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Review Article

Aromatherapy in the treatment of psychiatric disorders: A review

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ABSTRACT

Aromatherapy is most commonly used therapy for the relaxation purpose to overcome the symptoms associated with psychiatric disorders. Essential oils are most commonly used substances for this purpose. These are obtained from various plant species including lavender, rosemary, sage, and salvia. The objective of this study was to evaluate aromatherapy in the treatment of psychiatric disorders. A computer-based search of Pubmed, Medline, Embase, Cinahl, PsycINFO, AMED, and the Cochrane Database of Systematic Reviews was performed. Trials were included if they were potential human trials assessing aromatherapy in the treatment of psychiatric disorders and utilized validated instruments to assess participant eligibility and clinical endpoints. Selection criteria of the study was decided and taken into consideration. Trials were identified that met all eligibility requirements. Individual trials investigating botanical sources and clinical effects of essential oils used in aromatherapy. Results of the trials are discussed to form the basis of a recommendation. No good quality evidence were identified on which to base a recommendation. However, no serious side effects were reported in any of the study on use of aromatherapy. Further studies are recommended to reach at any conclusion.

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INTRODUCTION

Aromatherapy is basically referred to as essential oil components that have “aroma” and also called as aromatic. But the use of essential oil in the therapies is not only due to these aromatic components but also other components are responsible for various actions during the therapy. Essential oils obtained from plant parts through steam distillation process or by peel of citrus fruits. Chemically, essential oils are heterogeneous in nature. the lipophilic volatile hydrocarbon monoterpenoids and other less volatile oils are responsible for various therapeutic activities. It is still controversial that about the reason behind pharmacology of essential oils.[1-5]

By three ways essential oils could penetrate and absorbed into the human body firstly, through the olfactory and respiratory route (vapor inhalation) secondly, topical application and finally through oral route by taking capsules filled with essential oils. Anciently Egyptians used the aromatic oils as a perfume about 5000 years ago. And 200 references from bible

supports that they were also utilize aromatic oils for healing purpose and spiritual purpose. In 16th century in the Germany the base of modern aromatherapy held on. Gattefosse, a French chemist, first analyze the healing power of essential oils and this was further revived by valnet. The effects of aromatic oils could be both direct and indirect physiological effects. However time to time more evidence proved that aromatic oil could be used for the treatment of chronic pain, CNS and cerebral problems. [6-9] All of that uses of aromatic oils are summarized in Table 1.

According to Frey the inhalation of aromatic oils allow the therapeutic components to move towards brain through both extraneuronally and intraneuronally through perineuralchannels. And all of this happens in minutes. Aromatherapy is not used by medical professionalism mostly but it's one of the most beneficial among all complementary therapy. This review is to analyze the importance and action of aromatherapy in various psychotic illnesses.[14-1

Table 1: Effects and chemical constituents of aromatic oil relevant to cerebral functions:[10-13]

Essential oil	Latin name	Reported therapeutic effects	Main constituents
Chamomile	<i>Chamomelum Nobilis</i>	Analgesic, hypnotic, sedative	Isobutyl angelate, methyl angelate and 2- methyl angelate
Jasmine	<i>Jasminum grandiflorum</i>	Antidepressant, euphoric, stimulating	Benzyl acetate, benzyl benzoate and methy-cis-jasmonate

