FEATURE ARTICLE

Effect of Aromatherapy Massage on Agitation and Depressive Mood in Individuals With Dementia

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Abstract

The current study examined the effects of aromatherapy massage on alleviating agitation and depressive mood in individuals with dementia. A randomized controlled trial and repeated measures design was conducted. A total of 59 participants were randomly assigned to intervention or control groups. The intervention group received aromatherapy massage once per week for 8 weeks. Results indicated no significant changes over time in overall agitation for either group, but agitation decreased from Week 1 to Week 5 for the intervention group. In addition, the overall depressive symptoms decreased significantly over time for the intervention group compared to the control group ($p < 0.001$). However, changes in agitation within 24 hours following aromatherapy massage showed some significant changes in Weeks 5 and 9.

Aromatherapy massage can be an effective and safe intervention to alleviate specific agitated behaviors and depressive mood in individuals with dementia. [Journal of Gerontological Nursing, 42(9), 38–46.]

With the increasing aging population, dementia has become a public health problem worldwide. Behavioral and psychological symptoms of dementia (BPSD) are common in individuals with different types of dementia. Studies have shown that BPSD are experienced by 12% to 74% of patients with Alzheimer's disease (Aalten et al., 2007; Ballard & Oyebode, 1995; Ropacki & Jeste, 2005). Among BPSD, several agitative behaviors may result from dementia. Individuals with dementia may sometimes behave aggressively, particularly those with moderate to severe dementia, which can be distressing for the individual and caregiver. In studies conducted between 2005 and 2014, agitative behaviors were reported to occur in approximately 30% of individuals with dementia in American studies and 28.9% to 71.4% of individuals in Taiwanese studies (Enache, Winblad, & Aarsland, 2011; Ford, 2014; Fuh, Wang, & Cummings, 2005). In addition, studies from the United States and Taiwan from 2002–2011 showed that depressive symptoms occurred in 20% to 32% and 39.1% to 70% of individuals with dementia,
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Along with agitative behaviors, depressive mood is a major cause of caregiver burden (Lin & Wang, 2008; Moyle, Murfield, O'Dwyer, & Van Wyk, 2013).

Psychotropic medications are widely used to manage agitation and depression in individuals with dementia. However, these medications have limited effects, a number of side effects, and a relatively high cost, thus making them less attractive for health care providers. Therefore, nonpharmacological strategies have been recommended to manage these behaviors and symptoms (Enache et al., 2011; Wood-Mitchell, James, Waterworth, Swann, & Ballard, 2008). Among the various complementary therapies, massage and aromatherapy are commonly used and seen as relatively noninvasive procedures for managing a variety of symptoms (Holt et al., 2003).

Suzuki et al. (2010) conducted a randomized controlled trial of a 6-week massage program in individuals with dementia and assessed its physical and psychological effects. The results showed that massage reduced aggressive behaviors and stress levels in these individuals, but did not affect emotional functions. A systematic review of massage-related studies (Moyle et al., 2013) discovered that only one study among 13 was considered to have adequate methodological quality, as based on the Validity Rating Tool. The study found that massage significantly reduced patients’ agitated behaviors (Holliday-Welsh, Gessert, & Renier, 2009). More recently, Moyle et al. (2014) conducted a randomized controlled trial using 10-minute foot massage versus quiet presence once daily during weekdays for 3 continuous weeks. They found that foot massage could promote relaxation and improve mood in individuals with dementia.

The positive effects of aromatherapy in patients with dementia were evidenced in some studies but not all. According to several systematic reviews (Forrester et al., 2014; Fung, Tsang, & Chung, 2012; Holt et al., 2003), aromatherapy not only reduced agitation and improved sleep but also reduced disturbed behaviors and facilitated desirable behaviors. However, O’Connor, Eppingstall, Taffe, and van der Ploeg (2013) found that pure lavender oil had no discernible effect on affect and behavior in individuals with dementia residing in nursing homes. Snow, Hovanec, and Brandt (2004) found that use of a purely olfactory form of aromatherapy to decrease agitation in individuals with severe dementia is not practical due to impaired olfactory sense in these patients; therefore, cutaneous application is needed to interpret the effects of aromatherapy in individuals with dementia in previous controlled studies. Thus, aromatherapy in use with massage may strengthen the natural therapeutic properties of essential oils and healing power of massage therapy (Clarke, 2008).

