



## Pharmacists And Herbal Medications: Identifying Potential Interactions With Conventional Drugs

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### Abstract

Herbal medications, derived from plants, have a long history of use in various cultures for their potential therapeutic effects. They are often perceived as natural and safe alternatives to conventional pharmaceuticals. However, many patients incorporate herbal remedies into their daily routines without considering potential interactions with their prescribed medications. Commonly used herbal medications include *Echinacea*, *Ginkgo biloba*, St. John's Wort, Turmeric (curcumin), Garlic, Ginseng, and Milk thistle, each with its purported uses. While these herbs have been used for generations, their safety and effectiveness may vary, and not all herbal remedies are supported by robust scientific evidence. Pharmacists play a crucial role in ensuring patient safety and optimal therapeutic outcomes when it comes to identifying and managing drug interactions with herbal medications. Their roles include medication review and assessment, risk assessment and evaluation, patient education, communication with healthcare providers, and meticulous documentation and record-keeping. Interactions between herbal medications and conventional drugs can affect drug absorption, distribution, metabolism, and excretion. Pharmacists assess these interactions based on pharmacokinetic and pharmacodynamic factors, considering individual patient characteristics, medication importance, scientific evidence, and more. They educate patients about the risks and benefits of combining herbal and conventional treatments, empowering them to make informed choices. Pharmacists also communicate effectively with healthcare teams, provide valuable information, and report adverse events to regulatory agencies. Medication reconciliation during transitions of care, such as hospital admissions and discharges, ensures treatment continuity and patient safety. Documentation and record-keeping are crucial for maintaining accurate medication profiles, documenting assessments, and adhering to legal requirements. In summary, pharmacists play a pivotal role in recognizing, assessing, and managing potential interactions between herbal medications and conventional drugs. Their expertise ensures patient safety, effective treatment, and well-informed healthcare decisions in this complex landscape of healthcare.

**Keywords:** pharmacists, herbal medications, drug interactions, patient safety, healthcare decisions, conventional drugs

### INTRODUCTION

In recent years, the use of herbal medications alongside conventional drugs has gained popularity among individuals seeking alternative or complementary therapies for their health concerns. Herbal medications, derived from plants, have a long history of use in various cultures for their potential therapeutic effects (1). They are often perceived as natural and safe alternatives to conventional pharmaceuticals. As a result, many patients incorporate herbal remedies into their daily routines without considering potential interactions with their prescribed medications.

Commonly used herbal medications are often sought after for their potential health benefits. It is essential to understand that while these herbs have been used for generations, their safety and effectiveness may vary, and not all herbal remedies are supported by robust scientific evidence. Here are some commonly used herbal medications, along with their purported uses. *Echinacea*, derived from *Echinacea purpurea*, is traditionally used to support the immune system and help combat colds and respiratory infections (2). *Ginkgo biloba* is often used to improve memory, cognitive function, and circulation(3). St. John's Wort is commonly used for mild to moderate depression and mood disorders (4). Turmeric, or its active compound curcumin, is used for its anti-inflammatory and antioxidant properties, believed to support joint health and relieve pain (5). Garlic is used to support heart health, lower blood pressure, and reduce cholesterol levels (6). Ginseng is often used as an adaptogen to combat stress, boost energy, and enhance overall vitality (7). Milk thistle is known for its potential liver-protective properties and is used to support liver health (8). It is crucial to approach herbal medications with caution, consult healthcare providers, and purchase herbal products from reputable sources to ensure quality and purity, especially if taking conventional medications or having underlying health conditions.

While herbal remedies can offer numerous benefits, they also come with the potential for interactions with prescription medications. Pharmacists play a pivotal role in identifying and managing these interactions to ensure patient safety. This

review discusses the essential role of pharmacists in recognizing potential interactions between herbal medications and conventional drugs.

## **METHODOLOGY**

This study is based on a comprehensive literature search conducted on February 4, 2023, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the role of pharmacists in identification of potential interactions of herbal medications with conventional drugs. There were no restrictions on date, language, participant age, or type of publication.

## **DISCUSSION**

Interactions between herbal medications and conventional drugs can vary widely, affecting the absorption, distribution, metabolism, and excretion of medications. Pharmacists are pivotal in recognizing these interactions by considering pharmacokinetic and pharmacodynamic factors.

