESAS has been widely adopted across the world for clinical, research, and administrative purposes. The ESASr, a revision to the original tool, was found, in a multicenter study, to be significantly easier for patients to understand; it also decreased average completion time to three minutes (Watanabe, Nekolaichuk, & Beaumont, 2012). The overall Cronbach alpha for the ESAS in a study of 240 patients was 0.79. Test-retest coefficients were determined with Spearman correlation coefficients (Chang, Hwang, & Feuerman, 2000). The ESASr uses a visual analog scale with a range of 0 (indicating an absence of the symptom) to 10 (indicating the worst possible symptom) (Watanabe et al., 2012). The ESASr was completed daily by study participants during the intervention weeks, which included the essential oil and placebo weeks.

Aromatherapy: At the end of each intervention week of the study, each patient completed the final evaluation of aromatherapy (FEA), which took an average of two minutes. This researcher-generated form asked patients to rate their general experience with aromatherapy on a scale of 1 (terrible) to 10 (exceptional). It also asked patients in which week (week 1 or week 3) they thought they received the actual diffusion of essential oils. Patients were also asked for positive and negative comments regarding the use of aromatherapy and whether they planned to use aromatherapy in the future.

TABLE 5. Linear Regression Results for Edmonton Symptom Assessment Scale–Revised Scores

Symptom	$\bar{X}$ Treatment Estimate[a]	Treatment p	$\bar{X}$ Week Estimate[b]	Week p
Anxiety	–0.69	0.0064	–0.48	0.0617
Depression	–0.75	0.0006	–0.54	0.0134
Drowsiness	–0.73	0.0018	–0.86	0.0005
Lack of appetite	–1.06	0.0052	–0.33	0.3826
Nausea	–0.55	0.0677	–0.26	0.3902
Pain	–0.27	0.2996	–0.4	0.1296
Tiredness	–0.88	0.0008	–0.86	0.0014
Shortness of breath	–0.39	0.2253	–0.19	0.5603
Well-being	–0.6	0.0127	–0.33	0.1748
Total score	–6.06	0.0006	–4.64	0.009

[a] Mean difference in scores between aromatherapy and control conditions
[b] Mean difference in scores between week 1 and week 2 of treatment

Data Analysis

Statistical analysis was performed to test the hypothesis that aromatherapy produced better results than the placebo (lower PSQI and ESAS scores and higher satisfaction). A mixed-effects linear regression model, designed to test the effects of interest (i.e., the effect of aromatherapy relative to baseline and to placebo) while accounting for the within-subject correlation arising from the repeated measures design, was employed. The model included fixed effects for measurement week, which was dummy-coded with the baseline measurement as the reference, and presence of aromatherapy, which was dummy-coded with the baseline and placebo as the reference. A random effect was included for each participant. Statistical testing focused on the coefficient associated with the aromatherapy dummy variable, and significance of this effect provided evidence in support of the main hypothesis. Secondary testing was performed by writing contrasts to determine whether a placebo effect existed relative to baseline either before or after aromatherapy treatment. A 20% positive change in mean PSQI score or mean ESASr score during the aromatherapy intervention week was seen as significant (Ancoli-Israel et al., 2014; Beck et al., 2004; Chang et al., 2000). All statistical tests were two-sided with a significance level of 0.05.

Results

During the study period, a total of 75 patients were screened for the study. Seventeen patients did not meet inclusion criteria, and an additional six patients chose not to participate in the study. Reasons mentioned for nonparticipation included not believing in experiments, disliking smells because of headache or nausea, and experiencing tiredness. A total of 53 patients were enrolled, and 50 completed the study (see Figure 1). Patients ranged in age from 19–72 years (see Table 1). All patients were newly diagnosed with acute myelogenous leukemia.

