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Review

Herbal treatments used by patients before surgery: A literature review example

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ABSTRACT

Aim: Herbs, which hold significant historical significance in medicine and have been utilized for centuries to manage and prevent illnesses, interact with medications. This interaction extends to anesthetics and drugs administered during surgical procedures. Identifying these herbal remedies and discontinuing their use at appropriate intervals is crucial. This study aimed to identify publications examining the utilization of herbal medicine by presurgical patients through the PubMed database.

Method: Literature published between 2000 and 2023 was scrutinized using the keywords "herbal medicine, presurgical patients" in the PubMed database for this study.

Results: Among the studies, 56.2% constituted research articles and were thus included in the study. Those conducted within the last decade accounted for 22.2% of our sample. The majority of the studies were conducted in the United States (44.4%). The most frequently used herbs among the publications included in the sample were Echinacea (Echinacea) (*n*=5), Ginseng (Panax), Ginkgo biloba (*n*=3), Perforate St John's-wort (*n*=3), and Garlic (Allium sativum) (*n*=3).

Conclusions: Insights into preoperative herbal use are pivotal. It is well-established that herbs interact with anesthetic medications. The findings of this review indicate a paucity of literature on this subject globally. Therefore, there is a demand for more rigorous, experimental studies to raise awareness among healthcare professionals.

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1. Introduction

For centuries, humans have utilized their interactions with nature and their accumulated experiences to treat and prevent illnesses. As a result, traditional treatment methods, alongside folk medicine, have emerged. These healing approaches, which persist to this day, are referred to by the World Health Organization (WHO) as traditional, complementary, and integrative medicine (TCIM), encompassing "a broad set of health care practices that are not part of that country's own tradition or conventional medicine and are not fully integrated into the dominant health system" [2]. Herbal medicines, a component of these traditional treatment methods, are defined by the WHO as "medicinal herbs, herbal materials, herbal preparations, and herbal products containing herbs parts or other herbs materials or combinations thereof, as active ingredients" [2]. It is estimated that herbal medicine usage globally ranges from 65% to 80%, making it the primary healthcare choice among people [3]. The increasing preference for these herbal remedies can be attributed to several factors, including their accessibility, affordability, and natural origin [4,5].

In modern medicine, herbs also play a prominent role as the main ingredients in drug manufacturing. Many well-known medications, such as atropine (from Atropa belladonna, Solanaceae), quinine (from Cinchona officinalis, Rubiaceae), digoxin (from Digitalis purpurea,

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Plantaginaceae), codeine (from Papaver somniferum, Papaveraceae), and aspirin (from Salix alba, Salicaceae), have herbal origins [6]. Although herbal medicines are often considered natural, factors such as frequency of use, dosage, and timing can render them harmful. Lack of knowledge about the toxicological and pharmacological effects of the substances used and the interactions between drugs and herbs can lead to adverse effects in users [7]. Like all medical treatments, herbal medicines can interact with anesthetic agents or medications used before surgical procedures, potentially leading to undesirable outcomes in patients. The American Society of Anesthesiologists recommends discontinuing all herbal medicines 2-3 weeks before surgery [8]. Increasing awareness among healthcare professionals is crucial in this regard, and studies like this one contribute to raising that awareness. Therefore, the aim of this study is to identify publications on patients' use of herbal treatments before surgical operations through the PubMed database.

2. Materials and Method

This study was conducted in the format of literature review using the PubMed database, an international database in the field of biomedicine, between 01.02.2024 and 05.02.2024. PubMed, an openly accessible database, was established in 1996 in the United States and primarily focuses on health and biomedicine, containing over 36 million citations and abstracts [9]. Searches were conducted using the keywords "herbal medicine, presurgical patients" on the PubMed database. Additional keywords were not selected as the focus was solely on research involving patients who were undergoing anesthesia and using herbal medicines. No specific date range was selected, and all studies related to the topic within the period from 2000 to 2023 were included. Survey studies questioning herbal medicine use before surgery (across all age groups and surgical patients) were included, while case reports, reviews, systematic analyses, and similar studies were excluded. Ethical approval was not obtained for this study.