Aromatherapy massage is believed to increase oxygenation and nutrients of cells and tissue and release endorphins, which promote physical and mental relaxation (Clarke, 2008). Aromatherapy massage also has the potential to enhance comfort, sleep, and relaxation; provide immunological benefits (Rho, Han, Kim, & Lee, 2006); reduce levels of agitation (Holliday-Welsh et al., 2009); and alleviate anxiety (Rho et al., 2006). However, evidence to support the effectiveness of aromatherapy massage for agitation and depressive symptoms in individuals with dementia is limited. Only two studies involving both aromatherapy and massage have been identified. The first study conducted aromatherapy massage twice per week for 3 weeks, and agitative behaviors were only observed twice (i.e., in two afternoons) during this period. Results showed that the intervention decreased agitative behaviors that occurred between 3:00 and 4:00 p.m. Sample size was too small for demonstrating statistical significance, with each group having only seven participants (Smallwood, Brown, Coulter, Irvine, & Copland, 2001).

Another study compared effects of medication, aromatherapy massage, and placebo on agitation, emotion behaviors (e.g., depression, dysphoria, anxiety, euphoria), and quality of life. Melissa oil (i.e.,
lemon balm) was rubbed on participants' faces and hands twice daily for 1 to 2 minutes for 12 weeks (Burns et al., 2011). The results showed that the occurrence of agitation and depression did not significantly decrease in the aromatherapy massage group. Although both studies applied aromatherapy massage to manage agitation behaviors and depressive mood, small sample size and dosage were limitations. Additional scientific evidence of aromatherapy massage to manage agitation behaviors and depressive mood in individuals with dementia must be gathered using randomized controlled trials (Forrester et al., 2014; Fung et al., 2012; Yim, Ng, Tsang, & Leung, 2009). Therefore, the current study examined the effectiveness of aromatherapy massage on alleviating agitative behaviors and depressive mood in individuals with dementia.

Method

Sample and Setting

The current randomized controlled trial comprised individuals with dementia residing in five long-term care facilities in Taiwan. Participants with mild to severe dementia based on the Short Portable Mental Status Questionnaire (score ≤8) (SPMSQ; Pfeiffer, 1975) or Mini-Mental State Examination (score ≤17 for those with a high school education and ≤23 for those with a high school education or higher) (MMSE; Folstein, Folstein, & McHugh, 1975; Guo et al., 1988) were recruited. Of these individuals, those who demonstrated agitation or depressive symptoms in the past 2 weeks as reported by caregivers using the Chinese version of the Cohen-Mansfield Agitation Inventory (CCMAI; Lin, Kao, Tzeng, & Lin, 2007) and Cornell Scale for Depression in Dementia–Chinese Version (CSDD-C; Lin & Wang, 2008) were included in the study. Individuals with dementia were excluded if the severity of their behavioral problems prohibited interaction with the researcher.

Individuals with dementia were randomly assigned to the control or intervention groups through a randomized block technique performed by the researcher (i.e., intervener [J.-J.W.]). Data collectors (i.e., caregivers) were blind to participant allocation. The sample size was estimated using G-power 3.1. To achieve 20% effect size and 80% power for significance at an alpha level of 5% while considering a 20% drop-out rate for a trial with repeated measures design (Cohen, 2013), at least 51 participants were needed.

