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Review Article

Effectiveness of medicinal herbs on psychological indices before and after surgeries

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Abstract

Psychological complications appear to be significant disorders which need prolonged recovery period. They cause disability and impose hospitalized costs on patients. This systematic review was aimed to investigate the effectiveness of medicinal herbs on psychological indices in patients undergoing surgeries. The keywords such as anxiety, depression, aggressive, impulsive, stress, delirium and cognitive in combination with surgery and medicinal plants search terms such as medicinal plant or phyto or herb were used to search for relevant publications indexed in the Institute for Scientific Information (ISI), Scopus and PubMed using EndNote software. A total of 1231 studies with mentioned keywords were added to the bank of the study and after considering inclusion and exclusion criteria, 36 human studies were reviewed. Some medicinal plants such as *Passiflora incarnata* L., *Valeriana officinalis* L., *Melissa officinalis* L., *Crocus sativus* L., and *Rosa damascena* Mill. and some herbal formulas like Hochu-ekki-to and Yokukansan and also some phytochemicals such as ω -6 PUFA and Gastrodin reduce the psychological symptoms in several ways in the patients undergoing operation. Most of the clinical studies were carried out on aromatherapy and the others were based on oral administration. Taken together, using medicinal herbs in medical settings before and after surgery is an effective alternative way for alleviating some psychological disorders such as anxiety, depression, aggressive and impulsive behavior, stress, delirium and cognitive dysfunction. However, the surgeons and anesthesiologists must be aware of their interaction and possible complications.

Keywords: medicinal plant; drug discovery; psychological disorders; surgery

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Introduction

Surgical patients may undergo several psychological complications that can disturb the recovery trend and discharge from the hospital and

impose extra costs on them (1, 2). Psychological complications appear to be a significant and long-term which can cause prolonged recovery or long-lasting disability (3-6). Furthermore they have high frequency in surgery patients that lead to extra

morbidity and mortality (7). Patients awaiting surgery and postoperative patients who suffer from anxiety, stress, depression, delirium and other psychological disorders needs treatment and prophylaxis approaches for addressing and controlling these complications (1, 8). Alternative treatments consider as a widespread phenomenon prior to surgery (9). In this regard, use of medicinal plants in the treatment of diseases is one of the most popular methods because they are more safer than pharmaceutical drugs (10-14). Several studies have shown that medicinal herbs and their active ingredients, bioflavonoids, volatile oils and other substances can be effective, efficient and cheap for treatment against various disorders, such as psychological disorders (15-23).

Widespread use of medicinal herbs makes it important for surgeons and physicians to know about these drugs treatment effects and possible side effects in preoperative and postoperative patients (10, 24). Hence, medicinal plants are widely used before and after surgeries, all anaesthetists and surgeons must have to be familiarized with the potential perioperative complications of medicinal plants consumption (25). On the other hand, awareness of medical staff about their dedicated role is a vital issue in medical care (26-29). This review aims to investigate the effectiveness of medicinal herbs on psychological indices in patients undergoing surgery.

For doing this study, the keywords such as “anxiety”, “depression”, “aggressive”, “impulsive”, “stress”, “delirium” and “cognitive” in combination with “surgery” and medicinal plants search terms such as “medicinal plant” or “phyto” or “herb” were used to search for relevant publications indexed in the Institute for Scientific Information (ISI), Scopus and PubMed using EndNote software. A total of 1231 studies with mentioned keywords were added to the databank of the study (Supplementary Table 1).

A standard form, which included items such as author, the title or purpose of the study, intervention, variables, herbal dosage and outcome was designed. The full text of the articles that were in accordance with the purpose of the study were recorded in the form and entered into the study with the agreement of co-authors. Then, the studies that had positive effect on neonatal jaundice also were entered in the study. The articles where studies with non-positive effects, full texts that were not accessible, review articles, non-English or non Persian language articles, and studies that were not related to the aim of this study were excluded after all authors’ agreement was recovered. Finally, 36 articles were included in the study (Fig. 1).

Medicinal plants and their compounds can be effective on psychological disorders before and

after surgeries through various ways (Supplementary Table 2).

Medicinal plants and their derivatives reduce the psychological symptoms in several ways in the patients undergoing operation (Fig. 2). Most of the clinical studies were done on aromatherapy and the others were based on oral administration.

