



Essential Oil Studies For Cognition

Lemon balm and cognitive function

Lemon balm stimulates acetylcholine receptors

Recent studies indicate that lemon balm stimulates the brain's acetylcholine receptors. Acetylcholine (ACh) is the primary neurotransmitter involved in brain activity related to cognitive functions, and deficits in ACh levels and activity are among the primary neurological factors in the development of Alzheimer's disease. Lemon balm's stimulation of ACh receptors might make it useful in the treatment of Alzheimer's, especially in conjunction with its well known use as a mild sedative, which could be beneficial in helping to alleviate the nervous agitation often associated with severe dementia. The antioxidant properties of lemon balm suggest that it may also provide some protection against the free radical damage that is believed to be a causative factor in Alzheimer's.

[Evid Based Complement Alternat Med](#). 2016; 2016: 9729818.

Published online 2016 Apr 28. doi: [10.1155/2016/9729818](https://doi.org/10.1155/2016/9729818)

PMCID: PMC4864554

Influence of the *Melissa officinalis* Leaf Extract on Long-Term Memory in Scopolamine Animal Model with Assessment of Mechanism of Action

6. Conclusion

The subchronic administration of *MO* led to an improvement of long-term memory of rats; however the mechanisms of *MO* action are probably more complicated, since its role as a modulator of beta-secretase activity (due to inhibition of BACE1 mRNA expression in frontal cortex) should be taken into consideration.

It should be noted that we have studied a crude extract from leaf of *Melissa officinalis*, not a single pure chemical compound. This plant extract is a complex mixture, and its action may be a result of the summation of activities of several components (synergism/additive action of caffeic acid with salvianolic acids, rosmarinic acid, and others). In the case of extract from leaves of *Melissa officinalis*, it is possible that interactions occur between the 40 chemical compounds identified by HPLC system.

Taken together, it seems that the *MO* activity represents a possible option as complementary interventions to relieve the symptoms of mild dementia.

Neuroprotective properties of *Melissa officinalis* after hypoxic-ischemic injury both *in vitro* and *in vivo*

Conclusions

In conclusion, results implicate that *Melissa officinalis* has shown protective effect on ischemic damage mediated by the inhibition of HIF-1 α and oxidative stress, followed by the inhibition of apoptosis.

These results propose the potential use of *Melissa officinalis* or its constituents for central nervous system diseases and as a neuroprotective agent to prevent disorders involved with oxidative stress. Experiments are necessary to identify which of the plant components are responsible for these activities.

[Cell J.](#) 2011 Spring;13(1):25-30. Epub 2011 Apr 21.

Neuroprotective properties of melissa officinalis L. Extract against ecstasy-induced neurotoxicity.

[Hassanzadeh G¹](#), [Pasbakhsh P](#), [Akbari M](#), [Shokri S](#), [Ghahremani M](#), [Amin G](#), [Kashani I](#), [Azami Tameh A](#).

Abstract

OBJECTIVE:

The aim of the present study was to investigate the neuroprotective effects of *Melissa officinalis*, a major antioxidant plant, against neuron toxicity in hippocampal primary culture induced by 3,4-methylenedioxymethamphetamine (MDMA) or ecstasy, one of the most abused drugs, which causes neurotoxicity.

MATERIALS AND METHODS:

3-(4,5-dimethyl-2 thiazoyl)-2,5-diphenyl-tetrazolium bromide (MTT) assay was used to assess mitochondrial activity, reflecting cell survival. Caspase-3 activity assay and Hoechst / propidium iodide (PI) staining were done to show apoptotic cell death.

RESULTS:

A high dose of ecstasy caused profound mitochondrial dysfunction, around 40% less than the control value, and increased apoptotic neuronal death to around 35% more than the control value in hippocampal neuronal culture. Co-treatment with *Melissa officinalis* significantly reversed these damages to around 15% and 20% respectively of the MDMA alone group, and provided protection against MDMA-induced mitochondrial dysfunction and apoptosis in neurons.

CONCLUSION:

Melissa officinalis has revealed neuroprotective effects against apoptosis induced by MDMA in the primary neurons of hippocampal culture, which could be due to its free radical scavenging properties and monoamine oxidase (MAO) inhibitory effects.

[Curr Pharm Des.](#) 2006;12(35):4613-23.