Juniper	<i>Juniperus Communis</i>	Analgesic, aphrodisiac.	Myrcene, alphapinene and gamma-elemene
Lavender	<i>Lavender Augustifolia</i>	Anticonvulsant, analgesic, stimulating, anxiolytic, sedative	Linalool, linalyl acetate and lavandulyl acetate
Lemon	<i>Citrus Limonum</i>	Reviving and stimulating	Limonene, beta-pinene and citral
Marjoram	<i>Origanum Marjorana</i>	Analgesic, anxiolytic Sedating and comforting	Sabinene, myrcene, linalool and gamma terpine
Melissa	<i>Melissa Officinalis</i>	Sedative, hypnotic Uplifting, anxiolytic	Geraniol, neral, citronellal
Rose	<i>Rosa Damascene</i>	Soothing, antidepressant, uplifting and sedating	Nerol, geraniol farnesol and citronellal
Rosemary	<i>Rosmarinus officinalis</i>	Darifying, analgesic, stimulating	Borneol, cineol, camphor and alpha pinene
Vetivar	<i>Vetivera Zizanoides</i>	Nerve tonic, calming, Uplifting and sedative	Vetiverol, vetivenes, Khusimol & vetivones
Sage	<i>Salvia Officinalis</i>	Nervine tonic	Alpha thujone, beta thujone, camphor

METHODS:

Data Sources/Search Methods

A systematic review of the literature was carried out using an unambiguous search strategy. Databases searched include Pubmed, Medline, Embase, Cinahl, PsycINFO, AMED, and the Cochrane Library. Previous systematic reviews, meta-analyses and randomised controlled trials (RCTs) were hand searched for additional references with the search extended to identify observational studies where appropriate. Internet searches were also carried out on various websites.

Review Methods

Trials were included in the review if they were prospective human trials assessing essential oils in the treatment of psychiatric disorders and utilized validated instruments to assess participant eligibility and clinical endpoints.

Inclusion and Exclusion Criteria

Selection criteria of the study was decided and taken into consideration. Treatments commonly available to patients without prescriptions were selected for inclusion. Studies were considered which included adults aged 18 years and over with no upper age limit. Exclusion criteria for studies was where there was no formal diagnosis by the International Classification of Disease (ICD) 9, ICD 10, Diagnostic Statistical Manual (DSM)-III or DSM-IV, or use of a recognized, validated and reliable measurement scale specifically for psychiatric symptoms. Further, studies in patient groups with clear indicators of psychosis or with significant psychological and/or physical comorbidities were also excluded.

RESULTS

Clinical studies

Pharmacological and phytochemical studies analyze the mechanism of oils that they enter in systemic circulation either orally, topically or IP, SC and inhalation etc then cross BBB and produce effects when they enter in CNS. Studies suggested that specific essential oils have CNS depressant and some have CNS stimulant effects so should be used according to the need of patient. Catatonia, sleepiness, agitation etc are some psychiatric disorder symptoms and essential oils can be used in such condition. [16-20] The structure of some of the essential oil components are as shown in Figure 1.

Pharmacology of essential oils with sedative activity

Lavender *augustifolia* is the individual oil that shows CNS depressant activity. As dependency is the most common issue caused by anxiolytic therapies like benzodiazepines but lavender oil lacks any dependency issue. Inhaling the vapors of lavender could block the pentetrazole-nicotine and electroshock induce convulsion also. Lavender exhibits dose-dependent effects just like diazepam. Linalool and linalyl acetate are the main active constituents of lavender *augustifolia*. The anxiolytic activities of lavender are directly associated with the blood concentration of linalool and linalyl acetate that is 3-11 ng/ml. Lavender is not indicated in the treatment of depression as studied in clinical trials by force swim test on mice. [21-24]

Linalools are one of the monoterpenoids and have anticonvulsant actions in those seizures which are related to glutamate and NMDA receptor binding. It also reduces uptake of glutamate by inhibiting potassium stimulating glutamate release. It also modifies the nicotine receptors at neuromuscular junction. The inhibition of adenylate cyclase and ion channel activity is also relevant to clinical effects. Due to all of this mechanism lavender is widely used in aromatherapy as CNS depressant and

anxiolytic agent. [25-28] More essential oils are used as CNS depressants are listed in Table 2.

