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Knowledge and practices of pharmacists toward herbal medicine in Erbil city.

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2 Pharmacists' Knowledge and Practices on Herbal Medicine in Erbil.

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Abstract

Background and Objectives: Herbal medicine use is growing globally, and pharmacists play a crucial role in ensuring its safe and effective application. This study assessed the knowledge, attitudes, and practices (KAP) of community pharmacists toward herbal medicine in Erbil City, Kurdistan Region, Iraq.
Methods: A descriptive cross-sectional study was conducted among 400 community pharmacists in both public and private pharmacies between December 2024 and February 2025. Data were collected using a validated self-administered questionnaire via Google Forms and hard copies. Statistical analysis was performed using SPSS version 27, with a p-value ≤ 0.05 considered significant.
Results: Most participants were female (69%) with an average age of 28 years; 62.5% worked in private pharmacies. Overall, 41.5% of pharmacists demonstrated fair knowledge, 30.8% poor knowledge, and 27.8% high knowledge of herbal medicine. Gender and income were significantly associated with knowledge levels ($p < 0.05$). Nearly half of the participants (48.3%) exhibited poor practice toward herbal medicine use, and personal use was significantly associated with better practice ($p = 0.016$).
Conclusion: Pharmacists in Erbil showed limited knowledge and suboptimal practice concerning herbal medicine, particularly regarding herb–drug interactions. Targeted training programs and stronger regulatory frameworks are essential to enhance pharmacists' competence and ensure safe patient counseling.

Introduction:

Herbal medicine has gained global prominence as an integral component of healthcare, particularly in developing countries where traditional remedies remain a primary source of treatment [1]. The World Health Organization (WHO) estimates that around 80% of the world's population relies on herbal preparations for some aspect of primary healthcare [2]. The increasing use of herbal products is driven by perceptions of their natural origin, cultural familiarity, affordability, and accessibility [3]. However, despite their widespread use, herbal medicines often lack standardized manufacturing processes, comprehensive safety evaluations, and sufficient scientific validation [4].Pharmacists, as medication experts, play a pivotal role in guiding safe and effective use of all therapeutic agents, including herbal and complementary medicines. Their professional responsibilities include ensuring patient safety, preventing herb–drug interactions, and providing evidence-based counseling [5,6]. However, several studies have reported that pharmacists' knowledge regarding herbal medicine is often limited, leading to inconsistent counseling practices and potential patient harm [7]. This knowledge gap may stem from the lack of formal education on herbal medicine within pharmacy curricula and insufficient continuing professional training.

In Iraq and the Kurdistan Region, the use of herbal products has grown rapidly in recent years [8]. Community pharmacies frequently stock a wide range of herbal formulations and dietary supplements that are sold without prescription [9]. In Erbil City, these products are commonly used for ailments such as digestive problems, respiratory infections, and cosmetic purposes. Despite their popularity, there is minimal regulatory oversight, and pharmacists' roles in ensuring quality and safe dispensing remain underexplored. Understanding pharmacists' knowledge, attitudes, and practices is therefore essential for promoting rational herbal medicine use in the region.While herbal medicines offer therapeutic potential, inappropriate use, contamination, and herb–drug interactions pose significant health risks [10]. Inadequate pharmacist knowledge or poor practice may contribute to misinformation, unsafe self-medication, and adverse outcomes. There is a lack of empirical data in Erbil City regarding pharmacists' competence and behavior in this domain, highlighting an urgent need for assessment.This study aims to assess the knowledge and practices of pharmacists toward herbal medicine in Erbil City, with the goal of identifying gaps in professional training and promoting evidence-based pharmacy practice. The findings will provide insights into the current level of awareness and practical engagement of pharmacists with herbal products in Erbil. Results can inform policymakers, educators, and health authorities to design targeted educational interventions and develop regulatory strategies to enhance patient safety and rational use of herbal medicines.