The psychopharmacology of European herbs with cognition-enhancing properties.

[Kennedy DO¹](#), [Scholey AB](#).

Abstract

Extensive research suggests that a number of plant-derived chemicals and traditional Oriental herbal remedies possess cognition-enhancing properties. Widely used current treatments for dementia include extracts of *Ginkgo biloba* and several alkaloidal, and therefore toxic, plant-derived cholinergic agents. Several non-toxic, European herbal species have pan-cultural traditions as treatments for cognitive deficits, including those

associated with ageing. To date they have not received research interest commensurate with their potential utility. Particularly promising candidate species include sage (*Salvia lavandulaefolia/officinalis*), Lemon balm (*Melissa officinalis*) and rosemary (*Rosmarinus officinalis*). In the case of sage, extracts possess anti-oxidant, estrogenic, and anti-inflammatory properties, and specifically inhibit butyryl- and acetyl-cholinesterase. Acute administration has also been found to reliably improve mnemonic performance in healthy young and elderly cohorts, whilst a chronic regime has been shown to attenuate cognitive declines in sufferers from Alzheimer's disease. In the case of *Melissa officinalis*, extracts have, most notably, been shown to bind directly to both nicotinic and muscarinic receptors in human brain tissue. This property has been shown to vary with extraction method and strain. Robust anxiolytic effects have also been demonstrated following acute administration to healthy humans, with mnemonic enhancement restricted to an extract with high cholinergic binding properties. Chronic regimes of aromatherapy and essential oil respectively have also been shown to reduce agitation and attenuate cognitive declines in sufferers from dementia. Given the side effect profile of prescribed cholinesterase inhibitors, and a current lack of a well tolerated nicotinic receptor agonist, these herbal treatments may well provide effective and well-tolerated treatments for dementia, either alone, in combination, or as an adjunct to conventional treatments.

[Pharmacol Biochem Behav.](#) 2002 Jul;72(4):953-64.

Modulation of mood and cognitive performance following acute administration of *Melissa officinalis* (lemon balm).

[Kennedy DO¹](#), [Scholey AB](#), [Tildesley NT](#), [Perry EK](#), [Wesnes KA](#).

Abstract

Melissa officinalis (lemon balm) is a traditional herbal medicine, which enjoys contemporary usage as a mild sedative, spasmolytic and antibacterial agent. It has been suggested, in light of in vitro cholinergic binding properties, that *Melissa* extracts may effectively ameliorate the cognitive deficits associated with Alzheimer's disease. To date, no study has investigated the effects on cognition and mood of administration of *Melissa* to healthy humans. The present randomised, placebo-controlled, double-blind, balanced-crossover study investigated the acute effects on cognition and mood of a standardised extract of *M. officinalis*. Twenty healthy, young participants received single doses of 300, 600 and 900 mg of *M. officinalis* (Pharmaton) or a matching placebo at 7-day intervals. Cognitive performance was assessed using the Cognitive Drug Research (CDR) computerised test battery and two serial subtraction tasks immediately prior to dosing and at 1, 2.5, 4 and 6 h thereafter. In vitro IC(50) concentrations for the displacement of [3H]-(N)-nicotine and [3H]-(N)-scopolamine from nicotinic and muscarinic receptors in human occipital cortex tissue were also calculated. Results, utilising the cognitive factors previously derived from the CDR battery, included a sustained improvement in Accuracy of Attention following 600 mg of *Melissa* and time- and dose-specific reductions in both Secondary Memory and Working Memory factors. Self-rated "calmness," as assessed by Bond-Lader mood scales, was elevated at the earliest time points by the lowest dose, whilst "alertness" was significantly reduced at all time points following the highest dose. Both nicotinic and muscarinic binding were found to be low in comparison to the levels found in previous studies.

[Psychosom Med.](#) 2004 Jul-Aug;66(4):607-13.

Attenuation of laboratory-induced stress in humans after acute administration of *Melissa officinalis* (Lemon Balm).

[Kennedy DO](#)¹, [Little W](#), [Scholey AB](#).

Abstract

OBJECTIVE:

Melissa officinalis (lemon balm) is contemporaneously used as a mild sedative and/or calming agent. Although recent research has demonstrated modulation of mood in keeping with these roles, no studies to date have directly investigated the effects of this herbal medication on laboratory-induced psychological stress.