Pharmacokinetic interactions center on how drugs are processed within the body. Herbal compounds can affect drug absorption by altering gastrointestinal pH levels, potentially making drugs less effective or leading to adverse effects (9). For example, antacids containing aluminum or magnesium can interfere with antibiotic absorption, while ginger may enhance drug absorption (10). Distribution, the drug's movement within the body, can be influenced by herbal compounds like those in *Ginkgo biloba* or garlic, which possess blood-thinning properties (11). When taken with anticoagulants, these herbs may increase bleeding risk. Metabolism, primarily in the liver, involves enzymes that metabolize drugs. Some herbs, like St. John's Wort, induce or inhibit specific enzymes, affecting drug metabolism. St. John's Wort induces the CYP3A4 enzyme, impacting drugs metabolized by it, including certain antidepressants and birth control pills (9). Excretion, drugs' removal from the body, can be influenced by herbal diuretics like dandelion or horsetail, potentially reducing drug effectiveness (12). Understanding these pharmacokinetic interactions is vital for pharmacists to ensure safe and effective conventional drug therapies when patients use herbal remedies. Patient education about disclosing all herbal and over-the-counter medication use to healthcare providers is fundamental.

Pharmacodynamic interactions focus on how herbal and conventional drugs impact the same physiological pathways, receptors, or systems, potentially leading to additive, synergistic, or antagonistic effects (13). Additive or synergistic interactions can enhance therapeutic benefits, reducing drug dosages and side effects. For example, valerian root, known for mild sedative properties, combined with prescription anxiety or insomnia medications may reduce drug dosages and side effects (14). Antagonistic interactions occur when herbal and conventional medications counteract each other, potentially reducing drug efficacy. For instance, ginseng's stimulant properties may diminish antipsychotic drug sedation, reducing their efficacy in managing psychotic symptoms (15). Monitoring and adjusting treatment plans are essential to mitigate these risks. Pharmacists evaluate interactions' severity, individual patient characteristics, the importance of medications, scientific evidence, dosage, and duration of therapy. By assessing these factors, they can make informed decisions, provide evidence-based recommendations, and collaborate with healthcare providers to ensure patients receive safe and effective care while combining herbal and conventional medications.

Adverse effects resulting from interactions between herbal medications and conventional drugs represent a critical concern in healthcare (16). These interactions can lead to a range of unintended and potentially harmful outcomes. One significant issue is the increased risk of side effects. When herbal remedies and prescription drugs are used in conjunction, the likelihood of experiencing side effects may rise significantly. This is because both treatments can independently contribute to specific side effects, and when combined, they can intensify these issues. Furthermore, the potential for drug toxicity cannot be overlooked. Herbal supplements containing compounds that impact the liver's detoxification enzymes can interfere with the metabolism of certain medications. As a result, the combined use of these herbal remedies and conventional drugs may lead to elevated drug levels in the bloodstream, increasing the risk of drug toxicity. This poses a particular concern in chronic conditions where consistent therapeutic levels are vital for successful treatment outcomes. Allergic reactions are another adverse effect that can arise from interactions between herbal and conventional medications (17). Some individuals may be hypersensitive to specific herbal compounds or ingredients in conventional drugs. When both are taken together, the risk of experiencing an allergic reaction, which can range from mild skin rashes to severe anaphylaxis, may elevate significantly. Gastrointestinal distress is yet another concern. While some herbal remedies, such as ginger or peppermint, have soothing effects on the digestive system and may be beneficial for specific conditions, their interaction with medications that affect the stomach or gastrointestinal tract, such as non-steroidal anti-inflammatory drugs (NSAIDs), can lead to unintended consequences (18). Additionally, adverse effects can manifest as altered drug efficacy. Herbal medications can interfere with the absorption, distribution, or metabolism of conventional drugs, ultimately reducing their effectiveness. This can lead to treatment failure, a significant concern for patients with chronic illnesses that rely on consistent therapeutic drug levels. To mitigate the risks associated with these adverse effects, healthcare providers, particularly pharmacists, must play a crucial role in assessing potential interactions, educating patients about the risks and benefits of combining herbal and conventional treatments, and making necessary adjustments to treatment plans. Patients, in turn, must provide a comprehensive medication history, including their use of herbal and over-the-counter supplements, to their healthcare providers.