Data Collection and Protection of Human Subjects

After receiving approval from the participating university's institutional review board, the researcher contacted the administrators of five long-term care facilities. The directors of the facilities referred individuals with dementia based on the study criteria. Written informed consent was obtained from the individuals with dementia or their surrogates. One staff member from each study site (i.e., a nurse or supervisor of the nursing aide) collected data throughout the study period. Staff data collectors were assigned by the nursing supervisor because they provided constant, hands-on care to participants. They received consistency training prior to the observation to minimize collection bias. Week 1 baseline data were collected using the CCMAI
and CSDD-C. The intervention group received aromatherapy massage for 8 continuous weeks, from Weeks 2 to 9. The main safety concerns with regard to essential oils are skin irritations, sensitizations, breathing difficulties, and oral toxicity (Clarke, 2008). However, most essential oils available to aromatherapists present no problems, and lavenders, matricaria chamomila (German chamomile), and orange oil are especially safe and useful for relaxation. The outcome measurements were collected at Weeks 5 and 9. The day after aromatherapy massage, staff data collectors were asked to rate the change in agitation using the 24-hour CCMAI at Weeks 2, 5, and 9.

**Intervention**

Control and intervention groups participated in regular activities (e.g., group singing, watching movies) in the long-term care facilities. Based on a previous review study (Forrester, 2014), interventions were performed twice per day to once per week from 3 to 12 consecutive weeks. Through an expert review, 30 minutes of aromatherapy massage once per week for 8 continuous weeks was deemed appropriate for the intervention group. To address concerns about participants in the control group not receiving the intervention, aromatherapy massage was provided to these individuals after completion of the study to receive additional feedback. Aromatherapy massage was performed by trained research assistants. Two research assistants (Y.-P.Y. and other) completed a 1-day aromatherapy massage course taught by a certified aromatherapist. The consistency of massage techniques used by each research assistant was evaluated by seven volunteers who received the massage intervention. The aromatherapy massage technique and procedure are described in Table 1.
### Table 1: Protocol for Aromatherapy Massage in the Current Study

<table>
<thead>
<tr>
<th>Protocol for Aromatherapy Massage in the Current Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The oil used was imported from England and labeled 100% pure Lavandula angustifolia (i.e., lavender) and orange.</td>
</tr>
<tr>
<td>2. The researcher explained the procedure of massage to participants.</td>
</tr>
<tr>
<td>3. Three drops of pure undiluted lavender and three drops of pure undiluted orange oil were mixed with 5 mL of essential oil by the research assistant.</td>
</tr>
<tr>
<td>4. If privacy was a concern, the researcher stepped out of the room as the participant undressed and covered him/herself with a towel or sheet.</td>
</tr>
<tr>
<td>5. Participants achieved a comfortable position and smelled the oil to ensure their preference. An allergy test was performed and noted for all participants.</td>
</tr>
<tr>
<td>6. Once in a comfortable position, the researcher rubbed oil on the participant after warming it in his/her palms.</td>
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<tr>
<td>7. Because the lymph flows within lymph vessels in only one direction, when performing a massage, the researcher moved his/her hands in the direction of the flow of blood and lymph (i.e., toward the heart and proximal lymph nodes).</td>
</tr>
<tr>
<td>8. Effleureage and petrissage were performed in a circular motion around the patient’s neck, shoulders, and arms.</td>
</tr>
<tr>
<td>9. Because participants have different tolerances to pressure, when deeper strokes were introduced, the researcher asked for feedback.</td>
</tr>
<tr>
<td>10. At the end of the aromatherapy massage, the researcher draped a towel over the participant’s neck, shoulders, and arms and rubbed gently to absorb most of the oil to avoid staining clothing.</td>
</tr>
<tr>
<td>11. The adverse effects of essential oils were monitored by caregivers at the long-term care facilities throughout the study period.</td>
</tr>
</tbody>
</table>

### Measurements

Demographic characteristics, including age, gender, educational level, marital status, religious belief, presence of chronic disease, and psychiatric medication use, were collected. In addition, any changes in dosage of the psychotropic prescription over the course of the study period were recorded.

