PLANT SCIENCE TODAY
Vol 12(4): 1-8
https://doi.org/10.14719/pst.10224

eISSN 2348-1900

RESEARCH ARTICLE

Insights into Iraqi pharmacists' perspectives, awareness and use of herbal medicines

Amjed Haseeb Khamees

Department of Pharmacognocy and Medicinal plants, College of pharmacy, University of Baghdad, Baghdad 100 01, Iraq

*Correspondence email - amjed.haseeb.khamees@gmail.com

Received: 24 June 2025; Accepted: 19 August 2025; Available online: Version 1.0: 10 September 2025; Version 2.0: 01 October 2025

Cite this article: Amjed HK. Insights into Iraqi pharmacists' perspectives, awareness and use of herbal medicines. Plant Science Today. 2025; 12(4): 1-8. https://doi.org/10.14719/pst.10224

Abstract

With the rising use of herbal remedies and a lack of dependable information available to consumers, pharmacists play a critical role in offering accurate and informed advice on these products' potential benefits and risks. This study sought to assess the knowledge, perceptions and professional behaviours of community pharmacists concerning herbal medicines. It also aimed to examine how pharmacists influence patient decisions about herbal product use and to pinpoint areas in need of professional development. A structured and anonymous questionnaire was distributed through email, social media and in-person methods. The survey encompassed demographic details, assessments of pharmacists' views and routines related to herbal medicine, the impact of their educational background on confidence levels and a 10 question quiz measuring factual knowledge. Data analysis was conducted using Qualtrics and Excel. Out of 156 community pharmacists surveyed, 42.9 % reported feeling confident in counselling patients about herbal products. Only 22.4 % regularly asked patients about their use of herbal medicines and 28.2 % recorded this information in their documentation. A small proportion (5.1 %) stated they never discussed potential adverse effects, while 9 % consistently addressed possible interactions between herbal and conventional medications. The mean knowledge score was 5.63 out of 10, indicating room for improvement in pharmacist preparedness regarding herbal medicine. The findings underscore the urgent need to strengthen pharmacists education on herbal medicines and ensure access to reliable resources. Enhancing these areas will improve patient safety and counselling quality.

Keywords: community pharmacy; herbal medicine; Iraqi pharmacists; pharmacognocy

Introduction

For centuries, plants have been central to medicinal practices, serving as the basis for numerous modern pharmaceuticals (1). Pharmacognosy, a field dedicated to studying crude drugs from plant and animal sources, has played a vital role in ensuring the quality control and authentication of herbal medicines (2). Herbal medicines are defined as products derived from plants or their parts, intended to support or enhance health (3). According to the 1994 Dietary Supplement Health and Education Act, herbal products are regulated as dietary supplements. While consumers often perceive herbal medicines as inherently safe due to their natural origin, this assumption is often misleading. Under the Dietary Supplement Health and Education Act, herbal products are not required to prove safety or efficacy before entering the market, making the consistency and safety of many over the counter (OTC) herbal medicines are uncertain. Contaminants and interactions between herbs and pharmaceuticals can result in unforeseen adverse effects. Herbal medicines may influence cytochrome P450 (CYP) enzymes, P-glycoprotein and other metabolic enzymes and drug transporters, which can potentially alter the effectiveness and safety of prescription and other drugs. Additionally, rigorous research on the safety and efficacy of many herbal medicines remains limited. While certain widely used herbs, like St. John's wort and *Ginkgo biloba*, show evidence of effectiveness for specific conditions, studies on herbal medicines frequently suffer from methodological flaws and yield inconsistent findings (4). Accurate dosing and administration are critical to ensuring the safety and effectiveness of all medications, including herbal remedies. This is especially important given the documented concerns in medical literature about ingredient inconsistencies and potential herb-drug interactions. The limited evidence and understanding surrounding herbal medicines can contribute to uncertainty among healthcare professionals regarding their appropriate role in contemporary healthcare practices (5). Despite the increasing prevalence of herbal medicine use, there remains a significant gap in research regarding pharmacists' awareness, knowledge and attitudes toward these products. Previous studies have highlighted pharmacists' crucial role in advising patients on medication safety; however, limited research has explored their preparedness and confidence in addressing herbal medicine-related concerns. Given the accessibility of community pharmacists and their responsibility in ensuring safe medication use, it is essential to assess their current level of engagement with herbal products and identify potential areas for improvement. Understanding pharmacists perspectives on herbal medicines will contribute to enhancing patient counselling, minimizing risks associated with improper use and promoting evidence-based integration of these products into pharmaceutical practice.