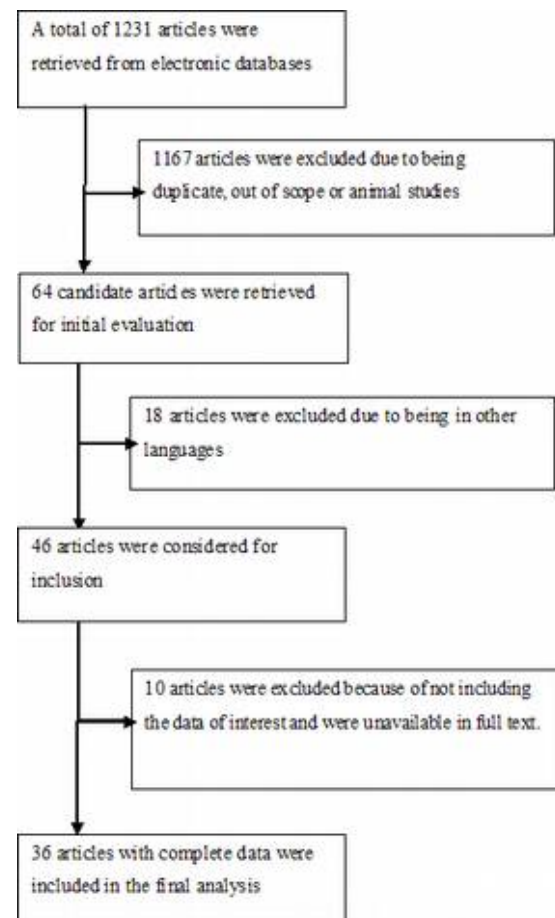


Fig. 1. Flowchart of the designed study

Aromatherapy

Many of the reviewed studies use the essential oil of the herbs as an aromatherapy method for their prophylactic effects against anxiety. Plants essential oils contain essence of the fragrance and that mainly contain two chemical groups which consist of terpenoids (sesquiterpenes and monoterpenes) and several phenylpropanoid derivatives (64, 65). On the other hand, essential oils and odor is composed of terpenes, alcohol, aldehydes, ethers, esters, ketones, oxides phenols and saturated and unsaturated hydrocarbons (66, 67). Essential oil in the medicinal herbs absorption occurs in lungs through respiration. They increase blood flow to the brain and able to cross the blood-brain barrier through respiration (66). Moreover, it is assumed that inhalation of the medicinal herbs’ fragrance can stimulate cell membranes of olfactory receptors (Ors) neurons which are responsible for the detection of odorants. This neurons transfer a message to the limbic system

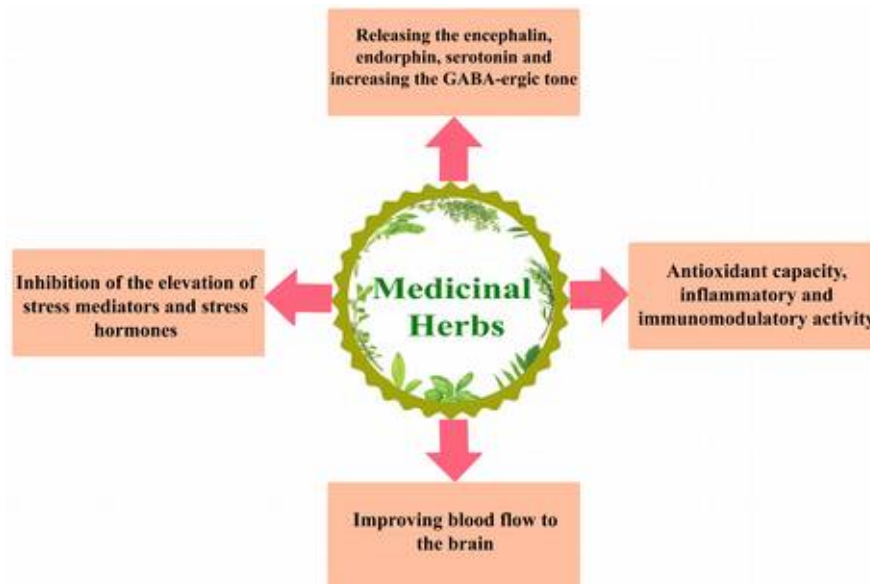


Fig. 2. Main mechanisms of the effects of medicinal herbs on psychological indices