The CCMAI was used to identify the level of agitation over the past 2 weeks. Participants were rated using 29 items related to a 7-point frequency scale, ranging from 1 = never to 7 = several times per hour. Internal reliability of the CMAI in long-term care facilities has been reported to be 0.82 (Cohen-Mansfield, Marx, & Rosenthal, 1989) with the Chinese version to be 0.7 (Lin, Kao, et al., 2007). Content validity was reported to be 0.99 by Lin, Kao, et al. (2007). Caregivers
were asked to rate the change in agitation following aromatherapy massage within 24 hours using the 24-hour CCMAI. The researchers modified the scoring of the 24-hour CCMAI to 1 = decrease, 2 = constancy, and 3 = increase.

The CSDD-C was used to measure signs and symptoms of depression in participants over the past 2 weeks using 19 items and five subscales: (a) mood-related signs, (b) behavioral disturbances, (c) physical signs, (d) cyclic functions, and (e) ideational disturbances. The internal reliability of the scale was 0.82, with content validity reported as 0.92 (Lin & Wang, 2008). Each item was measured on a 3-point scale, where 0 = absent, 1 = mild or intermittent, and 2 = severe.

After training with competency evaluation, the outcome measures were completed by the patient's day-shift nurse or supervisor of nursing aides.

**Data Analysis**

SPSS17 was used for descriptive analysis. A general linear model repeated measurement analysis was used to determine the differences in outcome measures at three measurement times. Chi-square test was used to analyze changes of timely effects of aromatherapy massage in preferences of each item of the 24-hour CCMAI between the intervention and control groups.

**Results**

**Demographic Characteristics**

A total of 61 individuals with dementia residing in five long-term care facilities were recruited. Two participants were hospitalized before data collection. The remaining 59 individuals were randomly assigned into control (n = 30) or intervention (n = 29) groups. Participants were mostly female (n = 36, 61%), ranging in age from 64 to 102 (mean age = 92, SD = 7 years). Mean MMSE score was 8.65 (SD = 6.7; range = 0 to 19), and mean SPMSQ score was 3.23 (SD = 2.7; range = 0 to 8). No significant differences in the degree of dementia or demographic characteristics were found between groups (Table 2). Forty-one (69.5%) participants were receiving psychotropic medication; however, no difference in psychotropic medication use was found between groups.
Two participants in the intervention group withdrew due to discomfort after the first aromatherapy massage session. One participant in the control group was discharged home in Week 6. Fifty-six participants (control, \( n = 29 \); intervention, \( n = 27 \)) completed the Week 9 assessment (Figure). No adverse effect was reported by either staff or patients during the intervention period. No differences regarding demographic characteristics were found between participants who completed the 9-week study and those who did not complete the study. Therefore, 56 individuals with dementia completed the 8-week trial. Using a repeated measures design, measurements were made at Weeks 2, 5, and 9 to test the effect of aromatherapy massage (93.1% power, \( p < 0.05 \)).
Outcome Measures of the Control and Intervention Groups Over Time

Agitative Behaviors. No significant difference was noted between groups regarding overall agitation (Table 3). However, the frequency of overall agitation decreased from Week 1 to Week 5 for the intervention group compared to the control group, but no additional change was noted at Week 9. Significant changes were demonstrated in four specific agitative behaviors: grabbing onto people or things inappropriately ($F = 6.51$, $p = 0.01$) and eating or drinking inappropriate substances ($F = 3.99$, $p = 0.048$) decreased, whereas making strange noises ($F = 4.19$, $p = 0.031$) and negativism ($F = 4.02$, $p = 0.031$) increased.
Depressive Mood. Depressive symptoms decreased significantly over time for the intervention group compared to the control group (Table 3). Regarding the five subscales on the CSDD-C, results showed mood-related signs ($F = 7.05, p = 0.001$), behavioral disturbances ($F = 12.3, p < 0.001$), physical signs ($F = 14.27, p < 0.001$), and cyclic functions ($F = 6.47, p = 0.002$) improved significantly, but no significant change was found for ideational disturbances ($F = 0.98, p = 0.375$). Therefore, four of the five subscales on the CSDD-C showed decreases in the intervention group.

