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## Effect of lavender aromatherapy on agitation in patients with dementia at Dementia Clinic, King Chulalongkorn Memorial Hospital: Pilot study

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**Srirojnopkukun K, Tangwongchai S. Effect of lavender aromatherapy on agitation in patients with dementia at Dementia Clinic, King Chulalongkorn Memorial Hospital: Pilot study. Chula Med J 2013 May – Jun; 57(3): 333 - 44**

**Objective** : *To assess the efficacy of aromatherapy as an intervention for agitated behaviors in patients with dementia at the Dementia Clinic, King Chulalongkorn Memorial Hospital.*

**Method** : *This was a randomized controlled trial which recruited 24 patients with dementia at the Dementia Clinic, King Chulalongkorn Memorial Hospital. The intervention was undertaken at the patient's home by major caregivers. The sample was randomly divided into two groups: the experimental group, 12 patients with a mean age of 80.83 years (SD: 5.31), received aromatherapy with lavender oil for 1 hour every day for 2 weeks; and the control group, 12 patients with a mean age of 80.75 years (SD: 6.84), received jojoba oil for 1 hour every day for 2 weeks. The agitated behaviors were assessed by using the Cohen-Mansfield Agitation Inventory (CMAI), pre and post intervention. Statistic analyses were conducted using Chi-square, Mann-Whitney U-test, the Wilcoxon signed-rank test and ANCOVA to compare the characteristics and primary outcomes of the study.*

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**Result** : *The baseline CMAI score was significantly lower in the control than the experimental group. At the end of the study, 3 subjects from the control group and 1 subject from the experimental group dropped out from the study. After adjusting for the baseline CMAI score by ANCOVA, the CMAI scores had significantly decreased in the aromatherapy group with lavender oil than the jojoba oil group ( $p < 0.05$ ) in ITT (LOCF).*

**Conclusion** : *The home-based aromatherapy with lavender oil was effective in reducing the agitation in patients with dementia. Nevertheless, this was a pilot study with a small sample size. Further studies are recommended using more subjects and longer periods of intervention.*

**Keywords** : *Dementia, aromatherapy, agitation, King Chulalongkorn Memorial Hospital.*

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กนกอร ศรีโรจน์นพคุณ, สุขเจริญ ตั้งวงษ์ไชย. โครงการนำร่องผลการทำสวนบำบัดโดยใช้  
น้ำมันหอมระเหยกลิ่นลาเวนเดอร์ต่อพฤติกรรมกระสับกระส่ายในผู้ป่วยโรคสมองเสื่อม ณ  
คลินิกโรคสมองเสื่อมโรงพยาบาลจุฬาลงกรณ์. จุฬาลงกรณ์เวชสาร 2556 พ.ศ. - มิ.ย.; 57(3):  
333 - 44

**วัตถุประสงค์** : เพื่อศึกษาผลของการเปลี่ยนแปลงของอาการกระสับกระส่ายโดยการบำบัด  
ด้วยสวนบำบัด ในคลินิกโรคสมองเสื่อมโรงพยาบาลจุฬาลงกรณ์