Despite ongoing debate among healthcare professionals, the use of herbal medicine has been steadily increasing in recent years. Since 2004, herbal supplement sales in the United States have consistently grown, reaching an estimated $8.085 billion in 2017, which represents a rise of 8.5 % from the previous year. Popular herbal supplements commonly sold in supermarkets and pharmacies include echinacea, cranberry, turmeric, green tea, ginger and saw palmetto. Data from the 2012 National Health Interview Survey on complementary health practices indicated that nearly 18 % of Americans used natural products, such as herbal medicines and other non-vitamin, non-mineral supplements (6), with individuals managing multiple chronic conditions reporting a usage rate of 22 % (7).

With the growing demand for herbal medicines and the risks associated with patients using these alongside conventional treatments, pharmacists need to recognize the importance of their role in managing herbal medicine use. According to the World Health Organization, community pharmacists or retail pharmacists are the most accessible healthcare professionals to the public, responsible for the safe provision of both prescription and non-prescription medications and for offering proper counselling at the point of dispensing (8). In recent years, the use of herbal products in Iraq has grown significantly, with many available over the counter in community pharmacies. Despite this trend, there is limited data on how Iraqi pharmacists perceive, recommend and manage these products in clinical practice. Pharmacists often serve as the first point of contact for patients seeking guidance on herbal medicines, yet gaps in education and confidence may hinder safe counselling. Although pharmacy education includes comprehensive training on conventional medications, coursework dedicated to herbal medicines is often limited. In Iraq, pharmacognosy is covered through three courses within the pharmacy curriculum, but some aspects may also appear in other contexts, such as drug discovery and herb-drug interactions. Regulatory frameworks governing herbal medicine use vary significantly across countries, influencing their availability, safety and quality control measures. While some countries enforce stringent regulations that require extensive clinical testing and quality assurance, others, including Iraq, follow less standardized approaches, which may impact the consistency and safety of herbal products in the market. These regulatory disparities highlight the need for pharmacists to be well-informed about the policies governing herbal medicines in their respective regions to ensure safe and evidence-based recommendations for patients. The role of pharmacists in relation to herbal medicine remains poorly defined, though several key responsibilities have been suggested in the literature. Specifically, community pharmacists should: recognize the use of herbal medicines among their patients, possess comprehensive knowledge about these products, ensure their safe and appropriate use, document patient usage, report any adverse reactions associated with herbal medicines, provide accurate education regarding their use and collaborate with other healthcare professionals when feasible (9). While these responsibilities are reasonable and attainable, there is limited research on how community pharmacists integrate herbal medicine into their practice or whether these responsibilities are being adequately followed. This study focused on community pharmacists because they are accessible to the public and because over-the-counter herbal products are widely available in many pharmacies. The aim was to explore Iraqi pharmacists' perceptions of herbal medicine, evaluate their knowledge and practices regarding these products and determine the impact they may have on the safe and appropriate use of herbal medicines, as well as identify areas where improvements could be made. This study addresses this gap by evaluating Iraqi community pharmacists' knowledge, attitudes and practices regarding herbal medicine use, aiming to identify areas for professional development and improve patient safety.

Materials and Methods

A structured questionnaire was developed based on existing literature and included four sections: demographics, perceptions and practices, impact of education and a 10 item knowledge quiz. The survey was created using Qualtrics and distributed in paper form. Data was analyzed using excel. This descriptive study surveyed community pharmacists across all Iraqi provinces, including the Kurdistan region. Eligibility was limited to actively practicing community pharmacists. An anonymous survey was developed using the Qualtrics online platform and the study received ethical exemption from the College of Pharmacy at the University of Baghdad. Following approval, the survey was distributed via social media, in-person delivery to local pharmacies and email and WhatsApp outreach including to College of Pharmacy alumni. All responses were recorded in Qualtrics. Paper surveys, which were distributed in person, were later collected and manually entered the system by the authors. Given the distribution methods, the exact sample size could not be determined, but the authors estimate that approximately 2500 pharmacists were invited to participate. Data collection occurred over four months, from March to June 2024. The survey included seven demographic questions, fifteen items assessing pharmacists' practices and perceptions regarding herbal medicine, three questions examining the influence of prior education on confidence and a ten-item true/false quiz to evaluate knowledge. Detailed survey questions are presented on tables. The quiz focused primarily on widely used herbal medicines, with two items addressing regulatory aspects of herbal medicine. Participants were instructed to select "unsure" for quiz items if they did not know the answer reducing the likelihood of random guessing that could bias the results. Data collection and analysis were conducted using Qualtrics and excel. Continuous and ordinal data were described using mean and median values. Questions were rated on scales ranging from 'never' (1) to 'always' (5) and 'strongly disagree' (1) to 'strongly agree' (5). These numerical values were used to calculate median responses.