Timely Effect of Aromatherapy. Regarding the timely effect of aromatherapy massage, participants were assessed using the 24-hour CCMAI on the day after aromatherapy massage in Weeks 2, 5, and 9 (Table 4). On the day after aromatherapy massage in Week 2, the number of agitative behaviors in the control group increased significantly compared to the intervention
group ($t = 2.36, p = 0.025$). In Weeks 5 and 9, the number of agitative behaviors in the intervention group decreased significantly compared to the control group ($t = -3.61, p = 0.001; t = -3.46, p = 0.002$, respectively). However, in Week 9, the number of agitative behaviors in the intervention group remained constant compared to the control group ($t = 2.42, p = 0.021$). After the intervention, the following changes in specific behaviors were demonstrated: *constant unwarranted request for attention or help* ($\chi^2 = 5.99, p = 0.05$), *repetitive sentences or questions* ($\chi^2 = 7.9, p = 0.019$), *cursing or verbal aggression* ($\chi^2 = 8.27, p = 0.016$), *scratching* ($\chi^2 = 7.12, p = 0.028$), and *general restlessness* ($\chi^2 = 7.52, p = 0.023$) decreased significantly in the intervention group in Week 5. However, only *repetitive sentences or questions* ($\chi^2 = 6.02, p = 0.049$) decreased significantly in the intervention group in Week 9.

The results of the current study showed that the occurrence of overall agitated behaviors decreased significantly in Week 5 compared to Week 1, but then remained unchanged in Week 9 (i.e., there was no significant improvement over time). Regarding the time-based effects, the number of agitated behaviors decreased after aromatherapy massage in the intervention group compared to the control group. In addition, the overall instances of depressive symptoms decreased significantly over time for the intervention group compared to the control group. The perceived benefit of aromatherapy massage was partially supported by a previous study (Smallwood et al., 2001), but the current larger sample provides more powerful evidence to support the effects of aromatherapy massage on managing agitated behaviors in individuals with dementia. However, the current study's findings are inconsistent with those of Burns et al. (2011); these differences may be attributed to different essential oil use, approaches, and dosages of

### TABLE 4

<table>
<thead>
<tr>
<th>Measurement Time Period</th>
<th>Control Group</th>
<th>Intervention Group</th>
<th>$t$ Test</th>
<th>$p$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 2</td>
<td>$n = 30$</td>
<td>$n = 29$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease</td>
<td>0.37 (1.1)</td>
<td>0.62 (1.15)</td>
<td>-0.87</td>
<td>0.388</td>
</tr>
<tr>
<td>Constant</td>
<td>27.93 (1.82)</td>
<td>28.38 (1.15)</td>
<td>-1.13</td>
<td>0.264</td>
</tr>
<tr>
<td>Increase</td>
<td>0.7 (1.62)</td>
<td>0 (0)</td>
<td>2.36</td>
<td>0.025*</td>
</tr>
<tr>
<td>Week 5</td>
<td>$n = 30$</td>
<td>$n = 27$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease</td>
<td>0.77 (0.25)</td>
<td>1.89 (2.61)</td>
<td>-3.61</td>
<td>0.001*</td>
</tr>
<tr>
<td>Constant</td>
<td>28.2 (1.52)</td>
<td>26.52 (4.48)</td>
<td>1.86</td>
<td>0.073</td>
</tr>
<tr>
<td>Increase</td>
<td>0.76 (1.55)</td>
<td>0.70 (2.51)</td>
<td>0.01</td>
<td>0.921</td>
</tr>
<tr>
<td>Week 9</td>
<td>$n = 29$</td>
<td>$n = 27$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease</td>
<td>0 (0)</td>
<td>1.52 (2.28)</td>
<td>-3.46</td>
<td>0.002*</td>
</tr>
<tr>
<td>Constant</td>
<td>28.48 (1.09)</td>
<td>27.33 (2.24)</td>
<td>2.42</td>
<td>0.021*</td>
</tr>
<tr>
<td>Increase</td>
<td>0.52 (1.09)</td>
<td>0.15 (0.53)</td>
<td>1.63</td>
<td>0.111</td>
</tr>
</tbody>
</table>

*p < 0.05.