Materials and Methods:

Study design A descriptive cross-sectional study was conducted to assess the knowledge and practices of pharmacists toward herbal medicine in Erbil City, Kurdistan Region, Iraq. The study was carried out between March and June 2024 among pharmacists working in both community and hospital pharmacies across various districts of Erbil. The study setting was chosen to represent a mix of urban and suburban pharmacy practices.

Study Population and Sampling The study population included licensed pharmacists currently practicing in Erbil City. Inclusion criteria were pharmacists with at least one year of professional experience and who consented to participate. Pharmacy students, interns, and non-licensed personnel were excluded.

The sample size was calculated using Cochran's formula for cross-sectional studies, assuming a 95% confidence level, 5% margin of error, and an estimated 50% response rate regarding adequate knowledge. The minimum required sample size was 384 participants, but 400 pharmacists were targeted to compensate for potential nonresponse. A stratified random sampling technique was employed to ensure proportional representation from different pharmacy sectors (community vs. hospital).

Data Collection Tool

Data were collected using a structured, self-administered questionnaire developed after reviewing previous literature [11] on pharmacists' knowledge and practices related to herbal medicine. The questionnaire consisted of four sections:

Sociodemographic characteristics (age, gender, qualification, years of experience, workplace).

Knowledge regarding herbal medicine efficacy, safety, interactions, and regulatory aspects.

Practice patterns, including frequency of dispensing herbal products, sources of information, and patient counseling behaviors.

The questionnaire was first developed in English and then validated by a panel of 10 pharmacy and public health experts for content relevance and clarity. A pilot study was conducted on 30 pharmacists (excluded from the final sample) to ensure reliability, yielding a Cronbach's alpha of 0.82, indicating good internal consistency.

Data Collection Procedure

Participants were approached in person by trained data collectors who explained the purpose of the study. After obtaining informed consent, pharmacists completed the questionnaire anonymously. The average completion time was 10–15 minutes. Confidentiality and voluntary participation were emphasized.

Data Management and Analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize variables. Knowledge scores were categorized as good, moderate, or poor based on Bloom's cut-off criteria (≥80%, 60–79%, and <60%). Associations between demographic variables and knowledge or practice levels were assessed using the

Chi-square test and Fisher's exact test where appropriate. A p-value < 0.05 was considered statistically significant. Data were entered and analyzed using IBM SPSS Statistics version 27.

Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee of the college of Medicine, Hawler Medical University (Approval No.: MGRC.2024.11/07). Participants were informed about the study objectives, and written informed consent was obtained prior to participation. All data were kept confidential and used solely for research purposes.

All methods were carried out in accordance with relevant guidelines and regulations.

Results:

The research included 400 participants whose demographic characteristics and socioeconomic information is presented below. The majority of respondents (62.5%) practiced medicine in private facilities while 37.5% worked in public facilities. The research sample contained 69.0% female participants while males made up 31.0%. The majority of participants (55.8%) were married while 44.0% were single and only 0.3% were divorced. The income distribution among participants showed that 41.8% earned between 500,000 and 1,000,000 ID while 33.5% made more than 1,000,000 ID and 24.8% received 500,000 ID or less. The perception of income adequacy matched the perception of income inadequacy among participants since 46.5% found their income sufficient while 47.3% believed it was insufficient for their needs but 6.3% received more than they needed. The pharmacy workforce consisted mainly of bachelor's degree holders in pharmacy (86.3%) followed by master's degree holders (10.5%) and PhD holders (3.3%). The population consisted mainly of Muslims (95.3%) while Christians made up only 4.8%. The research participants had an average age of 28 years with an interquartile range of ± 7 years and they had on average 5 years of work experience with an interquartile range of ± 7 years (Table 1).