Results

A total of 156 surveys were completed, yielding a response rate of approximately 6.2 %, based on an estimated 2500 pharmacists who received the survey. Among the respondents, 94 % were employed in chain pharmacies, 3 % in independent pharmacies and 3 % in other settings. Most participants were aged 25-34 years (48.7 %), with 1–5 years of professional experience (33.3 %). Notably, 71.8 % reported minimal or no formal education in herbal medicine. Furthermore, 69.9 % either lacked or were uncertain about access to evidence-based herbal medicine

resources in their workplace, while 71.8 % indicated that their pharmacies sold herbal medicines over the counter with 53.2 % reporting a sales rate of 5 % to 10 %. Detailed background characteristics are summarized in Table 1.

Pharmacists expressed diverse opinions regarding the general safety of herbal medicines and their concurrent use with prescription medications. However, 44.9 % of pharmacists (median = 3) agreed that herbal medicines often provide beneficial health effects. Most pharmacists acknowledged the importance of being knowledgeable about herbal medicines in community pharmacy practice (66.7 %, median = 4) and recognized their responsibility to provide patients with relevant information (64.1 %, median = 4). While less than half (42.9 %) agreed that they lacked confidence in their ability to offer adequate information on herbal medicines, only 14.7 % strongly agreed with this statement. Among those who had completed postgraduate studies in pharmacognosy and medicinal plants, 88.5 % had somewhat or strongly agreed that they felt confident in educating patients, compared to 6.4 % of pharmacists with minimal continuing education and 5.1 % of those with none. A detailed summary of pharmacists' perceptions regarding herbal medicines is presented in Table 2.

Nearly half of the pharmacists (46.8 %) reported that patients occasionally sought their advice on herbal medicines, while 15.4 % indicated frequent inquiries. A substantial proportion (34 %, median = 3) occasionally used evidence-based resources to obtain information on herbal medicines. Additionally, 10.3 % rarely asked patients about their use of herbal medicines and 5.1 % documented it in patient profiles. Pharmacists occasionally recommended the use of herbal medicines (49.4 %, median = 2) and 61.2 % either rarely or occasionally advised against their use (median = 3). However, 50 % frequently or always recommended consulting with a primary care physician before initiating herbal medicines (median = 4). Many pharmacists (59.6 %) occasionally or frequently discussed potential side effects and herb-drug interactions when patients purchased or inquired about herbal medicines, with both responses having a median of 4. Detailed frequencies of pharmacists' practices regarding herbal medicines are summarized in Table 2, based on responses from all 156 participants.

The data presented in Table 3 evaluates the influence of university education and additional training on the confidence levels of pharmacists in dealing with herbal medicines. The responses were categorized into three options: "Yes," "No," and "Very little.". When asked whether they had gained sufficient knowledge about the nature of herbal medicines and how to deal with them during their university studies, only 21.2 % (n = 33) of respondents agreed. A larger proportion, 39.7 % (n = 62), disagreed, while another 39.1 % (n = 61) reported that they had gained very little knowledge in this area. This distribution highlights a notable gap in the undergraduate pharmacy curriculum regarding herbal medicine, suggesting that many pharmacists enter the workforce without adequate preparation to handle this aspect of their profession effectively. In contrast,

