Lavender essential oil is an integrative and complementary therapy in the treatment of Alzheimer’s disease

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1 INTRODUCTION

Alzheimer's disease is a progressive and neurodegenerative disease that compromises memory, thought, and behavior.

Although there are currently no treatments that hinder the progress of Alzheimer's disease (AD), lavender essential oils are potential therapeutic agents for treating dementia symptoms. Knowing that lavender essential oils can be used in the treatment of Alzheimer's patients, the question is: what are the potential benefits of this essential oil?

2 GOAL

Investigate the benefits that lavender essential oil can provide to people with Alzheimer's disease.

3 METHODOLOGY

This is a literature review developed with articles published from 2012 to 2022 in Medline/PubMed and Google Scholar databases, using the descriptors: Alzheimer's disease; lavender essential oil; essential oil. Original and review articles were included in Portuguese English that deals with the theme and were available online. Simple and expanded abstracts, monographs, dissertations, theses, and articles not available online were excluded.

4 DEVELOPMENT

Alzheimer's disease (AD) is the most common type of dementia in the elderly and is characterized by a progressive and irreversible neurodegenerative process that causes a decrease in cognition (SANTOS; FERRAZ, 2022). It is a disease that leads to cognitive deficits and cognitive decline and impacts the lives of the patient and his/her family members.

There are several risk factors for Alzheimer's disease and other dementias, among them: non-modifiable factors such as age, the older the age, the higher the prevalence; sex, more frequent in women; family history, 1st or 2nd-degree relatives with the disease; race, more common in blacks and Hispanics...
Lavender essential oil is an integrative and complementary therapy in the treatment of Alzheimer's disease. Other factors are modifiable, such as low physical activity; tobacco smoking, among others (ATRI, 2019).

AD leads to cognitive, proprioceptive, and dementia impairments and can present in three stages. The first stage represents the onset of the disease and there is moderate memory loss, such as forgetfulness. In the second stage, there is recent memory loss and forgetfulness, alteration of the ability to interpret, loss of temporal orientation, and loss of functionality that prevents the performance of daily activities on their own. In the third phase, there is an almost total loss of cognitive capacity and the person lacks total dependence on a caregiver (BITENCOURT et al., 2018).

In AD, histopathological analysis shows the presence of extracellular β-amyloid plaques caused by dysfunction of the amyloid precursor protein and intracellular neurofibrillary tangles resulting in hyperphosphorylation of the tau protein (HARDY; SELKOE, 2002 apud VOULGAROPOULOU et al., 2019).

The presence of fibrillar amyloid deposits and the accumulation of abnormal filaments of tau protein in the walls of the blood vessels of the cerebral parenchyma generate inflammatory processes, and neuronal and synaptic losses (SERENIKI; VITAL, 2008 apud BITENCOURT et al., 2018). Therefore, there is evidence suggesting that in Alzheimer's disease there are inflammatory and oxidative stress responses as possible causative factors of cognitive deterioration (VOULGAROPOULOU et al., 2019).

Although there are pharmacological treatments that have been useful in slowing the progression of the disease and that should be administered according to prescription and medical guidance, there is the possibility of adding aromatherapy to the treatment. It is part of integrative and complementary health practices (PICS) and consists of topical application on the skin or inhalation of the aromas that essential oils release to improve the physical and mental health of the person. At no time do PICS replace medical or psychological treatment, but complement conventional therapy, however, it is important to investigate compounds of natural origin to serve as new neuroprotective agents for the treatment of AD.

There are several studies describing the results of aromatherapy in the treatment of people with dementia, as well as assessing its efficacy and safety. Aromatherapy has an impact on agitation control, response behaviors, and cognitive function in people with dementia (HUI et al., 2021; BALL et al., 2020; KIM et al., 2019; FUNG et al., 2012 apud D'ANDREA et al., 2022).

Among the essential oils (OEs) that can be used in the treatment of dementia is a lavender essential oil (OE). Several studies report their benefits in reducing receptive behaviors (BROOKER et al., 1997; GRAY; CLAIR, 2002; HOLMES et al., 2002; FU et al., 2013; LI et al., 2007; MOORMAN LI et al., 2017; SMALLWOOD et al., 2001; SNOW et al., 2004 apud D'Andrea et al., 2022). In addition to reducing restlessness and falls (SAKAMOTO et al., 2012 apud D'Andrea et al., 2022), it improves sleep quality (HENRY et al., 1994; TAKEDA et al., 2017 apud D'ANDREA et al., 2022) and improves cognitive functions (JIMBO et al., 2009 apud D'ANDREA et al., 2022).
It should be emphasized that the aromas released in aromatherapy trigger positive emotional and autobiographical memories, therefore, olfactory stimulation can corroborate the improvement of the quality of life and well-being of people with dementia and their caregivers (D’ANDREA et al., 2022).