**Table 1.** Interactions between conventional drugs and some commonly used herbal medications

Herbal Medication	Interactions with Conventional Drugs
<i>Echinacea</i>	May interact with immunosuppressive drugs, potentially reducing their effectiveness (2).
<i>Ginkgo Biloba</i>	Can increase bleeding risk when used with anticoagulant medications like warfarin or aspirin (3).
St. John's Wort	Induces CYP3A4 enzyme, impacting drugs metabolized by it, including certain antidepressants, birth control pills, and immunosuppressants (4).
Turmeric	May enhance the effects of blood-thinning medications, potentially increasing the risk of bleeding (5).
Garlic	Can interact with anticoagulants, leading to increased bleeding risk, and may affect the metabolism of certain drugs (6).
Ginseng	May interfere with antipsychotic drug sedation, reducing their efficacy in managing psychotic symptoms (7).
Milk Thistle	Can alter liver metabolism, potentially affecting the effectiveness of drugs processed through the liver (8).
Ginger	May enhance drug absorption, potentially increasing the effects of certain medications (10).
Valerian Root	When combined with prescription anxiety or insomnia medications, it may reduce drug dosages and side effects (14).
Dandelion	Herbal diuretics like dandelion may reduce drug effectiveness, affecting medications requiring consistent therapeutic levels (15).

In the context of identifying potential interactions between herbal medications and conventional drugs, pharmacists play a critical and specialized role in ensuring patient safety and optimal therapeutic outcomes.

#### **Medication Review and Assessment**

Medication review and assessment represent a foundational responsibility of pharmacists in the context of identifying potential interactions between herbal medications and conventional drugs (19, 20). Pharmacists are tasked with conducting comprehensive assessments of a patient's entire medication profile, leaving no room for oversight. This meticulous process involves scrutinizing the complete list of prescription medications, over-the-counter drugs, and herbal supplements that a patient is taking. Pharmacists employ their expertise in pharmacology and pharmacokinetics to evaluate the potential for interactions. They delve into the specific properties of herbal remedies and conventional drugs, considering factors such as their mechanisms of action, metabolic pathways, and known interactions with other substances. Furthermore, pharmacists consider individual patient characteristics, including age, gender, genetics, and overall health status. These factors can influence how medications are metabolized and how interactions may manifest in a particular patient. Pharmacists also assess the patient's medical history, identifying any underlying health conditions that could heighten the risk of interactions. This medication review and assessment process extends to considering the duration of therapy, the dosages prescribed, and the frequency of administration. Pharmacists critically evaluate the patient's adherence to prescribed regimens and whether they have been consistently taking their medications, including any herbal supplements (19). Ultimately, the goal of this comprehensive review and assessment is to identify any potential interactions that could compromise patient safety or treatment efficacy. Pharmacists are trained to recognize the warning signs of interactions, ranging from mild effects to severe adverse outcomes. When interactions are identified, pharmacists can take proactive steps to mitigate risks, such as adjusting dosages, recommending alternative therapies, or advising on the appropriate timing of medication administration to minimize potential conflicts.

#### **Risk Assessment and Evaluation**

Risk assessment and evaluation are fundamental components of a pharmacist's responsibilities when dealing with potential interactions between herbal medications and conventional drugs (20). Pharmacists are uniquely positioned to conduct a comprehensive evaluation of the risks associated with combining these substances, considering various critical factors to ensure patient safety and optimize therapeutic outcomes. Firstly, pharmacists assess the severity of potential interactions. They categorize interactions based on their likely impact, differentiating between those that are minor and may only require monitoring, and those that are moderate or major, necessitating intervention. This risk assessment considers the potential for adverse effects, changes in drug efficacy, and the overall impact on the patient's health (21). Furthermore, pharmacists evaluate the patient's specific health status and medical history. Factors such as age, underlying medical conditions, allergies, and genetics can influence how interactions manifest and their potential consequences. Pharmacists consider the patient's individual risk factors and vulnerabilities to tailor their recommendations and interventions accordingly. The therapeutic importance of the medications involved is another critical aspect of risk assessment. Pharmacists assess whether the herbal medications and conventional drugs are essential for managing the patient's health conditions. They prioritize medications that are vital for the patient's well-being, aiming to preserve the most effective and necessary treatments while addressing potential interactions. Additionally, pharmacists examine the scientific evidence available regarding specific interactions (19). They rely on up-to-date research, clinical studies, and reputable resources to determine the validity and significance of potential risks. Evidence-based decision-making is a cornerstone

of risk assessment and evaluation, allowing pharmacists to provide well-informed recommendations (22). Pharmacists also consider the dosage, frequency of administration, and duration of therapy for both herbal supplements and conventional drugs. Variations in these factors can influence the likelihood and severity of interactions. Pharmacists may recommend dosage adjustments or alternative treatment strategies to mitigate risks effectively. Overall, risk assessment and evaluation are integral to a pharmacist's role in this context. Their ability to weigh potential risks against the benefits of treatment is crucial in providing patient-centered care. By conducting a thorough risk assessment and evaluation, pharmacists can make informed decisions, offer evidence-based recommendations, and collaborate with healthcare providers to ensure that patients receive safe and effective care, even when combining herbal and conventional medications.