Table 1. Background characteristics

	Response	n (%)
Age	20 – 24	12 (7.7)
	25 – 34	76 (48.7)
	35 – 44	39 (25)
	45 – 54	18 (11.5)
	55 – 64	7 (4.5)
	≥ 65	4 (2.6)
Province	Mosul	2 (1.3)
	Salaheddin	13 (8.3)
	Baghdad	53 (34)
	Najaf	2 (1.3)
	Dhi Qar	6 (3.8)
	Basrah	15 (9.6)
	Maysan	0 (0)
	Kirkuk	15 (9.6)
	Diyala	0 (0)
	Karbala	34 (21.8)
	Babil	2 (1.3)
	Muthanna	0 (0)
	Diwaniya	6 (3.8)
	Anbar	0 (0)
	Kurdistan provinces	8 (5.1)
How long have you been a practicing pharmacist?	1 - 5 years	52 (33.3)
	6 - 10 years	38 (24.4)
	11 - 15 years	22 (14.1)
	16 - 20 years	17 (10.9)
	> 20	27 (17.3)
Do you have any participation in courses related to herbal preparations and medicines after completing your university studies?	Yes	44 (28.2)
	No	112 (71.7)
Do you have scientific sources and books on herbal medicines and preparations in your private pharmacy?	Yes	47 (30.1)
	No	109 (69.9)
Do you provide herbal medicines and preparations in your own pharmacy?	Yes	112 (71.8)
	No	44 (28.2)
What is the availability rate of herbal medicines and preparations compared to other medicines in your pharmacy?	5 - 10 %	83 (53.2)
	11 - 20 %	47 (30.1)
	21 - 30 %	17 (10.9)
	> 30 %	9 (5.8)

Table 2. Pharmacists' herbal medicine perception and practices

Please indicate how often you experience the following statements using the scale below:							
Perception:							
	Never	**Rarely**	**Occasionally**	**Frequently**	**Always**	**Total (n)**	**Median**
Know where I can find reliable information about herbal preparations.	12 7.7 %	25 16 %	40 25.6 %	57 36.5 %	22 14.1 %	156	2
Herbal medicines are generally safe to use.	13 8.3 %	5 3.2 %	68 43.6 %	65 41.7 %	5 3.2 %	156	3
Herbal medicines are generally safe to use with other medications.	15 9.6 %	12 7.7 %	76 48.7 %	50 32.1 %	3 1.9 %	156	3
Herbal medicines have a beneficial therapeutic effect on patients.	3 1.9 %	5 3.2 %	63 40.4 %	70 44.9 %	15 9.6 %	156	3
It is important for the pharmacist to have full knowledge of herbal medicines.	0 0 %	2 1.3 %	13 8.3 %	37 23.7 %	104 66.7 %	156	4
It is the pharmacist's responsibility to give the patient complete information about the herbal medicine.	2 1.3 %	3 1.9 %	12 7.7 %	39 25 %	100 64.1 %	156	4
Practice:							
Do patients ask questions about herbal preparations when they have prescribed them?	4 2.6 %	21 13.5 %	73 46.8 %	24 15.4 %	34 21.8 %	156	3
When you prescribe them, do you ask the patient about the reasons for using the herbal preparations?	8 5.1 %	16 10.3 %	56 35.9 %	38 24.4 %	38 24.4 %	156	4
Are you looking to review and learn more about herbal preparations?	4 2.6 %	19 12.2 %	58 37.2 %	39 25 %	36 23.1 %	156	2
Do you use evidence-based scientific resources to find information about herbal products?	11 7.1 %	17 10.9 %	53 34 %	31 19.9 %	44 28.2 %	156	3
Do you recommend herbal medicines and preparations to patients?	13 8.3 %	27 17.3 %	77 49.4 %	22 14.1 %	17 10.9 %	156	2
Do you recommend that patients avoid using herbal medicines and preparations?	31 19.9 %	32 20.5 %	65 41.7 %	16 10.3 %	12 7.7 %	156	3
Do you recommend that patients consult a doctor before using herbal preparations?	14 9 %	18 11.5	46 29.5	41 26.3 %	37 23.7 %	156	4
When ordering a herbal preparation, do you discuss with the patient possible drug interactions with other medications?	14 9 %	14 9 %	46 29.5 %	47 30.1 %	35 22.4 %	156	4
When prescribing to a patient, do you explain and discuss the side effects of herbal medicines?	8 5.1 %	19 12.2 %	45 28.8 %	43 27.6 %	41 26.3 %	156	3

Table 3. Impact of prior education on pharmacists' confidence

Please indicate how often you experience the following statements using the answers below:			
	Yes	**No**	**Very little**
During your university studies, do you think you gained sufficient knowledge about the nature of herbal medicines and how to deal with them?	33 21.2 %	62 39.7 %	61 39.1 %
Do you think you need to participate in courses or workshops on herbal drugs and pharmaceuticals?	138 88.5 %	8 5.1 %	10 6.4 %
Are you confident in your ability to give sufficient information about the herbal preparation to the patient?	67 42.9 %	23 14.7 %	66 42.3 %

an overwhelming majority of respondents, 88.5 % (n = 138), expressed the need to participate (Fig. 1).