**วิธีการการศึกษา** : การศึกษาเก็บรวบรวมข้อมูลจากผู้ป่วยโรคสมองเสื่อมจำนวน 24 คนที่มา  
เข้ารับการรักษาที่คลินิกโรคสมองเสื่อม ชั้น 12 ภาควิชา จิตเวช ตึก ภปร  
โรงพยาบาลจุฬาลงกรณ์ โดยมีผู้ดูแลหลักเป็นผู้ทำการบำบัดด้วยน้ำมัน  
หอมระเหยที่บ้านพักของผู้เข้าร่วมการวิจัย กลุ่มตัวอย่างจะได้รับการสุ่ม  
จับแยกกลุ่มออกเป็นกลุ่มการทดลองและกลุ่มควบคุม กลุ่มทดลองมีผู้เข้าร่วม  
จำนวน 12 คน มีค่าเฉลี่ยของอายุอยู่ที่ 80.83 ปี(SD: 5.31) จะได้รับน้ำมัน  
หอมระเหยกลิ่นลาเวนเดอร์เป็นเวลา 1 ชั่วโมงทุกวัน เป็นเวลาทั้งหมด 2 สัปดาห์  
และกลุ่มควบคุมมีผู้เข้าร่วมจำนวน 12 คน มีค่าเฉลี่ยของอายุอยู่ที่ 80.75 ปี  
(SD: 6.84) จะได้รับน้ำมันโจโจบา อย เป็นเวลา 1 ชั่วโมงทุกวัน เป็นเวลา  
ทั้งหมด 2 สัปดาห์ งานศึกษานี้ใช้แบบทดสอบ Cohen-Mansfield Agitation  
Inventory (CMAI) ในการประเมินอาการกระสับกระส่ายในผู้ป่วย  
โรคสมองเสื่อมทั้งก่อนทำการทดลองและหลังทำการทดลอง ข้อมูลที่บันทึก  
ได้นำมาวิเคราะห์ทางสถิติด้วยchi-square Mann-Whitney U-test  
Wilcoxon signed-rank test และ ANCOVA ในการเปรียบเทียบลักษณะ  
พื้นฐานและผลของการศึกษาระหว่างสองกลุ่มการทดลอง

**ผลการศึกษา** : ค่าคะแนนเฉลี่ย CMAI ก่อนการทดลองของกลุ่มควบคุมมีค่าคะแนนที่ต่ำกว่า  
กลุ่มทดลองอย่างมีนัยสำคัญทางสถิติมีผู้เข้าร่วมการวิจัยจำนวน 3 คนในกลุ่ม  
ควบคุม และ 1 คนในกลุ่มทดลองออกจากการวิจัยก่อนจบการวิจัย หลังจาก  
ปรับค่าคะแนนCMAIก่อนการทดลองโดยใช้สถิติ ANCOVA แล้วพบว่ากลุ่ม  
ทดลองบำบัดด้วยสวนบำบัดกลิ่นลาเวนเดอร์มีค่าคะแนน CMAI เฉลี่ย  
ลดลงมากกว่ากลุ่มควบคุมที่บำบัดด้วยสวนบำบัด jojoba oil อย่างมีนัย  
สำคัญทางสถิติ ( $p < 0.05$ ) โดยการวิเคราะห์แบบ ITT (LOCF)

**สรุป** : การบำบัดโดยใช้น้ำมันหอมระเหยกลิ่นลาเวนเดอร์ที่פקอาศัยของผู้ป่วยสามารถลดภาวะกระสับกระส่ายในผู้ป่วยโรคสมองเสื่อมได้ แต่อย่างไรก็ตาม การศึกษาครั้งนี้เป็นเพียงแค่การศึกษานำร่องที่มีกลุ่มตัวอย่างจำนวนน้อย เพราะฉะนั้นการศึกษาในอนาคตจึงควรศึกษาด้วยกลุ่มตัวอย่างที่มีจำนวนมากขึ้นและระยะเวลาที่นานยิ่งขึ้น

**คำสำคัญ** : โรคสมองเสื่อม, สิวคนธบำบัด, อาการกระสับกระส่าย, โรงพยาบาลจุฬาลงกรณ์.

Dementia is a chronic disease which is increasing throughout the world. More than 35 million people worldwide have been diagnosed with dementia, and there is an increasing rate of about 4.6 million people per year. In Thailand, 229,000 of the elderly are diagnosed with symptoms leading to dementia. Within the following 20 years, the number of patients will double and increase to approximately about 450,000 people, and within 50 years there is a possibility that the number will increase to more than a million.<sup>(1)</sup> People with dementia have impaired cognitive abilities including memory, language, attention and problem solving.<sup>(2)</sup> This impairment cannot be cured and it will have an effect on the patient activity of daily living (ADL) which perpetuates the patient's quality of life and causes stress in caregivers.