METHODS:

In this double-blind, placebo-controlled, randomized, balanced crossover experiment, 18 healthy volunteers received two separate single doses of a standardized *M. officinalis* extract (300 mg, 600 mg) and a placebo, on separate days separated by a 7-day washout period. Modulation of mood was assessed during predose and 1-hour postdose completions of a 20-minute version of the Defined Intensity Stressor Simulation (DISS) battery. Cognitive performance on the four concurrent tasks of the battery was also assessed.

RESULTS:

The results showed that the 600-mg dose of *Melissa* ameliorated the negative mood effects of the DISS, with significantly increased self-ratings of calmness and reduced self-ratings of alertness. In addition, a significant increase in the speed of mathematical processing, with no reduction in accuracy, was observed after ingestion of the 300-mg dose.

CONCLUSION:

These results suggest that the potential for *M. officinalis* to mitigate the effects of stress deserves further investigation.

[J Neurol Neurosurg Psychiatry](#). 2003 Jul; 74(7): 863–866.

doi: [10.1136/jnnp.74.7.863](https://doi.org/10.1136/jnnp.74.7.863)

PMCID: PMC1738567

***Melissa officinalis* extract in the treatment of patients with mild to moderate Alzheimer's disease: a double blind, randomised, placebo controlled trial**

[S Akhondzadeh](#), [M Noroozian](#), [M Mohammadi](#), [S Ohadinia](#), [A Jamshidi](#), and [M Khani](#)

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This article has been [cited by](#) systematic reviews in PubMed.

Abstract

Objective: To assess the efficacy and safety of *Melissa officinalis* extract using a fixed dose (60 drops/day) in patients with mild to moderate Alzheimer's disease.

Design: A four month, parallel group, placebo controlled trial undertaken in three centres in Tehran, Iran.

Methods: Patients with mild to moderate Alzheimer's disease aged between 65 and 80 years (n = 42; 18 women, 24 men) with a score of ≥ 12 on the cognitive subscale of Alzheimer's disease assessment scale (ADAS-cog) and ≤ 2 on the clinical dementia rating

(CDR) were randomised to placebo or fixed dose of *Melissa officinalis* extract. The main efficacy measures were the change in the ADAS-cog and CDR-SB scores compared with baseline. Side effects were systematically recorded.

Results: At four months, *Melissa officinalis* extract produced a significantly better outcome on cognitive function than placebo (ADAS-cog: $df = 1$, $F = 6.93$, $p = 0.01$; CDR: $df = 1$, $F = 16.87$, $p < 0.0001$). There were no significant differences in the two groups in terms of observed side effects except agitation, which was more common in the placebo group ($p = 0.03$).

Conclusions: *Melissa officinalis* extract is of value in the management of mild to moderate Alzheimer's disease and has a positive effect on agitation in such patients.

[J Neurol Neurosurg Psychiatry](#). 2003 Jul; 74(7): 863–866.

doi: [10.1136/jnnp.74.7.863](https://doi.org/10.1136/jnnp.74.7.863)

PMCID: PMC1738567

***Melissa officinalis* extract in the treatment of patients with mild to moderate Alzheimer's disease: a double blind, randomised, placebo controlled trial**

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Abstract

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Conclusions: *Melissa officinalis* extract is of value in the management of mild to moderate Alzheimer's disease and has a positive effect on agitation in such patients.

[J Clin Psychiatry](#). 2002 Jul;63(7):553-8.

Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia: the results of a double-blind, placebo-controlled trial with Melissa.

[Ballard CG](#)¹, [O'Brien JT](#), [Reichelt K](#), [Perry EK](#).

[Author information](#)

Abstract

BACKGROUND:

Behavioral and psychological symptoms in dementia are frequent and are a major management problem, especially for patients with severe cognitive impairment. Preliminary reports have indicated positive effects of aromatherapy using select essential oils, but there are no adequately powered placebo-controlled trials. We conducted a placebo-controlled trial to determine the value of aromatherapy with essential oil of *Melissa officinalis* (lemon balm) for agitation in people with severe dementia.