Lavender was the most popular scent selected, followed by peppermint and then chamomile. All patients in the sample were treated with a standard regimen for leukemia that delivers seven days of cytarabine

(Cytosar-U®) and three days of an anthracycline antibiotic, most often daunorubicin (Cerubidine®). This was the complete induction chemotherapy regimen for 84% of the sample. The remainder of the sample received this regimen with the addition of one of the following: decitabine (Dacogen®), a tyrosine kinase inhibitor on clinical trial, or a CD33 antibody on clinical trial.

Most patients reported poor quality sleep on the PSQI at baseline, with a mean score of 12.7. During the aromatherapy week, the mean PSQI score decreased from 12.7–9.7, but returned to near baseline at 12.4 during the placebo week. The difference in mean PSQI score and mean placebo score was statistically significant ($p = 0.0001$). Patients treated with aromatherapy in the first and third weeks had lower average PSQI scores than when treated with placebo. Aromatherapy decreased the overall PSQI score by 2.53 points. According to review of the PSQI subscale scores, aromatherapy significantly increased sleep duration ($p = 0.03$) and sleep quality ($p = 0.05$) and decreased sleep disturbances ($p = 0.04$), as reflected in Tables 2 and 3.

Table 4 shows the average weekly subscores for the ESASr and total scores for seven days during the two weeks of placebo and aromatherapy treatments. Aromatherapy reduced the weekly average ESASr score by 6.06 points, which was statistically significant ($p = 0.0006$). All subscales demonstrated a reduction in ESASr score with six symptom score changes showing a statistically significant benefit from aromatherapy: tiredness ($p = 0.02$), drowsiness ($p = 0.03$), lack of appetite ($p = 0.02$), depression ($p = 0.003$), anxiety ($p = 0.03$), and well-being ($p = 0.05$), as shown in Table 5. Tiredness and lack of appetite were the most severe symptoms during both weeks, whereas shortness of breath and anxiety were the least severe symptoms during the same time.

On the FEA, the patients rated their overall experience with aromatherapy at 7.4 on a 0–10 scale, which was significantly higher than placebo ($p = 0.0$). In addition, patients reported significantly higher satisfaction with aromatherapy regarding sleep and management of other symptoms ($p = 0.001$ and $p = 0.03$, respectively) (see Table 6). Although patients, on average, enjoyed their experience with aromatherapy, just 10 stated that they would use aromatherapy at home. In addition, 36 said that they would use aromatherapy during their next hospitalization. One patient commented, "I am so pleased to see that, in addition to clinical trials focused on cancer, the James also invests its time and money on trials to improve the treatment experience." Another patient stated, "I chose chamomile as my scent because my girlfriend grows chamomile and makes tea with it; it reminds me of home." A third patient noted, "My parents, who spent most nights with me, enjoyed the aromatherapy as much as I did."

Discussion

The current study adds to a growing body of evidence demonstrating the significant effects of aromatherapy when used for symptom management (Hines et al., 2012; Hwang & Shin, 2015; Johnson et al., 2016; Stringer & Donald, 2011). No adverse effects were observed during the use of aromatherapy. This is consistent with previous studies that have reported that aromatherapy interventions do not cause harm when used with appropriate recipients (Hines et al., 2012; Hodge et al., 2014; Varney & Buckle, 2013).

Much of the previous research on CAM techniques has used lower levels of research or poorly executed studies. This study was a randomized, controlled trial with double-blinded intervention with a placebo intervention week, which substantiates the effect truly being attributable to the intervention. The potential for the Hawthorne effect was decreased by using a placebo and by structuring the experimental group as its own control. The groups were treated in exactly the same manner during the experimental and control weeks, and the placebo allowed participants to remain unsure of the week (and the intervention). In general, aromatherapy is largely understudied; the greater control with the use of a randomized, controlled trial in this study lends greater value to the results of the study in terms of new knowledge.