Pharmacology of essential oils with stimulating activity

Some of the essential oils are used as CNS stimulant traditionally and are listed in Table 3. Some of the essential that contains CNS stimulating effects are rosemary (*rosmarium officinalis*), sage (*salvia species*), and jasmine (*jasmium grandiflora*). Data suggested that these therapeutic activities are depending on route of administration like rosemary inhalation enhances the locomotor activities. And the effects are associated with the blood concentration of 1,8-cineole because it increase in the cerebral blood flow after 20 minutes of inhalation. Further data suggested that pine oil having the sesquiterpenoid as active shows CNS depressant effects. If chamomile and lavender used with each other it will reduce the sleep time induce by Phenobarbital.

The possible mechanism of essential oil as having CNS stimulant activity may due to antagonism of GABA receptor, transmitter related enzymes and cholinergic receptors. So these actions may allow the use of essential oil in memory disorders and apathy that are very common in severe psychiatric disorders including Parkinson's disease, catatonic schizophrenia. [31-36]

Pharmacokinetics

The effects are entirely depending on the route of administration of essential oil. The metabolites are formed in the body when oil reaches to systemic circulation. The pharmacokinetic behavior also influences by chiral differences and it also effects the biological activity of constituents. According to the studies pharmacokinetic of monoterpenes undergoes by two stages of elimination that is rapid or fast. It also accumulates in adipocytes. The essential oil is metabolized through CYP450 enzyme of liver and so contraindicated in liver disease patient. [38-40]

Indication

Behavioral disorder with dementia

In the clinical trial which performed in residential area shows that lavender oil vaporization relief insomnia in patients with dementia. The most common aromatic oil used in dementia includes (*Lavandula angustifolia*) lavender and lemon balm (*Melissa officinalis*) may use individually or in combination. The use of lavender species and outcomes are described as in Table 4. By the usage of these oils the reduction in agitation and other positive symptoms in reduction of dementia was observed. Sage (salvia) another plant having aromatic oil currently approved in the treatment of dementia. It have anti-inflammatory, choline esterase inhibition and estrogenic activities too. *Salvia lavandulaefolia* (spanish sage) it improves attention and reduce psychological symptoms. Its oral preparation are also used in youth as a memory booster. *Salvia lavandulaefolia* is more prefer than *salvia officinalis* because that have high amount of thujone while *lavandulaefolia* have substantial content of camphor. Jasmine also used as a memory booster and lavender have no action to boost up memory instead it increase arousal rate. No side effects were reported during clinical trials hence it could prefer over antipsychotic drugs. Furthermore studies could be done by giving individuals antipsychotics and aromatherapy then monitors and compares results through EEG and neuroimaging. [41-43]

Psychiatric disorders associated with Parkinson's diseases

Sleep and apathy are the frequent symptoms of Parkinsonism and they are not treated with pharmaceuticals without any

adverse effects. Aromatherapy could be a great approach for the treatment of such symptoms in diseases. The behavioral symptoms in Parkinson also encounter through the use of aromatherapy in competitive therapies however in a clinical trial specific name of essential oil was not mentioned. [45]

Schizophrenia

Hicks reported the use of aromatherapy for sleep disorder in UK London. The patients were ready to take aromatherapy session in a week for the purpose of relaxation and treatment of insomnia. As lavender vaporization could induce relax sleep. On the basis of clinical trials the 70% schizophrenic patient feeling improvement while 80% feels stress free as shown in. The specific essential oils were not mentioned that used in schizophrenic patients. [46]

Sleep disorders

Insomnia, sleep apnea and day sleepiness associated with various psychiatric disorders. And could also spread to non-psychotic individuals. In studies the bags filled with lavender and put under the pillow of patient's improvement in sleep pattern were observed due inhaling aroma of lavender oil. In another studies lavender, basil, juniper, sweet marjoram was topically applied on patients hand and 73-90% of patients feel improvement in their sleep pattern and tranquilizer use reduced by 90-36%. According to EEG lavender have CNS depressant activities so induce sleep. In non-psychiatric patients chamomile (roman) essential oil used for improvement of sleep disorders. However no toxicity was reported by lavender use. It have interaction with alcohol, phenobarbital and chloral hydrate because it potentiates their CNS depressants effects. [47-48]