METHOD:

Seventy-two people residing in National Health Service (U.K.) care facilities who had clinically significant agitation in the context of severe dementia were randomly assigned to aromatherapy with *Melissa* essential oil (N = 36) or placebo (sunflower oil) (N = 36). The active treatment or placebo oil was combined with a base lotion and applied to patients' faces and arms twice a day by caregiving staff. Changes in clinically significant agitation (Cohen-Mansfield Agitation Inventory [CMAI]) and quality of life indices (percentage of time spent socially withdrawn and percentage of time engaged in constructive activities, measured with Dementia Care Mapping) were compared between the 2 groups over a 4-week period of treatment.

RESULTS:

Seventy-one patients completed the trial. No significant side effects were observed. Sixty percent (21/35) of the active treatment group and 14% (5/36) of the placebo-treated group experienced a 30% reduction of CMAI score, with an overall improvement in agitation (mean reduction in CMAI score) of 35% in patients receiving *Melissa* balm essential oil and 11% in those treated with placebo (Mann-Whitney U test; $Z = 4.1$, $p < .0001$). Quality of life indices also improved significantly more in people receiving essential balm oil (Mann-Whitney U test; percentage of time spent socially withdrawn: $Z = 2.6$, $p = .005$; percentage of time engaged in constructive activities: $Z = 3.5$, $p = .001$).

CONCLUSION:

The finding that aromatherapy with essential balm oil is a safe and effective treatment for clinically significant agitation in people with severe dementia, with additional benefits for key quality of life parameters, indicates the need for further controlled trials.

Rosemary and cognitive functions

[Evid Based Complement Alternat Med](#). 2016; 2016: 2680409.

Published online 2016 Jan 28. doi: [10.1155/2016/2680409](https://doi.org/10.1155/2016/2680409)

PMCID: PMC4749867

The Therapeutic Potential of Rosemary (*Rosmarinus officinalis*) Diterpenes for Alzheimer's Disease**4. General Summary and Conclusion**

The industrial scale exploitation of rosemary for food preservation and as natural antioxidant additives is attributed to its phenolic constituents. The predominant phenolic compounds that accounts for such effects as well as the various *in vitro* and *in vivo* pharmacological properties of the plant are the abietane type of diterpenes. Structurally, these groups of compounds are based on the steroidal-like terpenoid skeleton but have added pharmacophore of a phenolic structure. The rosemary diterpenoids of

pharmacological relevance are represented by (7) and (8) where the diorthohydroxyl/catecholic functional group is evident. Through these structural features, these compounds display a vast array of pharmacological effects ranging between antioxidant, metal chelation, and anti-inflammatory properties. These very mechanisms do also appear to be involved in the potential therapeutic effect of the compounds for AD. The further effect of rosemary diterpenes in A β formation, aggregation, and toxicity accounts for their additional benefit in tackling AD. Given that AD is a complex disease involving many pathological processes, treatment with multifunctional drugs like those demonstrated by rosemary diterpenes constitutes a viable therapeutic approach. The cascade of neurodegeneration process in AD has lots of similarities with other diseases like Parkinson's disease. Interestingly, some of the rosemary diterpenes such as carnosic acid (7) have been shown to have beneficial effect in Parkinson's disease model [178, 179]. It is also worth noting that only (7) and (8) have been extensively investigated for their possible therapeutic effect related to AD. Other interesting diterpenes including the glycosidic forms could have different bioavailability and therapeutic profile. Further research in this field will therefore provide more evidence on the therapeutic potential of rosemary diterpenes. All the available data to date however suggest that their effect on AD is very promising and further research including clinical trials is well warranted.

[Sci Pharm](#). 2013 Apr-Jun; 81(2): 531–542.

Published online 2012 Dec 23. doi: [10.3797/scipharm.1209-05](https://doi.org/10.3797/scipharm.1209-05)

PMCID: PMC3700080

Effects of Inhaled Rosemary Oil on Subjective Feelings and Activities of the Nervous System

[Winai Sayorwan](#),¹ [Nijsiri Ruangrungsi](#),¹ [Teerut Piriyaunporn](#),² [Tapanee Hongratanaworakit](#),³ [Naiphinich Kotchabhakdi](#),^{2,4} and [Vorasith Siripornpanich](#)^{*,4}
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Abstract