The assessment of pharmacists' knowledge of herbal medicines, as measured by the quiz, revealed a mean score of 5.63 out of 10. Pharmacists who had received higher education specifically in pharmacognosy and herbal medicine demonstrated slightly higher mean scores compared to their counterparts with no formal education in herbal medicine. Notably, questions related to Ginkgo biloba had a correct response rate exceeding 50 %, indicating a relatively stronger familiarity with this herbal product. However, knowledge of other herbal and pharmaceutical topics was more limited. Correct response rates for questions on garlic, echinacea, ginger, ivy, digoxin, senna and opioids ranged between 16.7 % and 49.4 %, indicating substantial knowledge gaps in these topics. A complete breakdown of the quiz results is presented in Table 4, offering insights into pharmacists' knowledge gaps and areas requiring further education and training.

Discussion

Community pharmacists are among the most accessible healthcare professionals to the public. Their responsibilities include the safe provision of both prescription and non-prescription medications, along with delivering appropriate counselling during the dispensing process (8). Pharmacists who offer herbal medicines have an additional professional obligation to ensure that their stock is sourced from reputable suppliers. They should provide advice only if they possess adequate training and recommend remedies exclusively when confident in their safety and quality (9). The demand for herbal medicines continues to rise annually. According to the findings of this survey, nearly all community pharmacies offer herbal medicines for purchase over the counter. While pharmacists reported that patients occasionally inquire about herbal medicines, it is likely that many individuals using these products do not disclose this information to their pharmacist. This highlights the importance of pharmacists proactively acknowledging and documenting their patients' use of herbal medicines. However, many pharmacists admitted to rarely inquiring about or recording herbal medicine use in patients' profiles. This is a critical area for

Table 4. Pharmacists' herbal medicine quiz responses

	True	False	Unsure
Herbal medicines are regulated by the Food and Drug Administration (FDA)	66 42.3 %	47 30.1 % *	43 27.6 %
Eating garlic increases the risk of bleeding.	77 49.4 %*	18 11.5 %	61 39.1 %
Pregnant women are not allowed to eat ginger.	84 53.8 %	38 24.4 %*	34 21.8 %
Gingko biloba is used to treat dementia	134 85.9 %*	5 3.2 %	17 10.9 %
Senna leaves can be used to treat constipation for a period not exceeding three months.	114 73.1 %	26 16.7 %*	16 10.3 %
All herbal medicines are approved and registered according to the regulations for approving and registering food supplements in the Iraqi Ministry of Health.	94 60.3 %*	19 12.2 %	43 27.6 %
Echinacea is used to treat diseases associated with immunodeficiency.	56 37.2 %*	7 4.5 %	91 58.4 %
Pethidine is a natural opioid drug.	80 51.3 %	57 36.5 %*	19 12.2 %
Ivy is used to treat allergic rhinitis.	86 55.1 %	38 24.4 %*	32 20.5 %
Digoxin is an alkaloid.	86 55.1 %	40 25.6 %*	30 19.2 %