The behavioral and psychological symptoms of dementia (BPSD) are common along the course of the illness and may have an effect on the patient's lifestyle and caregiver's burden, specifically agitation and emotional inconsistency exhibited by the patient. Up to 88 percent of dementia patients are reported to experience some BPSD. One of the most common BPSD is agitation. Sixty percent of dementia patients experience<sup>(3)</sup> restlessness, screaming, irritable moods, aggression and agitation. Agitation that is triggered from external stimuli can sometime cause depression to the patients and caregivers, and this can lead to irritable moods which can result in confrontations.<sup>(4)</sup> Agitation behavior usually occurs at noon and in the evening due to the environmental change shifting around the patient. The level of severity in agitation can be from normal to a dangerous level. Agitation along with mood

inconsistencies can bring harm to others or even the patient themselves. For example, inappropriate behaviors like throwing objects, speaking foul language or even screaming.<sup>(4 - 6)</sup> Therefore mood inconsistencies has become one of the main problems a caregiver is faced with.

Currently, aromatherapy has been receiving widespread attention throughout the world in the management of chronic pain depression, anxiety, as well as cognitive, sleep and stress-related disorders.<sup>(7)</sup> From previous studies involving with aromatherapy, the studies were not focusing only on emotion or cognitive area but also in behaviors. There are few evidences of clinical experiment using aromatherapy to decrease agitation in people with dementia.<sup>(8,9)</sup> The use of essential oils extracted from plants can help relief nervous tension, anxiety, insomnia that causes agitation in the patient.

The aim of this study was to assess the efficacy of aromatherapy as an intervention for agitated behaviors in patients with dementia. Lavender essential oil had been chosen as an intervention in this study due to its capacity for improving mental conditions and mood states. The researcher presumed that aromatherapy with lavender essential oil would result in the improvement in agitation compared to placebo intervention with jojoba oil.

## Method

### Subjects

The study recruited 24 male or female patients with dementia from the Dementia Clinic, King Chulalongkorn Memorial Hospital. All participants met the following criteria: diagnose with Alzheimer's

disease (AD), vascular dementia or AD with CVD: having CMAI score and TMSE score greater than 24, willing to participate in the study and having a caregiver to administer the aromatherapy at home. Finally, all caregivers and participants were able to speak and understand Thai language. All participants were randomly assigned to experimental group (n = 12) and control group (n = 12) by simple random sampling technique. Written informed consent form was obtained before participation by authorized relatives and/or major caregivers in the study.

The study protocol has been approved by the Ethics Committees of the Faculty of Medicine, Chulalongkorn University.

### **Procedures**

The author assessed all participants and caregivers for their demographic data, clinical diagnosis and the severity of agitation by using Cohen-Mansfield Agitation Inventory (CMAI).<sup>(10)</sup> Thai Mental State Examination (TMSE) was administered to assess the level of cognitive impairment. All interventions were administered by major caregivers in the evening between 18.00 and 19.00 hour and conducted in an air-conditioned room. The caregivers received an aromatherapy lamp with an instruction on the therapy session directly from the researcher. The experimental group received aromatherapy with lavender and the control group received placebo intervention of jojoba oil. The subjects of both groups received daily aromatherapy for 2 weeks with a total of 14 times. Agitated behaviors were assessed by using Cohen-Mansfield Agitation Inventory (CMAI) long-form Thai version both before and after the

therapy session. During the intervention, the author contacted the caregivers by telephone calls to verify and ensure that the caregivers continuously gave aromatherapy to the participants as instructed. Lavender essential oil was used because of its beneficial in a variety of condition in medical uses to decrease agitation, anxiety and stress.<sup>(11)</sup> Jojoba oil was used in this intervention as placebo because it has a very light scent and has no aroma therapeutic effect.<sup>(12)</sup>

### **Statistical Analysis**

Statistical analyses were performed using SPSS 17.0 statistics software. The data included gender, age, marital status, occupation, education, and type of dementia, caregiver and the duration of the chronic disease the patient had been suffering from. The primary outcome was the mean change from the baseline of CMAI score in both groups. Descriptive analyses were performed for percentage, means and standard deviation. The data were analyzed using Chi-square and Mann-Whitney U-test to compare the baseline characteristics and CMAI between the two groups. The Wilcoxon signed-rank test and ANCOVA were performed to analyze for the mean change from baseline of CMAI before and after the intervention.