Rosemary oil is one of the more famous essential oils widely used in aroma-therapy. However, the effects of rosemary oil on the human body, in particular the nervous system, have not been sufficiently studied. This study investigates the effects of the inhalation of rosemary oil on test subjects' feelings, as well as its effects on various physiological parameters of the nervous system. Twenty healthy volunteers participated in the experiment. All subjects underwent autonomic nervous system (ANS) recording. This consisted of measurements of skin temperature; heart rate; respiratory rate; blood pressure; evaluations of the subjects' mood states; and electroencephalography (EEG) recordings in the pre-, during treatment, and post-rosemary inhalation periods as compared with control conditions. Our results showed significant increases in blood pressure, heart rate, and respiratory rate after rosemary oil inhalation. After the inhalation treatments, subjects were found to have become more active and stated that they felt "fresher". The analysis of EEGs showed a reduction in the power of alpha1 (8–10.99 Hz) and alpha2 (11–12.99 Hz) waves. Moreover, an increment in the beta wave (13–30 Hz) power was observed in the anterior region of the brain. These results confirm the

stimulatory effects of rosemary oil and provide supporting evidence that brain wave activity, autonomic nervous system activity, as well as mood states are all affected by the inhalation of the rosemary oil.

Conclusion

In brief, our results suggest the occurrence of the positive stimulatory effects of rosemary oil inhalation. These findings provide evidence that brain wave activities, autonomic nervous system responses, and mood states can all be modified with rosemary oil inhalation. The results support that there are medicinal benefits of rosemary when used as a stimulant in essential oil treatments.

[Ther Adv Psychopharmacol](#). 2012 Jun; 2(3): 103–113.

doi: [10.1177/2045125312436573](https://doi.org/10.1177/2045125312436573)

PMCID: PMC3736918

Plasma 1,8-cineole correlates with cognitive performance following exposure to rosemary essential oil aroma

[Mark Moss](#) and [Lorraine Oliver](#)

This article has been [cited by](#) other articles in PMC.

Abstract

Objective

The mode of influence of the aromas of plant essential oils on human behaviour is largely unclear. This study was designed to assess the potential pharmacological relationships between absorbed 1,8-cineole following exposure to rosemary aroma, cognitive performance and mood.

Methods

Twenty healthy volunteers performed serial subtraction and visual information processing tasks in a cubicle diffused with the aroma of rosemary. Mood assessments were made pre and post testing, and venous blood was sampled at the end of the session. Pearson correlations were carried out between serum levels of 1,8-cineole, cognitive performance measures and change in mood scores.

Results

Here we show for the first time that performance on cognitive tasks is significantly related to concentration of absorbed 1,8-cineole following exposure to rosemary aroma, with improved performance at higher concentrations. Furthermore, these effects were found for speed and accuracy outcomes, indicating that the relationship is not describing a speed–accuracy trade off. The relationships between 1,8-cineole levels and mood were less pronounced, but did reveal a significant negative correlation between change in contentment and plasma 1,8-cineole levels.

Conclusion

These findings suggest that compounds absorbed from rosemary aroma affect cognition and subjective state independently through different neurochemical pathways.

[Int J Neurosci](#). 2003 Jan;113(1):15-38.

Aromas of rosemary and lavender essential oils differentially affect cognition and mood in healthy adults.

[Moss M¹](#), [Cook J](#), [Wesnes K](#), [Duckett P](#).

[Author information](#)

Abstract

This study was designed to assess the olfactory impact of the essential oils of lavender (*Lavandula angustifolia*) and rosemary (*Rosmarinus officinalis*) on cognitive performance and mood in healthy volunteers. One hundred and forty-four participants were randomly assigned to one of three independent groups, and subsequently performed the Cognitive Drug Research (CDR) computerized cognitive assessment battery in a cubicle containing either one of the two odors or no odor (control). Visual analogue mood questionnaires were completed prior to exposure to the odor, and subsequently after completion of the test battery. The participants were deceived as to the genuine aim of the study until the completion of testing to prevent expectancy effects from possibly influencing the data. The outcome variables from the nine tasks that constitute the CDR core battery feed into six factors that represent different aspects of cognitive functioning. Analysis of performance revealed that lavender produced a significant decrement in performance of working memory, and impaired reaction times for both memory and attention based tasks compared to controls. In contrast, rosemary produced a significant enhancement of performance for overall quality of memory and secondary memory factors, but also produced an impairment of speed of memory compared to controls. With regard to mood, comparisons of the change in ratings from baseline to post-test revealed that following the completion of the cognitive assessment battery, both the control and lavender groups were significantly less alert than the rosemary condition; however, the control group was significantly less content than both rosemary and lavender conditions. These findings indicate that the olfactory properties of these essential oils can produce objective effects on cognitive performance, as well as subjective effects on mood.