Anxiety

Heading to visual analogue rating scale in 8 months the anxiety and depression levels were become less by use of aromatherapy. Vaporized Orange oil could not use for anxiety in a clinical trial study however chamomile and lavender were used to reduce anxiety. The 60 minutes exposure to vaporized lavender oil could reduce anxiety in cancer patients. In the ICU patients and patients undergoing cardiac surgery if administer essential oil massage therapy the anxiety levels can reduce very smoothly. [49-51]

Depression

Many essential oils are used in reducing depression. There is further need of clinical trials on aromatherapy in patients with depression. [21, 52]

Other disorders

In epilepsy patient the seizure development could reduce by the use of aromatherapy. A learning disabilities patient shows no response on lavender, lemon grass and orange flower aromatherapy treatments. Aromatherapy has a valuable importance in chronic pain. Addiction, autism and other development disorders and sexual disorders could also improve by aromatherapy usage. [53]

Safety adverse effects and contraindication

Safety for aromatherapy therapy product is of great concern and non-licensed products are using now a days in aromatherapy. Tisserd and Balacs describe the safety use of essential oil in their book '*Essential Oil A Guide for Health Care Professionals*'. This provide information about each essential oil and its use in various psychiatric and other disorders. Aromatherapy contraindicated to pregnant lady and breastfeeding women.

The essential oils selected for the use are of great therapeutic range and have loosest toxicities and contraindication. Lavender have no contraindications and could safely use in therapy. More essential oil that have no contraindication includes basil, clary sage, geranium, chamomile, marjoram, vetiver, patchouli,

napeta, frank inesence, lemon, melissa and thyme.[54-59] Some metabolites of essential oils consider harmful than parent compound e.g. ether safrole and other phenyl methyl ether reduce glutathione levels in liver. So it may contraindicate with acetaminophen use and liver disease patients. Some oils are abortifacient and neurotoxic at high doses so they are prohibited to use in aromatherapy e.g. juniper, sage, savin, thujone, wormwood etc. some oils which have high quantities of ketones are contraindicated to epileptic patients because they have tendency to induce epilepsy at high doses.[60-65]

Over dosage of camphor oil associated with GIT and CNS irritation. High dose (1g orally) could cause hepatotoxicity and acute hepatic encephalopathy. And more toxic doses 50-150 mg/kg could cause status epilepticus in childrens.camphor never combine with eucalyptus oil because they have 1,8-cineole which is responsible to increase motor activity. This combination may cause ataxia, convulsion, slurred speech and unconsciousness. Other neurotoxic oils are myristicin and elemicin present in nutmeg oil.[66-71]

Allergic reactions may possible by use of topical essential oils e:g. thymol in thyme, monoterpenes, phenol, lactone, esters could cause skin sensitivity and allergies.however lavender oil reported to use in eczema.essential oil should be use by the advice of aromatherapist and same precaution should be done as with that of synthetic drugs. Undiluted essential oil use is prohibited.[72-76]

DISCUSSION

Some essential oils have CNS stimulant activities and some have CNS depressant activities as shows above in Table 2 and 3. While in some cases the species of same plant have different CNS effects as shows above in table 4. All of these effects

entirely depends on the chemical constituents of the plant and chemical nature of the compound that either it is stimulant or depressant. It could administer then according to patient requirement and need. To explore aromatherapy in clinical practice the neuroimaging and EEG should perform to monitor the actions of essential oils on CNS.

Heeding to studies *juniper* plant was found to be very active and effective for mental health. While *geranium and orange oil* is not suitable for this purpose. Finally aromatherapy is just like other pharmacotherapies and have extended actions on human system e:g the inhalation of limonene increase systolic blood pressure with alertness and restlessness limonene effects only blood pressure, on the other hand the *lavender species* have actions on CNS. *Lavender and jasmine* are use to reduce increased diastolic pressure in adults by exercise and workouts. However it is not prefer to access aromatherapy as a pharmacotherapy without knowing the whole pharmacology of essential oils. So further clinical studies and investments may required.