Limitations

Several limitations to this study exist. Although the demographics are representative of this patient

TABLE 6. Comparison of Patient Satisfaction Between Treatments (N = 50)

	Aromatherapy Satisfaction		Placebo Satisfaction			
Variable	$\bar{X}$	SD	$\bar{X}$	SD	MD	p
Improved sleep	5.72	2.36	4.92	2.7	0.8	0.000
Overall experience	7.44	1.86	6.61	2.18	0.83	0.000
Other symptoms	4.17	2.48	3.54	2.39	0.63	0.03

MD—mean difference
Note. All variable scores ranged from 0–10, with higher scores indicating greater satisfaction.

population, this study focused only on diagnosis. The newly diagnosed patient with acute leukemia routinely experiences a harsh, long-term hospitalization for induction chemotherapy, so the results of this study may not be generalizable to all patients with cancer and those with other diseases.

Implications for Nursing

Oncology nurses are a critical point of contact for patients receiving inpatient and ambulatory chemotherapy. An essential component of the nurse–patient relationship includes patient teaching on management of the expected symptoms of cancer treatment. Although nurses provide expert repeated chemotherapy administration and related care, they have the opportunity to develop a trusting relationship with the patient and his or her family. Effective oncology nursing improves patients' ability to contribute to their own care and to their ability to manage symptoms during and between treatments.

Oncology nurses can employ aromatherapy as an effective tool in decreasing many symptoms that plague patients with cancer. Nurses can initiate aromatherapy safely and effectively with minimal training. They can teach patients to use aromatherapy and, as a result, have a greater sense of control over their treatment environments. Families and friends can also become involved in treatment by supporting the use of aromatherapy.

When using aromatherapy, considering the setting is important. If patients share space with one another, perhaps in an ambulatory setting, care providers have to be mindful that a scent that is helpful to one patient may seem intrusive or noxious to another patient. During this study, the current authors were mindful of this potential, but never had a nonstudy patient complaint related to the aromas. However, the authors did not anticipate having to consider the effect on family members who may have chosen to stay overnight in the patient's room. Several patients were unable to be involved in the trial, not because they met exclusion criteria, but because a family member had respiratory issues. Nurses who integrate CAM therapies into patient care must stay abreast of current evidence-based CAM strategies.

Sleep latency is the length of time required to accomplish the transition from full wakefulness to sleep, normally to the lightest of the non-REM sleep stages. Prolonged sleep latency is one of the central complaints among patients with insomnia (Absolon et al., 2016), and it precedes the patient request for intervention. Employing aromatherapy, as opposed to pharmacologic interventions, for patients who are experiencing sleep latency would be cost effective, produce no serious symptoms, and encourage more control for the patient with cancer. The effect on sleep duration may also prove to be of great importance to patients who complain of frequent sleep interruption when hospitalized.

Knowledge Translation

- Many patients newly diagnosed with acute leukemia experience insomnia during their initial hospitalization.
- Many symptoms commonly experienced by patients with cancer may be improved by the addition of aromatherapy with diffusion of essential oils.
- Patients with acute leukemia have reported enjoying the experience of aromatherapy and may opt for it during subsequent hospitalizations.

Oncology nurses play an essential role in assessing, managing, and treating symptoms, including all of those reflected in this study. Aromatherapy has the potential to complement existing medical and pharmacologic therapies within the oncology setting, particularly in terms of symptom management. For oncology nurses, an emphasis should be placed on continuing to research practical interventions that can improve the experience of patients with cancer throughout their treatment and afterward, including aromatherapy in various settings with diverse patient populations. Further exploration of the reasons patients are not interested in using aromatherapy at home is a gap in this study and deserves future attention.

Conclusion

Aromatherapy is a viable intervention for improving insomnia and other common symptoms for this specific subset of patients with cancer. This intervention is less costly and safer than the standard use of pharmacologic measures. Aromatherapy is becoming one of the most popular CAM techniques and is increasingly being used by patients in the hospital and in their home environments. More studies are needed to add to the growing evidence and the test applicability of aromatherapy in other patient populations.

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