### Table 4:
Changes in Agitation After Aromatherapy Massage According to the Chinese Version of the 24-Hour Cohen-Mansfield Agitation Inventory
aromatherapy massage. In sum, the randomized controlled trial design in the current study compensated for the limitations of previous studies and provided robust scientific evidence on the effectiveness of aromatherapy massage.

Regarding specific agitated behaviors, the results showed that the occurrence of *grabbing onto people or things inappropriately* and *eating or drinking inappropriate substances* decreased, whereas *making strange noises* and *negativism* increased over time. Although these current findings cannot be compared with previous studies, they are reasonable because the agitated behaviors of individuals with dementia fluctuate over time due to unmet personal and environmental needs (Algase et al., 1996).

Regarding time, the results showed the occurrence of *constant unwarranted request for attention or help, repetitive sentences or questions, cursing or verbal aggression, scratching, and general restlessness* decreased within 24 hours after aromatherapy massage. Although more decreases in agitated behaviors were found in the intervention group in the current study, the fluctuating results with regard to specific agitated behaviors for individuals with dementia can be attributed to a variety of personal and environmental factors. For example, the small room size and lack of a ventilation system during high temperatures in the summer at some long-term care facilities may have motivated some agitated behaviors. In addition, such agitated behaviors often occur because patients' needs are not met appropriately. According to Cerejeira, Lagarto, and Mukaetova-Ladinska (2012), unmet needs are commonly associated with *irritability*, a pervasive feeling of unease in response to a sense of threat or actions, which can be expressed as rapid emotional shifts, within seconds or minutes, due to hunger, sleepiness, pain, or other variables.

The current findings show significant decreases in overall depressive symptoms occurred over time in the intervention group, consistent with the results of the study by Lin, Chan, Ng, and Lam (2007) in which an aroma diffuser was used for at least 1 hour during nightly sleep of individuals with dementia. However, the findings are inconsistent with other studies—one that used Melissa oil massage on individuals with dementia (Burns et al., 2011) and one that used carrier oil massage in Korean older women (Rho et al., 2006), both of which found that aromatherapy massage could alleviate anxiety but not depression. These inconsistent findings may be due to the differences in the carrier oil used, procedure, and dosage.

Previous studies examining the effectiveness of aromatherapy using lavender oil demonstrated inconsistent findings. O'Connor et al. (2013) found that pure lavender oil had no discernible impact on affect and behavior in individuals with dementia residing in nursing homes. However, Lin, Chan, et al. (2007) found lavender to be an effective essential oil to alleviate agitation in Chinese individuals with dementia. Although direct support as to whether the current study's
effects were from the lavender oil or massage remains unknown, it may be inferred from the results that using aromatherapy with cutaneous massage may be an effective treatment for individuals with dementia.

**Limitations**

There were some limitations to the current study. First, it is difficult to distinguish the effects due to aromatherapy and massage. Second, observations were based on a total period of 2 weeks, but the agitated behaviors of individuals with dementia fluctuate over time, and thus the observers may have missed certain behaviors. Third, aromatherapy massage was only performed once per week for 8 continuous weeks, and this intervention dosage may not be adequate. Thus, comparisons of the three group designs (i.e., aromatherapy, massage, and control) of aromatherapy massage with different dosages of intervention are options for future research.

**Implications for Clinical Practice**

The findings of the current study can be referenced by health care providers in long-term care facilities working to plan more effective interventions to alleviate agitation and depressive moods of individuals with dementia. Aromatherapy massage can be applied quickly to alleviate agitated behavior and planned as a regular activity to improve depressive moods in these individuals.

**Conclusion**

The effectiveness of nonpharmacological approaches to BPSD has been raised in support of developing more multidisciplinary teams to manage individuals with dementia; however, the effects of aromatherapy massage remain inconclusive in the literature. Long-term care facilities lack the ability and time to manage all instances of agitation and depressive moods of individuals with dementia. Thus, it is necessary to plan effective interventions to help health care providers address the issues they face in this regard.

**References**

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