Cognition and other oils

[Int J Neurosci](#). 2008 Jan;118(1):59-77.

Modulation of cognitive performance and mood by aromas of peppermint and ylang-ylang.

[Moss M¹](#), [Hewitt S](#), [Moss L](#), [Wesnes K](#).

[Author information](#)

Abstract

This study provides further evidence for the impact of the aromas of plant essential oils on aspects of cognition and mood in healthy participants. One hundred and forty-four volunteers were randomly assigned to conditions of ylang-ylang aroma, peppermint aroma, or no aroma control. Cognitive performance was assessed using the Cognitive Drug Research computerized assessment battery, with mood scales completed before and after cognitive testing. The analysis of the data revealed significant differences between conditions on a number of the factors underpinning the tests that constitute the battery. Peppermint was found to enhance memory whereas ylang-ylang impaired it, and lengthened processing speed. In terms of subjective mood peppermint increased alertness and ylang-ylang decreased it, but significantly increased calmness. These results provide support for the contention that the aromas of essential oils can produce significant and

idiosyncratic effects on both subjective and objective assessments of aspects of human behavior. They are discussed with reference to possible pharmacological and psychological modes of influence.

Aromatherapy and dementia

[BMC Complement Altern Med](#). 2015; 15: 93.

Published online 2015 Mar 29. doi: [10.1186/s12906-015-0612-9](#)

PMCID: PMC4381454

Comparison of the efficacy of aroma-acupressure and aromatherapy for the treatment of dementia-associated agitation

[Man-Hua Yang](#), [Li-Chan Lin](#), [Shiao-Chi Wu](#), [Jen-Hwey Chiu](#), [Pei-Ning Wang](#), and [Jaung-Geng Lin](#)

Abstract

Background

One of the most common symptoms observed in patients with dementia is agitation, and several non-pharmacological treatments have been used to control this symptom. However, because of limitations in research design, the benefit of non-pharmacological treatments has only been demonstrated in certain cases. The purpose of this study was to compare aroma-acupressure and aromatherapy with respect to their effects on agitation in patients with dementia.

Methods

In this experimental study, the participants were randomly assigned to three groups: 56 patients were included in the aroma-acupressure group, 73 patients in the aromatherapy group, and 57 patients in the control group who received daily routine as usual without intervention. The Cohen-Mansfield Agitation Inventory (CMAI) scale and the heart rate variability (HRV) index were used to assess differences in agitation. The CMAI was used in the pre-test, post-test and post-three-week test, and the HRV was used in the pre-test, the post-test and the post-three-week test as well as every week during the four-week interventions.

Results

The CMAI scores were significantly lower in the aroma-acupressure and aromatherapy groups compared with the control group in the post-test and post-three-week assessments. Sympathetic nervous activity was significantly lower in the fourth week in the aroma-acupressure group and in the second week in the aromatherapy group, whereas parasympathetic nervous activity increased from the second week to the fourth week in the aroma-acupressure group and in the fourth week in the aromatherapy group.

Conclusions

Aroma-acupressure had a greater effect than aromatherapy on agitation in patients with dementia. However, agitation was improved in both of the groups, which allowed the patients with dementia to become more relaxed. Future studies should continue to assess the benefits of aroma-acupressure and aromatherapy for the treatment of agitation in dementia patients.

[Cochrane Database Syst Rev.](#) 2014 Feb 25;(2):CD003150. doi: 10.1002/14651858.CD003150.pub2.

Aromatherapy for dementia.

[Forrester LT](#)¹, [Maayan N](#), [Orrell M](#), [Spector AE](#), [Buchan LD](#), [Soares-Weiser K](#).

Author information

Abstract

BACKGROUND:

Complementary therapy has received great interest within the field of dementia treatment and the use of aromatherapy and essential oils is increasing. In a growing population where the majority of patients are treated by US Food and Drug Administration (FDA)-approved drugs, the efficacy of treatment is short term and accompanied by negative side effects. Utilisation of complimentary therapies in dementia care settings presents as one of few options that are attractive to practitioners and families as patients often have reduced insight and ability to verbally communicate adverse reactions. Amongst the most distressing features of dementia are the behavioural and psychological symptoms. Addressing this facet has received particular interest in aromatherapy trials, with a shift in focus from reducing cognitive dysfunction to the reduction of behavioural and psychological symptoms in dementia.