CONCLUSION

It is concluded that aromatherapy may be give as a adjuvant in the treatment for psychiatric disorders. But the use of essential oils could be done on safety basis. Aromatherapy has no so-called adverse reactions as other psychoactive drugs have. The further clinical studies are clearly warranted. There is a need to establish phytochemical standardization which includes all database about the essential oils using in aromatherapy. Also, there should be further studies conducted to discover more new plant species having pharmacological actions and explore to the aromatherapy procedures.

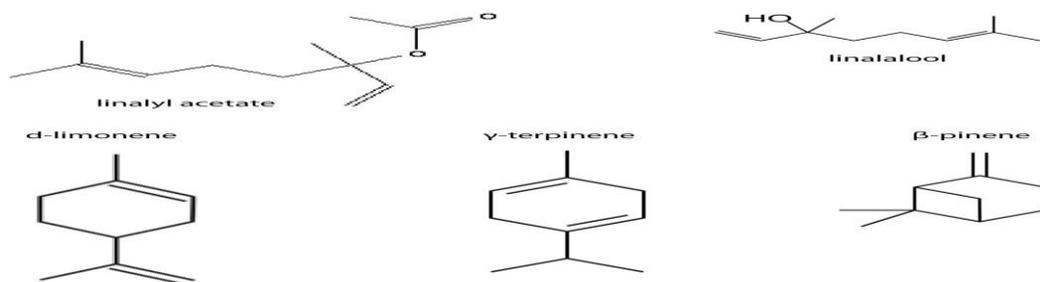


Figure 1. Structures of linalyl acetate, linalool, d-limonene, γ -terpinene, and β -pinene

Table 2: Essential oils that shows CNS depressant actions [29-30]

Essential oil/family	constituents	Main CNS effects
<i>Acorus gramineus</i> (<i>araceae</i>)	Alpha and beta asarone	Anticonvulsant, neuroprotective, sedative
<i>Artemisia annua L.</i> (<i>asteraceae</i>)	Camphor, cineole, p-cymeme	Sedative
<i>Rosmerinus officinalis</i>	1,8-cineole	sedative
<i>Melissa officinalis</i>	citral	Sedative, antidepressant
<i>Rosa centifolia</i>	citronellal	anticonflict
<i>Lavandula species</i>	See table IV	See table IV
<i>Roman chamomile</i> (<i>asteracea</i>)	-	anxiolytic

Table 3: essential oils that have CNS stimulate effects [37]

Essential oils/ common name/ family	constituents	CNS effects
<i>Citrus limonum</i> (rutaceae)	Citral and geranyl	Neuroimmunomodulatory stimulant
<i>Jasmiun grandiflora</i> jasmine	Benzyl acetate , benzyl benzoate	Spasmolytic stimulant
<i>Rosmerinus officinalis</i> Rosemary (Labiatae)	Camphor, 1,8-cineol, alpha pinene	stimulatory
<i>Salvia officinalis</i> Sage (labiatae)	Alpha-thujone Camphor and beta-thujone	Antioxidant, cholinergic, GABAnergic
thymol	-	Stimulant in normal Anxiolytic in stressed
<i>Salvia Lavandulaefolia</i> Spanish sage (labiatae)	Borneol, camphor, 1,8-cineol and alpha-thujone	Memory enhancing Stimulatory Antioxidant neurochemical

Table 4: CNS effects of diffrent species of lavender [44]

Lavender species	Main CNS effects
<i>Lavendula Augustifolia</i>	anticonflict
<i>French lavender Linalyl acetate</i>	Anticonvulsant Sedative Spasmolytic Neuroprotective anasthesia
<i>Lavandula Stoechas L.</i>	Anticonvulsant sedative
<i>Lavendula Vera DC.</i>	Anticonvulsant sedative
<i>Linalool</i>	anticonvulsant
<i>Linalyl Acetate</i>	sedative

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