3. Results

As a result of the searches, a total of 16 studies published between 2000 and 2023 were identified.Upon examination, it was found that a total of 9 studies met the inclusion criteria. The other 7 studies werereviews, systematic analyses, or studies focusing on the effects of herbs on diseases (Fig. 1).

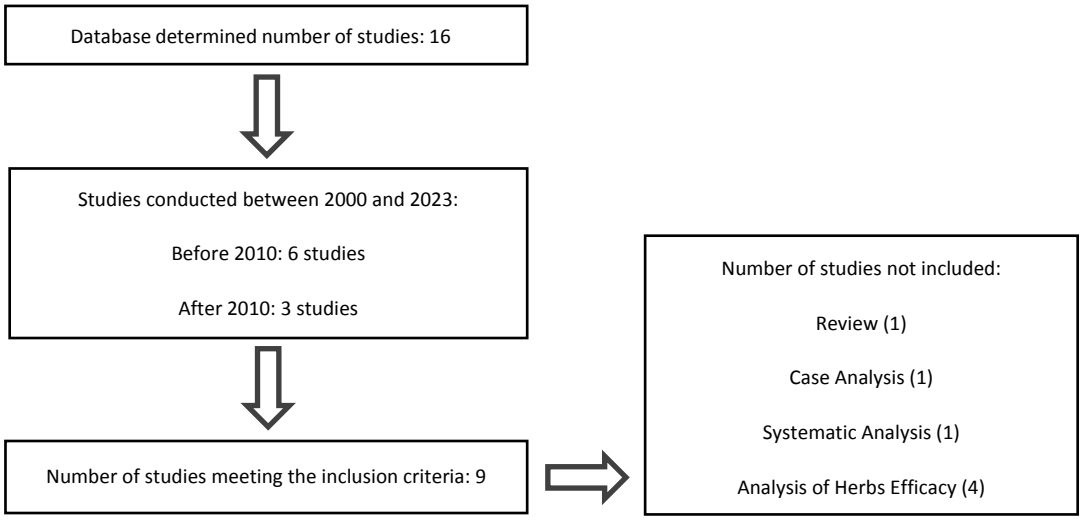

Fig. 1. Study selection process.

Between 2000 and 2012, 77.7% (n=7) of the studies were conducted, while this percentage decreased to 33.3% (*n*=2) for the years 2018-2023. All studies were in the form of surveys, questioning whether surgical patients used any herbal products. Most of the studies took place in the USA, accounting for 44.4% (*n*=4). Other countries had one study each, including Türkiye, France, China, Taiwan, and Nigeria (Table 1).

According to study results upon reviewing the 9 included studies, it was observed that the most frequently mentioned herbs were Echinacea (Echinacea) (*n*=5), Ginseng (Panax) (*n*=4), Ginkgo biloba (*n*=3), St. John's Wort (Perforate St John's-wort) (*n*=3), and Garlic (Allium sativum) (*n*=3) (Table 2).

Table 1. Location and year of the studies.

Study	Year	Location
Tsen et al. [10]	2000	USA
Leung et al. [11]	2001	USA
Hepner et al. [12]	2002	USA
Baillard et al. [13]	2006	France
Lee et al. [14]	2006	China
Heller et al. [15]	2006	USA
Onyeka et al. [16]	2012	Nigeria
Yılmaz and Çiftçi [17]	2018	Türkiye
Yeh et al. [18]	2023	Taiwan

Table 2. Herbs and publications.