*Number of respondents who answered correctly for each question

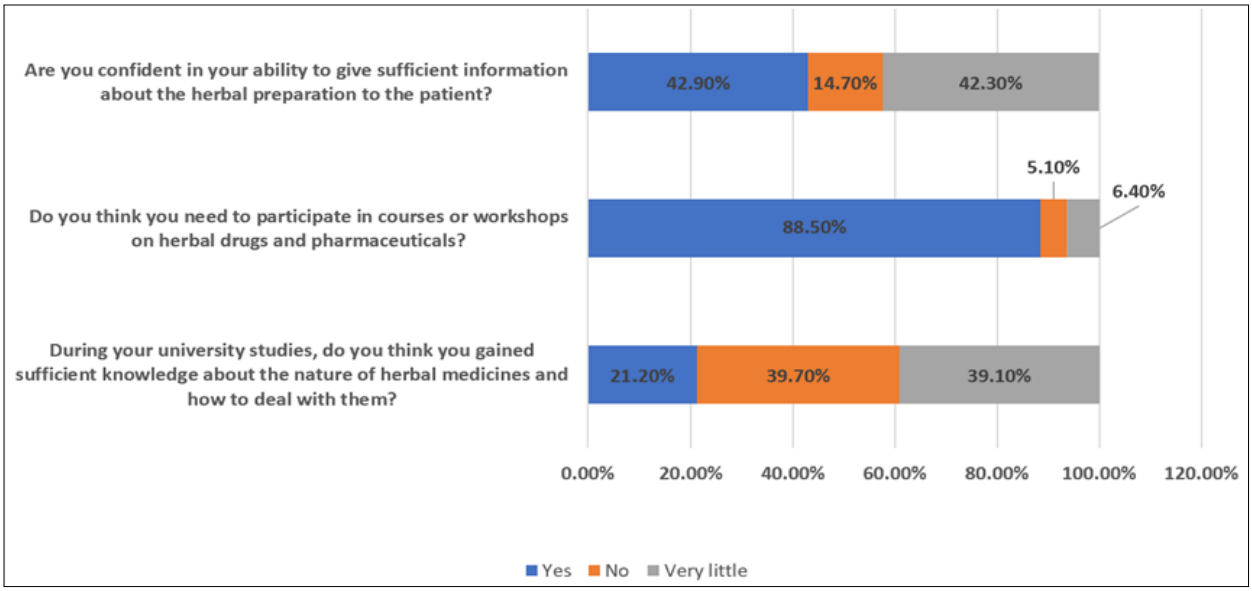

Fig. 1. Impact of prior education on pharmacists' confidence.

improvement, as herbal medicines can interact with prescription drugs, necessitating pharmacist intervention to prevent potential herb-drug interactions.

Although the median response to questions regarding the frequency of discussing herb-drug interactions and side effects was "frequently," only about a quarter of pharmacists reported that they "always" discuss these risks when patients purchase or inquire about herbal medicines. Given that many patients may lack awareness of the safety concerns and regulatory limitations associated with herbal medicines, it is essential for pharmacists to consistently address potential interactions and adverse effects. Despite the time constraints faced by community pharmacists and the lack of routine documentation of over the counter (OTC) medications, prioritizing these practices is crucial to ensuring safe and effective medication use (10). Similar findings have been reported in international studies, such as a survey conducted in Australia, where pharmacists acknowledged the importance of discussing herb-drug interactions but cited time limitations and inadequate knowledge as barriers to effective counselling (11). Beyond safety concerns, pharmacists play a key role in promoting the proper use of herbal medicines. Approximately 25.6 % of pharmacists indicated that they never or rarely recommend herbal medicines, while 52 % reported advising against their use occasionally or frequently. These recommendations may stem from concerns about safety and efficacy, as well as a lack of confidence in providing accurate counselling. In fact, more than one-third of pharmacists expressed confidence in their ability to provide appropriate information about herbal medicines. Developing the knowledge and skills to educate patients about herbal medicines is as important as it is for other OTC products. Most pharmacists agreed that it is their professional responsibility to be knowledgeable about herbal medicines and to use this knowledge to educate patients. However, many pharmacists reported receiving little to no prior education on herbal medicines. Those who had formal or continuing education in this area were more likely to feel confident in counselling patients about herbal medicines, as evidenced by the results. While prior education was associated with increased confidence, quiz scores were only slightly higher among pharmacists with prior training compared to those without.

A review of herbal medicine education worldwide suggests that the integration of herbal medicine courses within pharmacy curricula is inconsistent. Studies conducted in the United Kingdom and the United States have shown that while some pharmacy programs include pharmacognosy and herbal medicine coursework, the depth and quality of this education vary significantly (12). This inconsistency has raised concerns regarding pharmacists' preparedness to counsel patients on herbal medicines, mirroring the findings in Iraq. A study in Malaysia also emphasized the need for standardizing herbal medicine education to improve pharmacists' confidence and competence (13). Pharmacy colleges in Iraq should prioritize incorporating more comprehensive courses on herbal medicine into their curricula and emphasize the study of pharmacognosy across pharmaceutical education programs. One of the critical barriers to achieving this competency is the lack of standardized education on herbal medicines across pharmacy schools. In Iraq, pharmacy curricula vary significantly between institutions, with some offering detailed courses in pharmacognosy and others providing only minimal exposure to herbal medicine concepts. This inconsistency results in varying levels of competency among pharmacy graduates, which may impact their ability to guide patients effectively. For example, studies from Germany and Canada have highlighted that structured herbal medicine education within pharmacy programs leads to increased pharmacist confidence and competence in recommending and counselling patients on herbal therapies (14). Standardizing herbal medicine education by incorporating comprehensive and evidence-based courses into pharmacy programs is essential to ensure that all future pharmacists gain the necessary knowledge and skills in this field. Beyond formal education, it is essential for pharmacists to be aware of and have access to reliable, evidence-based resources on herbal medicine. However, fewer than one-third of participants in this study reported frequently or always consulting evidence-based resources for information on herbal medicine. Notably, more than half (69.9 %) of the pharmacists surveyed either lacked access to an evidence-based herbal medicine resource within their pharmacy or were unsure whether such a resource was available. Additionally, many participants expressed uncertainty about where to locate trustworthy information on herbal medicines. This highlights a critical gap in the accessibility and utilization of credible resources, underscoring the need for both improved education and the provision of readily available, evidence-based tools to support pharmacists in this area. A comparative study from South Korea emphasized the importance of providing pharmacists with institutional access to validated herbal medicine databases, demonstrating that access to such resources significantly improved pharmacists' ability to offer reliable counselling (15).