OE is one of the tools most used by physiotherapists and chiropractors as a natural remedy. In pharmacy, phytotherapy, and aromatherapy, lavender has been used to treat central nervous system disorders such as anxiety, stress, and sleep disorders (LÓPEZ et al., 2017).

OEs act as neuroprotective and anti-aging and are effective in treating neurological disorders such as dementia, epilepsy, and anxiety. Specifically, about AD, they are a potential multipotent agent (AYAZ et al., 2017).

Lavender OEs (Lavandula angustifolia ssp, Lavandula angustifolia Mill, and Lavandula hybrida Rev) act as a potent antioxidant and antiapoptotic in laboratory tests performed on guinea pigs with scopolamine-induced dementia. A significant increase in the level of immune system antioxidant enzymes, including superoxide dismutase, glutathione peroxidase, and CAT, was found during exposure by subacute inhalation to OE. In addition, there is a total quantitative decrease in GSH and lipid peroxidation in specific brain tissues. The results of the studies indicate that the OEs corroborate the neuroprotective action of the test samples due to their strong antioxidant and antiapoptotic activities (HANCIANU et al., 2013).

A study was conducted using human neural tissue neuroblasts (SH-SY5Y) exposed to different neurotoxic agents. The study aimed to evaluate the effects of lavender essential oil (Lavandula angustifolia) on well-established targets of the central nervous system, such as MAO-A, SERT, GABA A, and NMDA receptors, in addition to in vitro neurotoxicity models. In this study, it can be confirmed that lavender provides to reduce agitation and depression, as it can contribute, at least in part, to the modulation of the NMDA receptor, to the inhibition of SERT and was able to protect SH-SY5Y cells from hydrogen peroxide-induced neurotoxicity, although it was not able to reduce malonate toxicity. The researchers concluded that lavender had protective action on the cells, as it reduced LDH, NO release, intracellular accumulation of ROS, and loss of MMP (LÓPEZ et al., 2017).

Another study contributed to confirming the neuroprotective effect of essential oils. In it, lavender and coriander OEs have been tested to combat neurotoxicity induced by Aβ 1-42 oligomers, which is a peptide that is directly associated with the development and progression of AD. It has been determined that the main active ingredient of lavender and coriander OEs is linalool and at a concentration of 10 μg/mL can reduce nuclear morphological abnormalities in cells treated with Aβ 1-42 oligomers for 24 hours. They were also able to neutralize the increased production of reactive intracellular oxygen species and the activation of the pro-apoptotic enzyme caspase-3 induced by oligomers Aβ 1-42. Therefore, these OEs are natural agents that deserve therapeutic interest against neurotoxicity induced by Aβ 1-42 (CAPUTO et al., 2021).

A study that deserves attention aimed to evaluate the in vitro bioactivities associated with The EO of Lavandula pubescent Decne. The EO was analyzed for its antioxidant, antimicrobial, anticholinesterase...
and anticipate functions. Lavandula pubescent Decne OE was phytochemically analyzed and its composition revealed the presence of 25 constituents, with carvacrol (65.27%) being the most abundant. OE also has anti-Alzheimer's activity, as carvacrol is an inhibitor of acetylcholinesterase and butyrylcholinesterase, thus inhibiting the main enzymes associated with AD. Therefore, it can be useful to improve cerebral cholinergic transmission and decrease β-amyloid aggregation and the formation of neurotoxic fibrils (ALI-SHTAYEH et al., 2020).

The antioxidant capacity of Lavandula pubescent Decne OE was attributed to the high content of the main phenolic constituents of the oil, especially carvacrol. This active ingredient provides electrons for reactive oxygen species (ROS) and converts them into more stable nonreactive species, enclosing the reaction into a free ROS chain. In addition to indicating antiobesity activity, it inhibits the pancreatic lipase enzyme that is responsible for the digestion and absorption of triglycerides and thus leads to a reduction in fat absorption. High antibacterial activity was found for Staphylococcus aureus, inhibiting activity for Candida albicans, strong antidermatophyte activity against Microsporum canis, Trichophyton rubrum, Trichophyton mentagrophytes, and Epidermophyton floccosum. It was concluded that this OE is a valuable source of antioxidant, neuroprotective, anti-hyperlipidemic, and antimicrobial agents (ALI-SHTAYEH et al., 2020).

5 CONCLUSION

The studies analyzed suggest that lavender essential oil is a potential neuroprotective and antioxidant agent for the treatment of people with Alzheimer's.

The studies describe four types of lavender: Lavandula angustifolia ssp and Lavandula angustifolia Mill, Lavandula hybrida Ver, which have as its main active ingredient linalool, with anti-Alzheimer's and anti-aging activity; and OE of Lavandula pubescent Decne, which has a high concentration of carvacrol, which has antioxidant, antimicrobial, anticholinesterase and antilipemic activity.

It is inferred that the four types of lavender essential oils investigated represent a complement in the treatment of people with Alzheimer's and should be further studied as a possibility of pharmacological treatment or as part of pics.
REFERENCES