### **Result**

This study consisted of 24 patients with dementia: 3 males and 21 females. The mean age in the experimental group and the control group were 80.03 (SD = 5.31) and 80.75 (SD = 6.84) years old, respectively. From the randomized participants, 4 did not complete the study. In the experimental group,

there were 11 of 12 patients who completed the study while 1 withdrew due to loss of contact with the caregiver, and 9 of 12 patients from the control group completed the study while 4 withdrew from the study due to loss of efficacy, as the caregivers stated that the intervention cause more agitation and loss of contact with the caregiver. The demographics and characteristics of the subjects are show in Table 1. There were no significant differences between the two groups in their demographics and baseline characteristics.

Table 2 reveals the effect of aromatherapy between the experimental group that received lavender essential oil and the control group that received jojoba oil (placebo). After 2 weeks of intervention, there was a statistically significant improvement in CMAI ( $p < 0.05$ ) in the experimental group than the control. The comparison of this intervention was based on the intention to treat analysis. Missing data of this study was based on the last observation carried forward (LOCF).

**Table 1.** Demographic characteristics of the study population from dementia clinic, King Chulalongkorn Memorial Hospital.

Factor	Experiment group (n = 12)	Control group (n = 12)	P value
Age (yrs) <sup>1</sup> Mean ± SD	80.83 ± 5.31	80.75 ± 6.84	0.407
Education <sup>2</sup>			
Diploma-Bachelor degree	3 (25.0%)	1 (8.3%)	0.602
Junior high–High school	2 (16.7%)	2 (16.7%)	
Primary school – None	7 (58.3%)	9 (75.0%)	
Married <sup>2</sup>	4 (33.3%)	2 (16.7%)	0.405
Occupational <sup>2</sup>			0.132
Government officers	4 (33.3%)	1 (8.3%)	
Others and none	8 (66.7%)	11 (91.7%)	
Caregiver <sup>2</sup>			.368
Son/Daughter	11 (91.7%)	10 (83.3%)	
Couple/Partner	1 (8.3%)	0 (0%)	
Others	0 (0%)	2 (16.7%)	
Family history of Dementia <sup>2</sup>	3 (25.0%)	1 (8.3%)	.273
Diagnosis <sup>2</sup>			0.160
Alzheimer's disease	10 (83.3%)	6 (50.0%)	
Vascular Dementia	1 (8.3%)	5 (41.7%)	
Ad with CVD	1 (8.3%)	1 (8.3%)	
Illness duration (yrs) <sup>1</sup> Mean ± SD	4.33 ± 2.498	3.92 ± 1.782	0.136
TMSE <sup>1</sup> (Mean ± SD, min, max)	14.67 ± 6.243 (3,22)	18.33 ± 3.892 (10,22)	0.145

Values are expressed as <sup>1</sup>mean ± standard deviation; <sup>2</sup>number (percentage). *P* values are based on Chi-square and Mann-Whitney U-test