### ***Patient Education***

Patient education is a cornerstone of a pharmacist's responsibilities when addressing potential interactions between herbal medications and conventional drugs. Pharmacists are instrumental in ensuring that patients have the knowledge and understanding necessary to make informed decisions regarding their medication regimens. In the context of herbal and conventional drug interactions, patient education involves several crucial elements (23). Firstly, pharmacists provide patients with clear and accessible information about the specific interactions that may occur when combining herbal supplements with prescribed medications. They explain the mechanisms behind these interactions, detailing how herbal compounds can affect the absorption, metabolism, or actions of conventional drugs. Patients are educated on the potential consequences of these interactions, including changes in drug efficacy or the risk of adverse effects. Pharmacists emphasize the importance of open communication between patients and healthcare providers. Patients are encouraged to disclose all the medications and supplements they are taking, including herbal remedies, to their healthcare team. This transparency allows healthcare providers to make well-informed decisions and adjustments to treatment plans, minimizing the risks associated with interactions. Moreover, patients receive guidance on how to recognize signs of adverse effects or interactions. Pharmacists educate patients on the common symptoms to watch for, empowering them to take prompt action if they suspect any issues (24). This proactive approach contributes to early intervention and improved patient safety. Pharmacists also provide practical advice on how to manage their medication regimens effectively. This includes instructions on proper dosing, timing of administration, and the importance of medication adherence. Patients are educated on strategies to ensure they take their medications as prescribed while safely incorporating herbal supplements if they choose to do so. In addition to discussing the potential risks, pharmacists inform patients about any potential benefits or synergistic effects that may result from combining herbal remedies with conventional drugs. This comprehensive understanding allows patients to make well-balanced decisions about their treatment options, weighing the potential advantages and disadvantages. Furthermore, pharmacists encourage patients to seek professional guidance before initiating any new herbal supplements or making significant changes to their treatment regimens (25). This ensures that healthcare providers are aware of any potential interactions and can provide personalized recommendations based on the patient's specific health status and goals. Overall, patient education is a vital responsibility for pharmacists when dealing with potential interactions between herbal medications and conventional drugs. It empowers patients to actively participate in their healthcare decisions, promotes medication safety, and enhances treatment outcomes. By providing comprehensive education, pharmacists play a crucial role in ensuring that patients make informed choices that prioritize their well-being while navigating the complexities of combining herbal and conventional medications.

### ***Communication with healthcare providers***

In the context of identifying and managing potential interactions between herbal medications and conventional drugs, effective communication with healthcare providers stands as a pivotal responsibility for pharmacists. They serve as vital intermediaries between patients and healthcare teams, facilitating the exchange of essential information to ensure safe and well-informed healthcare decisions (26). Pharmacists meticulously review patients' medication profiles, compiling a comprehensive list of all substances being used, including herbal supplements. They assess the potential for interactions, categorize their severity, and provide evidence-based recommendations to healthcare providers, such as dosage adjustments or alternative medications. This clear and concise communication is essential in conveying the urgency and significance of specific cases. Pharmacists also consider patient-specific factors and contribute to medication reconciliation during transitions of care, ensuring treatment continuity (27). Additionally, they educate healthcare providers about the latest research and guidelines regarding interactions and promptly report adverse events to regulatory agencies. This collaborative and interdisciplinary approach optimizes patient safety, enhances treatment outcomes, and promotes coordinated patient-centered care. Medication reconciliation is a critical responsibility of pharmacists when addressing potential interactions between herbal medications and conventional drugs. This process involves a thorough review and comparison of a patient's medication list during transitions of care, such as hospital admissions, discharges, or changes in healthcare settings. Pharmacists meticulously document and reconcile all prescription medications, over-the-counter drugs, and herbal supplements that the patient is taking to ensure that the treatment plan remains accurate and aligned with the patient's health goals (26). During hospital admissions, pharmacists collaborate with healthcare teams to compile an accurate medication history, which may include patient-reported information and data from external sources such as community pharmacies or electronic health records. They pay specific attention to herbal supplements, as patients may not always consider them medications or may not be aware of potential interactions. Pharmacists communicate with patients to gather this crucial information, ensuring that nothing is overlooked. Throughout the hospital stay, pharmacists work closely with healthcare providers to make any necessary adjustments to the patient's medication regimen, considering

the potential interactions and the unique circumstances of the hospital setting. This may involve discontinuing or modifying certain herbal supplements or conventional drugs to minimize risks and optimize treatment (28). During hospital discharges, pharmacists again play a crucial role in medication reconciliation. They ensure that any changes made during the hospital stay are clearly communicated to the patient and the outpatient healthcare team. Pharmacists educate patients about their updated medication regimen, including any modifications or discontinuations necessitated by potential interactions. In ambulatory care settings, pharmacists continue to engage in medication reconciliation during routine appointments, emphasizing the importance of ongoing monitoring and assessment. They ensure that the patient's medication list remains accurate and up to date, making any necessary changes based on the latest information and clinical considerations. Medication reconciliation by pharmacists is essential for preventing medication-related errors, mitigating the risks of potential interactions, and ensuring treatment continuity. It fosters a seamless transition of care, improves patient safety, and contributes to the overall effectiveness of healthcare services.