(center of emotions) and the feeling center in the brain, release endorphin, enkephalin and serotonin. So mentioned neurotransmitters confront with stress and can bring calmness for the patients and reduce anxiety and depression (31, 68). Furthermore, essential oils can reduce pain, depression, anxiety, bipolar disorder and attention deficit hyperactivity disorder by activation of the γ -aminobutyric acid (GABA) receptor system (69). It should be noted that GABA is the chief inhibitory neurotransmitter in the vertebrate central nervous system and the GABA receptor system exerts a major inhibitory function in the brain. GABAergic system prevents us from generating inappropriate emotional and behavioral responses and its dysfunction has been implicated in several psychological disorders (70).

In this study, four study is reported that inhalation of medicinal plants oils cannot reduce psychological symptoms (39, 40, 49, 52). Maybe these inconsistencies may arise from ineffectiveness of short inhalation, diverse concentrations and due to different sample sizes. On the other hand, various illnesses may have different stress syndrome and experience varying degrees of anxiety. Therefore, this can interfere with study results. The clinical trials not reported any adverse side effects associated with aromatherapy and consider it as a safe method for reducing psychological symptom in pre and postoperative stages.

Oral administration

Clinical trials showed that edible consumption before and even after surgery, have prophylactic and therapeutic effects against stress, anxiety, delirium and cognitive disorders in patients. Some of the medicinal herbs, physiologically affect on stress in an indirect way by controlling inflammatory processes and stress mediators (53, 62). Some of them after intestinal absorption

entered the blood flow and like the aromatherapy can affect on brain neurotransmitters. They may play the role of agonistic and antagonistic agents on serotonin and dopamine receptors and can insert protective effects against the glutamate-induced excitatory neurotoxicity by amelioration of astrocyte dysfunction.

Although, in many reviewed clinical studies, positive outcomes were observed in controlling the psychological symptoms of patients, but in several studies, herbal treatments could not be effective in psychological disorders (47, 57, 58). Side effects and herb-drug interactions are the most important issue that anaesthetists and surgeons caution during oral administration. Cardiovascular instability, increased bleeding tendencies, hypertension, electrolyte disturbances, endocrine effects, coagulation disorders, renal failure and hepatotoxicity are attributed medicinal herbs side-effects in surgeries (25, 71-73). So, currently available data propose that unknown herbal treatments must be discontinued up to 2 weeks before and after elective surgery (61). No side effects were reported from oral intake of herbs in the reviewed clinical trials. But the important thing is that the most of the studies performed frequently on plants that had already been carried out on them. Therefore, this issue cannot provide a clear inference of medicinal herbs side effects in pre and postoperation periods.

Although most studies reported positive consequences in these disorders, there were some problems in designing studies. For example, the follow-up period was short in the studies and in some clinical studies blinding was not done or sample size was insufficient. Different samples with different severity of psychological problems as well as studies can affect the results. For instance, the patient who has a tumor removal surgery may affect major depression and this can

have impact on other psychological disorders (74) and may experience excessive stress than hernial surgery. So a herbal prescription cannot be of equal uses (time, dose) in both procedures. The other considerable thing is data collection method and outcome assessment. In the surveyed studies evaluation of psychological disorders has been relying on subjective assessment tools such as Depression Scale—Hospital Anxiety and Depression Scale (HADS-D), Spielbergers state anxiety inventory questionnaires, State-Trait Anxiety Inventory (STAI) and other instruments. In spite of this, if subjects fail to reliably report, subjective evaluation tools are not reliable (75, 76). However recently, measurement of biomarkers (and even concomitant with questionnaires) in some psychological disorders can non-invasively evaluate the patients' psychological status in more accurate way.

Conclusion

Use of medicinal herbs in medical settings before and after surgery is an effective alternative way for alleviating some psychological disorders such as anxiety, depression, aggressive and impulsive behavior, stress, delirium and cognitive dysfunction. But the surgeons and anaesthetists must be aware of their interaction and possible complications.

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Conflicts of interest

The authors declare no conflict of interest.

Authors contributions

All authors cooperated for writing the draft and they read and approved the manuscript.

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