This study had several strengths, including a robust sample size and complete anonymity in the survey, likely encouraging pharmacists to provide honest responses. Moreover, the relevance of the topic, given the increasing sales of herbal medicines, likely contributed to a higher level of engagement and completion rates among participants. However, the study also had some limitations. One key limitation was the potential lack of generalizability to all community pharmacists in Iraq. A significant proportion of respondents had only one to five years of experience, which may not fully represent the perspectives of more experienced pharmacists. Additionally, as the survey was distributed through social media, email and direct delivery to local pharmacies, there was likely an overrepresentation of Iraqi pharmacists from the local region, introducing a potential geographic bias.

The quiz used to assess pharmacists' knowledge of herbal medicines was another limitation. It consisted of only eight questions focused on specific herbal medicines and two questions addressing regulations. While the brevity of the survey helped improve response rates, it may have limited the depth of analysis regarding pharmacists' knowledge. A slightly longer and more comprehensive quiz might have provided more robust insights. Lastly, some ambiguity in the survey design may have affected participant responses. For example, the option "very little" in questions about prior herbal medicine education could have been unclear, as it did not specify a quantifiable measure. This option was included to account for pharmacy colleges that offer herbal medicine as electives or cover it as a minor topic within broader courses, but it may have introduced some confusion among respondents.

The findings of this study are consistent with previous research conducted in other countries, which similarly reported limited pharmacist confidence and knowledge regarding herbal medicines. For instance, a study from Malaysia revealed that only 33.9 % of pharmacists felt confident in counselling patients about herbal products, despite high public demand for such advice (13). The most used herbal products in Iraq include garlic (*Allium sativum*), ginger (*Zingiber officinale*), senna (*Senna alexandrina*) and ginkgo (*Ginkgo biloba*), many of which are used for cardiovascular, digestive, or cognitive conditions. However, these herbs are known to carry significant risks, especially when combined with conventional medicines. For example, garlic and ginkgo can increase bleeding risk when taken with anticoagulants, while senna may cause electrolyte imbalance if overused. Herb-drug and herb-food interactions remain a serious concern, particularly due to the lack of routine patient disclosure and pharmacist inquiry. To mitigate these risks, pharmacists should consistently screen for herbal product use during patient consultations, provide clear counselling on possible interactions and rely on updated, evidence-based databases. Incorporating clinical decision-support tools and continuing education programs focused on herb-drug interactions would further enhance pharmacists' ability to ensure safe integration of herbal medicines into patient care.

Conclusion

This study revealed considerable gaps in Iraqi pharmacists' knowledge, confidence and documentation practices regarding herbal medicines. These findings highlight the urgent need for targeted educational programs, curriculum reform and improved access to evidence-based resources. Strengthening pharmacists' competencies in this area is essential for ensuring safe and effective integration of herbal products into patient care.

Acknowledgements

The author expresses their gratitude to the University of Baghdad for offering the essential facilities needed to conduct this study.

Authors' contributions

The author confirms contribution to the paper as follows: study conception and design, data collection, analysis and interpretation of results and draft manuscript preparation by AHK. The author reviewed the results and approved the final version of the manuscript.

Compliance with ethical standards

Conflict of interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

Ethical issues: This study was conducted in accordance with ethical guidelines for research involving human subjects. Ethical approval was obtained from the college of pharmacy, University of Baghdad and informed consent was secured from all participants prior to their involvement in the study. Participants were fully informed about the study's objectives, procedures and their right to withdraw at any time without consequences. Confidentiality and anonymity of respondents were strictly maintained throughout the research process.