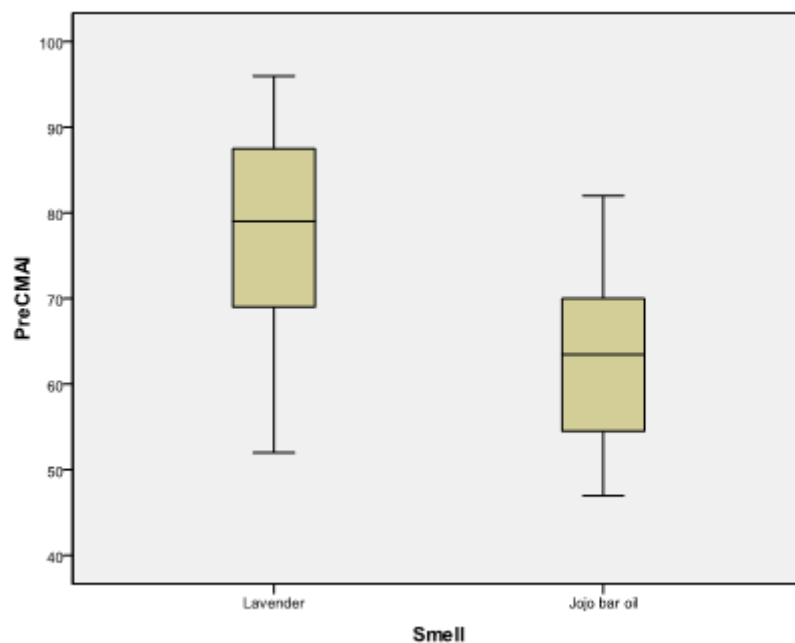


**Table 2.** The comparison of Agitation behavior between pretest and posttest treatment with Lavender Aromatherapy and jojoba oil in experiment group and control group based on the intention-to treat analysis (LOCF).

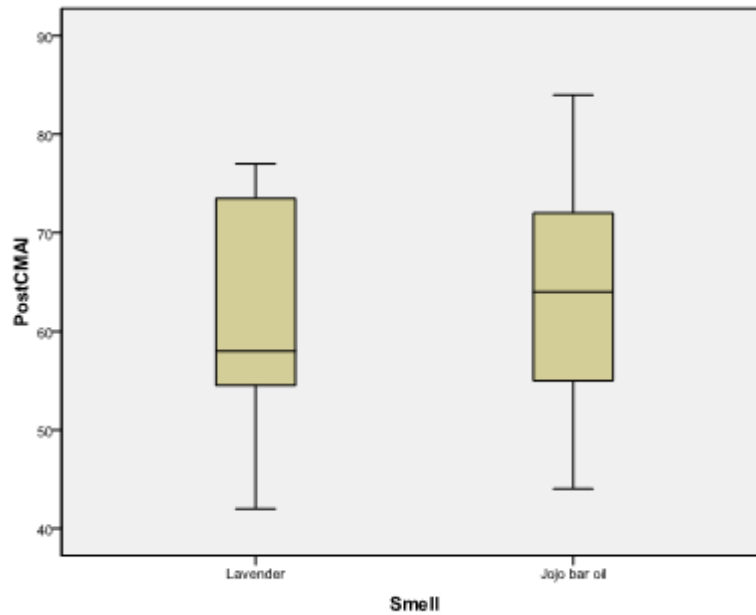
Factor	Experimental group (n = 12) (mean ± SD)		Control group (n = 12) (mean ± SD)		P value
	Pretest	Posttest	Pretest	Posttest	
Agitation	77.33 ± 13.6	61.58 ± 12.15	63.08 ± 10.42	63.42 ± 12.58	0.014*
Physical aggressive	17.91 ± 6.09	13.36 ± 4.48	14.33 ± 3.71	14.22 ± 4.15	0.034
Physical non aggressive	33.45 ± 8.02	26.91 ± 7.45	28.89 ± 8.04	27.33 ± 7.28	0.008
Verbal aggressive	9.55 ± 2.88	6.91 ± 2.84	9.22 ± 2.44	8.44 ± 2.51	0.004
Verbal non- aggressive	16.45 ± 4.11	13.00 ± 2.97	11.22 ± 2.11	11.89 ± 4.25	0.088

Values are expressed as mean ± standard deviation. P values are based on The Wilcoxon signed-rank test and ANCOVA signed-rank test (P <0.05)

Change in Cohen-Mansfield Agitation Inventory (CMAI) of subjects in pretest and posttest of the experimental group and the control group from baseline score is shown in Figure 1 and Figure 2.



**Figure 1.** Cohen-Mansfield Agitation Inventory (CMAI) total score from baseline in each group based on the intention-to treat analysis (LOCF).



**Figure 2.** Change in Cohen-Mansfield Agitation Inventory (CMAI) total score from baseline in each group based on the intention-to treat analysis (LOCF).