OBJECTIVES:

To assess the efficacy of aromatherapy as an intervention for people with dementia.

SEARCH METHODS:

ALOIS, the Cochrane Dementia and Cognitive Improvement Group Specialized Register, was searched on 26 November 2012 and 20 January 2013 using the terms: aromatherapy, lemon, lavender, rose, aroma, alternative therapies, complementary therapies, essential oils.

SELECTION CRITERIA:

All relevant randomised controlled trials were considered. A minimum length of a trial and requirements for follow-up were not included, and participants in included studies had a diagnosis of dementia of any type and severity. The review considered all trials using fragrance from plants defined as aromatherapy as an intervention with people with dementia and all relevant outcomes were considered.

DATA COLLECTION AND ANALYSIS:

Titles and abstracts extracted by the searches were screened for their eligibility for potential inclusion in the review. For Burns 2011, continuous outcomes were estimated as the mean difference between groups and its 95% confidence interval using a fixed-effect model. For Ballard 2002, analysis of co-variance was used for all outcomes, with the nursing home being treated as a random effect.

MAIN RESULTS:

Seven studies with 428 participants were included in this review; only two of these had published usable results. Individual patient data were obtained from one trial (Ballard 2002) and additional analyses performed. The additional analyses conducted using individual patient data from Ballard 2002 revealed a statistically significant treatment effect in favour of the aromatherapy intervention on measures of agitation (n = 71, MD -11.1, 95% CI -19.9 to -2.2) and behavioural symptoms (n = 71, MD -15.8, 95% CI -24.4 to -7.2). Burns 2011, however, found no difference in agitation (n = 63, MD 0.00, 95% CI -1.36

to 1.36), behavioural symptoms (n = 63, MD 2.80, 95% CI -5.84 to 11.44), activities of daily living (n = 63, MD -0.50, 95% CI -1.79 to 0.79) and quality of life (n = 63, MD 19.00, 95% CI -23.12 to 61.12). Burns 2011 and Fu 2013 found no difference in adverse effects (n = 124, RR 0.97, 95% CI 0.15 to 6.46) when aromatherapy was compared to placebo.

AUTHORS' CONCLUSIONS:

The benefits of aromatherapy for people with dementia are equivocal from the seven trials included in this review. It is important to note there were several methodological difficulties with the included studies. More well-designed, large-scale randomised controlled trials are needed before clear conclusions can be drawn regarding the effectiveness of aromatherapy for dementia. Additionally, several issues need to be addressed, such as whether different aromatherapy interventions are comparable and the possibility that outcomes may vary for different types of dementia.

[Taehan Kanho Hakhoe Chi](#). 2005 Apr;35(2):303-12.

[The effect of lavender aromatherapy on cognitive function, emotion, and aggressive behavior of elderly with dementia].

[Article in Korean]

[Lee SY](#)¹.

[Author information](#)

Abstract

PURPOSE:

This study was to develop an aromatherapy hand massage program, and to evaluate the effects of lavender aromatherapy on cognitive function, emotion, and aggressive behavior of elderly with dementia of the Alzheimer's type.

METHOD:

The Research design was a nonequivalent control group non-synchronized quasiexperimental study. Lavender aromatherapy was administrated to experimental group I for 2 weeks, jojoba oil massage was administrated to experimental group II for 2 weeks, and no treatment was administrated to the control group for 2 weeks. Data was analyzed using the chi(2)-test, ANOVA, repeated measures of ANCOVA and ANCOVA in the SPSS program package.

RESULT:

1. Experimental group I did not show significant differences in cognitive function in relation to the experimental group II and control group. 2. Experimental group I showed significant differences in emotion and aggressive behavior in relation to the experimental group II and control group.

CONCLUSION:

A Lavender aromatherapy hand massage program is effective on emotions and aggressive behavior of elderly with dementia of the Alzheimer's type.

[BMJ](#). 2002 Dec 7; 325(7376): 1312-1313.