Echinacea (Echinacea)	Ginseng (Panax)	Ginkgo biloba	St. John's Wort (Hypericum perforatum)	Garlic (Allium sativum)
Tsen et al. [10]	Tsen et al. [10]	Tsen et al. [10]	Tsen et al. [10]	Tsen et al. [10]
Baillard et al. [13]	Baillard et al. [13]	Baillard et al. [13]	Baillard et al. [13]	Heller et al. [13]
Hepner et al. [13]	Leung et al. [13]	Yılmaz and Çiftçi [13]	Hepner et al. [13]	Yılmaz and Çiftçi [13]
Leung et al. [13]	Heller et al. [13]			
Heller et al. [13]				

The information regarding the timing, location, herbal usage, and specific herbs featured in the studies included in the research is summarized in Table 3. Notably, all of these studies center around surgical patients, including diverse groups such as pregnant individuals and those undergoing plastic surgery.

Table 3. Case summaries of the study.

Study	Year	Location	Patient type	Patient number	Method	Herbal medicine usage rate	Herbs
Tsen et al. [10]	2000	USA	All surgical patients	3106	Survey study	22.0%	Echinacea, Ginkgo Biloba, St. John's Wort, Garlic, Ginseng
Leung et al. [11]	2001	USA	All surgical patients	2560	Survey study	39.2%	Echinacea, Ginseng
Hepner et al. [12]	2002	USA	Pregnant women expected to give birth within 20 weeks	734	Survey study	7.1%	Echinacea, St John's Wort, Ephedra
Baillard et al. [13]	2006	France	All surgical patients	1057	Survey study	20.0%	Valerian, Ginkgo Biloba, Ginseng, St John's Wort, Echinacea
Lee et al. [14]	2006	Chinese	All surgical patients	601	Survey study	85.0%	The herbs are used in soups and mixtures.
Heller et al. [15]	2006	USA	Plastic surgery patients	100	Survey study	55.0%	Echinacea, Garlic, Ginseng, Ginger
Onyeka et al. [16]	2012	Nigeria	Day surgery patients	60	Survey study	40.0%	Local herbs are being used.
Yılmaz and Çiftçi [17]	2018	Türkiye	All surgical patients	600	Survey study	14.0%	Garlic, Swedish bitters, green tea, Ginkgo Biloba, horsetail, and plane tree leaves are being used.
Yeh et al. [18]	2023	Taiwan	All surgical patients	1428	Survey study	50.9%	Traditional Chinese herbs

4. Discussion

This study, focusing on the use of herbal medicine by patients before surgery, was conducted between 01.01.2024 and 05.02.2024 using the PubMed database. Screening was carried out using keywords, and as a result, a total of 16 studies were identified. Among these, 7 studies (43.8%) were excluded from the analysis due to being reviews, case analyses, systematic analyses, or analyses of herbal efficacy. A total of 9 studies (56.2%) were included for further examination. These studies were evaluated based on the year of publication, country, field, number of patients, and the herbal drugs identified (Table 3). Additionally, based on the reviewed articles, the most frequently mentioned herbs were identified as Echinacea (Asteraceae), Ginseng (Panax), Ginkgo biloba, St. John's Wort (Hypericum perforatum), and Garlic (Allium sativum) (Table 2). The interactions of these herbs with anesthetic agents were considered significant. The traditional uses and anesthetic effects of these herbs were reviewed accordingly.

Echinacea (Asteraceae) has been integrated into traditional treatment methods for centuries and has been used to treat ailments such as the common cold, bronchitis, and upper respiratory tract infections [19]. It is recommended that this herb, which is used to boost the immune system, should not be used at least two weeks before surgery [20]. Although conclusive evidence is lacking, concerns about hepatotoxicity exist. Therefore, it is emphasized that caution should be exercised in the use of echinacea in surgeries, especially in patients with impaired liver function [21].

Ginseng (Panax) has been used for therapeutic purposes for thousands of years in Korea, China, and Japan, with the belief that it can heal the entire body. In traditional Chinese medicine, it has been regarded as a medicinal herbs that nourishes five vital organs-spleen, lungs, heart, kidneys, and liver-calms the mind, regulates mental activities, improves vision, and, when used regularly, extends lifespan [22]. People have also used this legendary herbs as an aphrodisiac, rejuvenator, and energy booster [23]. It is recommended that ginseng be discontinued at

least 7 days before surgery [20] due to its potential to increase bleeding and cause hypoglycemia [20,24,25].