## Discussion

This study was conducted to observe the effectiveness of aromatherapy in reducing agitated behaviors in dementia patients. All subjects had their agitation behavior measured by Cohen-Mansfield Agitation Inventory (CMAI) before and after they received the intervention. The subjects in the experimental group with lavender aromatherapy showed a greater reduction of agitated behavior after they had received 2 weeks of aromatherapy compared to the subjects in the control group that received jojoba oil. The efficacy of lavender essential oil in the control group showed more improvement in agitation compared to the improvement in the jojoba oil group which conforms to the study completed by Holmes (2002)<sup>(13)</sup> which found that after the patient with severe dementia inhaled lavender aromatherapy, 60% of them showed signs of improvement and only one patient showed

no sign of improvement. In addition, similar results have also been found in other studies from the latter research undertaken by Ballard (2004)<sup>(14)</sup> which used aromatherapy with the purpose to reduce the BPSD and found that aromatherapy with lemon balm essential oil significantly increased in the CMAI score in the experimental group. Lin (2007)<sup>(15)</sup> also found that aromatherapy with lavender essential oil can reduce agitation in dementia patients. Jimbo (2009)<sup>(16)</sup> suggested that after 28 days of aromatherapy of rosemary essential oil and lemon essential oil in the morning and lavender essential oil and orange essential oil in the evening, patients with Alzheimer's disease showed signs of improvement in their cognitive function which is related in personal orientation. There is a study which found that aromatherapy had no effect on agitation in dementia patients. Snow (2004) suggested that there were no differences between participants in the study with

lavender essential oil compared to thyme oil and unscented grape seed oil with the same intervention where an absorbent fabric sachet was pinned near the collarbone of each participant's shirt.

The previous studies on aromatherapy indicated that aromatherapy can be used as a complementary treatment. Clive Holmes and Clive Ballard (2004) studied the mechanisms of aromatherapy in dementia; the study showed that the goal of its treatment was to affect psychological and biological aspects. The psychological aspects are dependent on individual's perception of the pleasantness of a smell and individual's past involved with the smell. Biological aspects are associated with neurochemical effects. The olfactory response to the essential oil is immediate and linked directly to the brain. The limbic system is influenced by indicators from the olfactory nerves and stimulates the relaxing effect from the inhalation of essential oils. Essential oil can also be applied directly to the skin which leads to absorption of the essential oil into the bloodstream and also directly links to the brain.<sup>(17 - 19)</sup>

In Thailand, this study was conducted for the first time as a pilot study which used aromatherapy with lavender essential oil in order to decrease agitation and evaluated agitation behavior. The result shows that lavender oil has an effect on agitated behavior. It may be useful for caregivers to use aromatherapy as a complementary treatment for dementia patients along with standard care received in hospitals. In addition, it may be useful for other studies to research more about aromatherapy effects with different essential oils or herbs.

To minimize the error in this experiment, the author followed up the entire cohort of participants

by calling their caregivers to check up and remind them of the intervention every other day both in the experimental group and the control group. Those with jojoba oil received the same intervention as the lavender group. This study was limited by so many reasons. First of all, the sample size was small and with a short period of intervention. Secondly, the therapy session within two weeks depended on the caregivers' responsibility. If any subject failed to follow the treatment routine for more than 4 days, they would be excluded from the study and the author could not control the other activities provided by the caregivers. Finally, during the whole session of this study, the participants also received the standard treatment from hospital including medicine and another activity. This study has shown that medicine had no effect on the intervention which was given to the participants had no impact on the agitated states experienced by the participants. However, the result need to be examined more clearly to prove and ensure that medicine and others activities had no effect on this intervention in order to improvement in agitated behaviors.

As for future studies, the participants should be tested for more than their ability to smell in order to confirm the efficacy of aromatherapy and it should be tested with a larger sample size, other essential oils and longer periods of intervention in the future.

## Conclusion

In summary, this study found that after two weeks of lavender aromatherapy, dementia patients showed signs of decreasing agitated behaviors measured with CMAI. The evidence suggests that aromatherapy with lavender oil, as a

nonpharmacologic intervention, may be beneficial in the treatment of agitated behaviors in patients with dementia.

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