PMCID: PMC1124787

Sensory stimulation in dementia

An effective option for managing behavioural problems

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Most older people with dementia at some point in their illness develop psychiatric symptoms or behavioural disturbances such as agitation, aggression, depression, delusions, wandering, sleep disturbance, and hallucinations. Collectively, these are termed behavioural and psychological symptoms of dementia.¹ They are frightening for patients and their carers; constitute a major management problem for psychiatrists, general practitioners, and geriatricians; and act as a trigger for admission to institutional care. After excluding treatable causes such as concurrent infections, non-pharmacological approaches such as behavioural management are the recommended first line intervention.²

In practice, however, drugs such as neuroleptics and other sedatives are often prescribed in an attempt to control what can be an alarming situation. Although neuroleptics have modest term efficacy in the short term,³ they are associated with side effects such as sedation, extrapyramidal signs, falls, a detrimental impact on quality of life,⁴ and, possibly, accelerated cognitive decline.⁵ These side effects are most pronounced in people with severe dementia, exactly the group who have most behavioural and psychological symptoms and for whom no evidence is available from placebo controlled trials of neuroleptics or other psychotropic agents. A wide range of alternative approaches has been tried, including multisensory interventions such as snoozelan (involving fiberoptic lights and touch) but reports have essentially been qualitative and based on small numbers of patients. Two exceptions are aromatherapy and bright light treatment, which have emerged as promising treatments.

Aromatherapy has a long history and is the fastest growing of all complementary treatments. Three placebo controlled trials have been completed in the last year, and each has reported a significant beneficial effect on agitation compared with placebo, with almost complete compliance and no side effects (table). In addition, as opposed to neuroleptics, which seem to be associated with a detrimental impact on wellbeing, quality of life significantly improved with aromatherapy.⁸

Lemon balm (*Melissa officinalis*) or lavender oil (*Lavendula officinalis*) are the two main agents used and are delivered by either inhalation or skin application.⁶⁻⁸ Almost all

participants in the studies completed the course of treatment. This emphasises the excellent tolerability of aromatherapy, which is in contrast to many of the pharmacological treatments in this group of patients—it is common for 30% or more of the participants to be unable to complete a trial. Explanations for the efficacy of aromatherapy range from subjective psychological to direct biological action. In the studies cited no extended period of massage was used, and a direct chemical effect seems therefore likely.^{6,8} Essential oils contain many terpenes, which are rapidly absorbed through the lungs and cross the blood-brain barrier. In addition, many possess cholinergic activity or act on γ aminobutyric acid receptors.^{12,13}

Bright light is effective in the treatment of seasonal affective disorder.¹⁴ The technique involves sitting in front of a light box with the entire visual angle subtended by the light source—the amount of light is important (up to 10 000 lux compared with average office light, which is up to 300 lux). Three controlled trials have been published in the past three years that investigate the effect of bright light on sleep disturbance and behavioural disorders in dementia (table).⁹⁻¹¹ Some benefits were reported for restlessness, but a particular beneficial effect has been found for sleep disturbances. These results are promising.

Lavender and migraine

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Lavender essential oil in the treatment of migraine headache: a placebo-controlled clinical trial.

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Abstract

Lavender essential oil has been used as an anxiolytic drug, a mood stabilizer, a sedative, spasmolytic, antihypertensive, antimicrobial, analgesic agent as well as a wound healing accelerator. We have studied for the first time the efficacy of lavender essential oil inhalation for the treatment of migraine in a placebo-controlled clinical trial.

METHODS:

Forty-seven patients with definite diagnosis of migraine headache were divided into cases and controls. Cases inhaled lavender essential oil for 15 min, whereas the control group used liquid paraffin for the same time period. Patients were asked to record their headache severity and associated symptoms in 30-min intervals for a total of 2 h. We matched the two groups for key confounding factors.

RESULTS:

The mean reduction of headache severity in cases was 3.6 ± 2.8 based on Visual Analogue Scale score. The reduction was 1.6 ± 1.6 in controls. This difference between the controls and cases was statistically significant with $p < 0.0001$. From 129 headache attacks in cases, 92 responded entirely or partially to lavender. In the control group, 32 out of 68 recorded headache attacks responded to placebo. The percentage of responders was significantly higher in the lavender group than the placebo group ($p = 0.001$).

CONCLUSION:

The present study suggests that inhalation of lavender essential oil may be an effective and safe treatment modality in acute management of migraine headaches.