### **Documentation and record-keeping**

Documentation and record-keeping are foundational responsibilities of pharmacists when addressing potential interactions between herbal medications and conventional drugs. The meticulous and organized documentation of patient information, interactions, assessments, and interventions is crucial for ensuring patient safety, maintaining continuity of care, and adhering to regulatory requirements (29). Pharmacists start by maintaining accurate and comprehensive records of each patient's medication profile. This includes recording the names, dosages, frequencies, and routes of administration of all prescription drugs, over-the-counter medications, and herbal supplements (30). The documentation process is thorough, leaving no room for oversight, and it involves updating the records whenever there are changes to the patient's medication regimen. In cases where potential interactions between herbal remedies and conventional medications are identified, pharmacists document their assessments and evaluations. This includes categorizing the interactions based on severity and clinical significance, outlining the reasoning behind their recommendations, and recording any interventions made to mitigate risks. Documentation ensures that healthcare providers and future caregivers have a clear understanding of the patient's unique circumstances and the rationale for specific actions taken. Pharmacists also maintain records of patient-specific factors that may influence interactions, such as medical history, allergies, genetics, and any adverse events experienced. This information helps tailor recommendations and interventions to the individual patient's needs and preferences. During transitions of care, such as hospital admissions, discharges, or outpatient visits, pharmacists ensure the accurate transfer of medication information (29). They document changes to the medication regimen, including modifications related to herbal supplements, and communicate these changes effectively to the patient and the healthcare team. Furthermore, pharmacists adhere to regulatory requirements and standards for documentation and record-keeping. They maintain patient confidentiality and protect sensitive information. Documentation and record-keeping are not only essential for patient care but also for legal and regulatory compliance. Should any questions, concerns, or disputes arise regarding a patient's medication history or the management of potential interactions, thorough and well-maintained records serve as a reliable source of information and documentation of the pharmacist's actions and decisions.

**Table 2.** Roles of pharmacists in the context of identifying and managing drug interactions with herbal medications

<b>Role of Pharmacist</b>	<b>Description</b>
Medication Review and Assessment	- Conduct a comprehensive assessment of a patient's entire medication profile, including herbal supplements.
	- Evaluate the potential for interactions based on pharmacokinetic and pharmacodynamic factors.
	- Consider individual patient characteristics, health status, and medical history to identify interaction risks.
Risk Assessment and Evaluation	- Categorize interactions based on severity and potential impact on patient health.
	- Assess individual patient risk factors, including age, genetics, and allergies, to tailor recommendations.
	- Prioritize essential medications and consider the therapeutic importance of each drug.
Patient Education	- Provide clear and accessible information to patients about potential interactions and their consequences.
	- Encourage open communication between patients and healthcare providers regarding all medications used.
	- Educate patients on recognizing signs of adverse effects or interactions and managing their medication regimens.
Communication with Healthcare Providers	- Communicate effectively with healthcare teams, providing detailed information about identified interactions.
	- Collaborate on medication adjustments, dosage changes, or alternative therapies to mitigate risks.
	- Report adverse events to regulatory agencies and contribute to the improvement of patient safety.

Documentation and Record-Keeping	- Maintain accurate and comprehensive records of medication profiles, interactions, assessments, and interventions.
	- Ensure the accurate transfer of medication information during transitions of care, such as hospital admissions.
	- Adhere to legal and regulatory requirements, protecting patient confidentiality and sensitive information.

## CONCLUSION

The use of herbal medications alongside conventional drugs has become increasingly popular, but it comes with the potential for interactions that can impact patient safety and treatment efficacy. Pharmacists play a crucial role in recognizing and managing these interactions by conducting thorough medication reviews and assessments, assessing risks, educating patients, communicating with healthcare providers, and maintaining meticulous documentation. By fulfilling these responsibilities, pharmacists ensure that patients receive safe and effective care while navigating the complexities of combining herbal and conventional medications. Patient safety remains at the forefront of their efforts, emphasizing the importance of informed decision-making and collaborative healthcare practices.

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