References

1. Bent S. Herbal medicine in the United States: review of efficacy, safety and regulation: grand rounds at University of California, San Francisco Medical Center. J Gen Intern Med. 2008;23(6):854-9. https://doi.org/10.1007/s11606-008-0632-y
2. Sarker SD. Pharmacognosy in modern pharmacy curricula. Pharmacogn Mag. 2012;8(30):91-2. https://doi.org/10.4103/0973-1296.96545
3. Kuesten C, Hu C. Functional foods and dietary supplements. In: Meiselman HL, editor. Handbook of Eating and Drinking: Interdisciplinary Perspectives. Cham: Springer; 2020:915-39. https://doi.org/10.1007/978-3-030-14504-0_153
4. Asher GN, Corbett AH, Hawke RL. Common herbal dietary supplement–drug interactions. Am Fam Physician. 2017;96(2):101-7. https://doi.org/10.4236/health.2012.411168
5. Glisson JK, Rogers HE, Abourashed EA, Ogletree R, Hufford CD, Khan I. Clinic at the health food store? Employee recommendations and product analysis. Pharmacotherapy. 2003;23(1):64-72. https://doi.org/10.1592/phco.23.1.64.31912
6. Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL. Trends in the use of complementary health approaches among adults: United States, 2002–2012. Natl Health Stat Report. 2015;(79):1-16. https://doi.org/10.15620/cdc:27598
7. Ward BW, Schiller JS, Goodman RA. Multiple chronic conditions among US adults: a 2012 update. Prev Chronic Dis. 2014;11:E62. https://doi.org/10.5888/pcd11.130389
8. Dolovich L, Austin Z, Chang F, et al. Pharmacy in the 21st century: enhancing the impact of the profession of pharmacy on people's lives in the context of health care trends, evidence and policies. Can Pharm J (Ott). 2018;152(4). https://doi.org/10.1177/1715163518815717
9. Heinrich M, Williamson EM, Gibbons S, Barnes J. Fundamentals of Pharmacognosy and Phytotherapy. 2nd ed. London: Elsevier Health Sciences; 2012.
10. Ung COL, Harnett J, Hu H. Community pharmacist's responsibilities with regards to traditional/complementary medicine products: a systematic literature review. Res Social Adm Pharm. 2017;13(4):686-716. https://doi.org/10.1016/j.sapharm.2016.09.003
11. Cramer H, Sibbritt D, Adams J, Lauche R, Vickers A. The role of pharmacists in complementary and integrative medicine: a systematic review. Res Social Adm Pharm. 2021;17(3):501-9. https://doi.org/10.1016/j.sapharm.2020.04.011
12. Shen J, Wang Y, Fan T. Herbal medicine education in pharmacy curricula: a global perspective. Pharm Educ. 2018;18(4):221-30. https://doi.org/10.1016/j.pe.2018.03.004
13. Abdullah MA, Ismail N, Chong WW. Knowledge, attitudes and practices of community pharmacists in Malaysia towards complementary and alternative medicine: a cross sectional study. BMC Complement Altern Med. 2019;19(1):55. https://doi.org/10.1186/s12906-019-2454-4
14. Fasinu PS, Phillips S, Elferink C, Rapoport H. Herbal medicine education in pharmacy programs in Germany and Canada: a comparative analysis. J Herb Med. 2016;6(2):72-9. https://doi.org/10.1016/j.hermed.2016.02.003
15. Kim JY, Lee J, Kim H. Availability and use of evidence-based resources for herbal medicine by community pharmacists in South Korea. BMC Health Serv Res. 2020;20(1):789. https://doi.org/10.1186/s12913-020-05614-3

Additional information

Peer review: Publisher thanks Sectional Editor and the other anonymous reviewers for their contribution to the peer review of this work.

Reprints & permissions information is available at https://horizonepublishing.com/journals/index.php/PST/open_access_policy

Publisher's Note: Horizon e-Publishing Group remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Indexing: Plant Science Today, published by Horizon e-Publishing Group, is covered by Scopus, Web of Science, BIOSIS Previews, Clarivate Analytics, NAAS, UGC Care, etc

See https://horizonepublishing.com/journals/index.php/PST/indexing_abstracting

Publisher information: Plant Science Today is published by HORIZON e-Publishing Group with support from Empirion Publishers Private Limited, Thiruvananthapuram, India.