Ginkgo biloba, another important herb in traditional Chinese medicine, is used to treat blood-related disorders, enhance memory, and keep the mind sharp. Ginkgo leaf extract is also used in modern medicine for its therapeutic effects in regulating cerebral blood flow, protecting against free radicals, and delaying the progression of dementia and diabetes [26]. Due to its antiplatelet pharmacological effects, this herb is recommended to be discontinued at least 36 hours before surgery due to the risk of bleeding [20].

St. John's Wort (Perforate St John's-wort); dating back to ancient Greece, it has been used for mental health issues such as anxiety and depression, as well as for wound and burn treatment [27,28]. The St. John's Wort herbs, commonly used in antidepressant therapy, poses a risk of blocking the reuptake of dopamine, norepinephrine, and serotonin, thus it is recommended to discontinue its use at least 5 days before surgery [20,21,29].

Garlic (Allium sativum); historically, it has been used for respiratory tract ailments, gastrointestinal issues, hypertension, diabetes, leprosy, warts, and pain relief [30]. Due to its pharmacological effects on hypertension, hyperlipidemia, and atherosclerosis, garlic is recommended to be discontinued at least 7 days before surgery due to concerns about increased bleeding risk [20,31].

According to the review results it becomes evident that Echinacea, Ephedra, Garlic, Ginkgo biloba, Ginseng, Kava, St. John's Wort, and Valerian are among the herbs that exhibit the most significant interactions with anesthetic agents. These herbs, widely utilized as herbal remedies, raise concerns during the perioperative period due to their potential effects [14]. Recommendations exist for discontinuing herbal use 2-3 weeks before surgery [14,32]. Studies have raised concerns about the use of these herbs. According to a case report by Gravas et al. [33], excessive consumption of garlic resulted in renal hematoma following extracorporeal shock wave lithotripsy (SWL) in an elderly patient with nephrolithiasis. Additionally, studies have shown associations between bleeding risk and herbs containing Ginkgo biloba, chondroitin-glucosamine, melatonin, turmeric, blueberry, chamomile, fenugreek, milk thistle, and peppermint, with recommendations for discontinuation of these herbs at least two weeks before surgery [34]. Herbal treatments not only pose risks of bleeding but also concerns about sedative effects of chamomile taken for diabetes, interactions of St. John's Wort used for depression with other medications before surgery. These examples can be expanded upon [35]. In light of this information, it is important to inquire whether patients use herbal remedies before surgery. Recent studies have shown different herbal remedy uses among patients. In a study conducted in Türkiye by Civraz et al. [36], it was found that black seed and green tea were commonly used. In the literature, studies investigating the use of herbal mixtures in traditional Chinese medicine or regional herbs can also be observed [14,16,18].

The reviews were conducted solely through PubMed. Due to the exclusion of other databases, a comprehensive conclusion cannot be reached. Additionally, this study focused only on the plants used before surgery, hence screening was carried out using only two keywords. Information regarding plant usage within studies related to traditional treatment methods is not included in this study.

5. Conclusions

As a result a total of 16 studies were identified. As 7 of these studies (43.8%) were reviews, case analyses, systematic analyses, or analyses of herbs efficacy, they were not included in the review. A total of 9 studies (56.2%) were included in the review. When all studies are examined, it becomes evident that theuse of herbal medicine by patients before surgery is crucial for ensuring a comfortable surgical experience. This is because herbs can interact with medications, potentially leading to complications. Therefore, there is a need for research to identify these medicinal herbs. However, the existing literature is inadequate, and new studies are limited. This study addresses a significant gap in summarizing preoperative herbal use, providing guidance for physicians, healthcare providers, and researchers.

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Conflict of Interest

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Author Contributions

All of the authors made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; were involved in drafting the manuscript or revising it critically for important intellectual content; and gave final approval of the version to be published.

Data Availability

The datasets created and/or analyzed during the current study are not publicly available, but are available from the corresponding author upon reasonable request.

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