Table 1. Demographics characteristics of the participants (N = 400)

Variable	Category	Frequency	Percent (%)
Area of Practice/Setting	Private	250	62.5
	Public	150	37.5
Gender	Male	124	31.0
	Female	276	69.0
Marital Status	Single	176	44.0
	Married	223	55.8
	Divorced	1	0.3
Monthly Income	500,000 ID	99	24.8
	500,000–1,000,000 ID	167	41.8
	>1,000,000 ID	134	33.5
Income Satisfaction	Satisfy	186	46.5
	Not Satisfy	189	47.3
	Exceeds	25	6.3
Highest Level of Education	Bachelor's in Pharmacy	345	86.3

	Master's in Pharmacy	42	10.5
	PhD	13	3.3
Religion	Muslim	381	95.3
	Christian	19	4.8
Median of age ± Interquartile range	28 ± 7 years		
Median of years of experience ± Interquartile range	5 ± 7 years		

The result of the study demonstrated that (71.8%) of respondents use herbal medicine as a personal therapy, which raises concerns as it would reinforce their existing attitudes toward such treatments. The analysis presented in Table 2 investigates the relationship between pharmacists' knowledge base and their professional and demographic characteristics. The results showed that gender correlated significantly with the results ($p < 0.001$) because men demonstrated poor knowledge at a rate of (45.2%) while women showed (24.3%) poor knowledge and better fair and high levels of knowledge. The analysis showed that monthly income produced statistically relevant distinctions ($p = 0.030$). The pharmacists who earned between 500,000 and 1,000,000 ID had the highest percentage of fair knowledge at (48.5%) and those earning above 1,000,000 ID displayed the worst knowledge at (38.8%). The analysis of practice settings approached statistical significance ($p = 0.052$) but showed that private settings had a slightly better distribution of knowledge compared to public settings. The research findings identify gender and income as primary factors influencing herbal medicine knowledge among pharmacists.

Table 2. Knowledge Levels by Demographic and Professional Variables

Variable	Poor Knowledge No (%)	Fair Knowledge No (%)	High Knowledge No (%)	P-value
Area of practice				
Private	66 (26.4%)	110(44.0%)	74 (29.6%)	0.052
Public	57 (38.0%)	56 (37.3%)	37 (24.7%)	
Gender				
Male	56 (45.2%)	34 (27.4%)	34 (27.4%)	<0.001
Female	67 (24.3%)	132(47.8%)	77 (27.9%)	
Marital status				
Single	51 (29.0%)	69 (39.2%)	56 (31.8%)	0.416
Married	72 (32.3%)	96 (43.0%)	55 (24.7%)	
Monthly income				
≤500K ID	30 (30.3%)	35 (35.4%)	34 (34.3%)	0.030
500K-1M ID	41 (24.6%)	81 (48.5%)	45 (26.9%)	
>1M ID	52 (38.8%)	50 (37.3%)	32 (23.9%)	
Income satisfaction				
Satisfy	57 (30.6%)	78 (41.9%)	51 (27.4%)	0.177
Not satisfy	53 (28.0%)	82 (43.4%)	54 (28.6%)	
Exceeds	13 (52.0%)	6 (24.0%)	6 (24.0%)	
Education level				
Bachelor	103(29.9%)	146(42.3%)	96 (27.8%)	0.166
Master	12 (28.6%)	18 (42.9%)	12 (28.6%)	
PhD	8 (61.5%)	2 (15.4%)	3 (23.1%)	
Religion				

Muslim	**117(30.7%)**	**157(41.2%)**	**107(28.1%)**	**0.782**
Christian	**6 (31.6%)**	**9 (47.4%)**	**4 (21.1%)**	
Use of herbal medicine				
Yes	**32 (28.3%)**	**51 (45.1%)**	**30 (26.5%)**	**0.642**
No	**91 (31.7%)**	**115(40.1%)**	**81 (28.2%)**	

The graph in Figure 1 shows how participants rated their understanding of herbal medicine. The highest percentage, which is 41.5%, demonstrated fair knowledge about herbal medicine. The survey showed that 30.8% of participants had poor knowledge, while 27.8% possessed high knowledge.

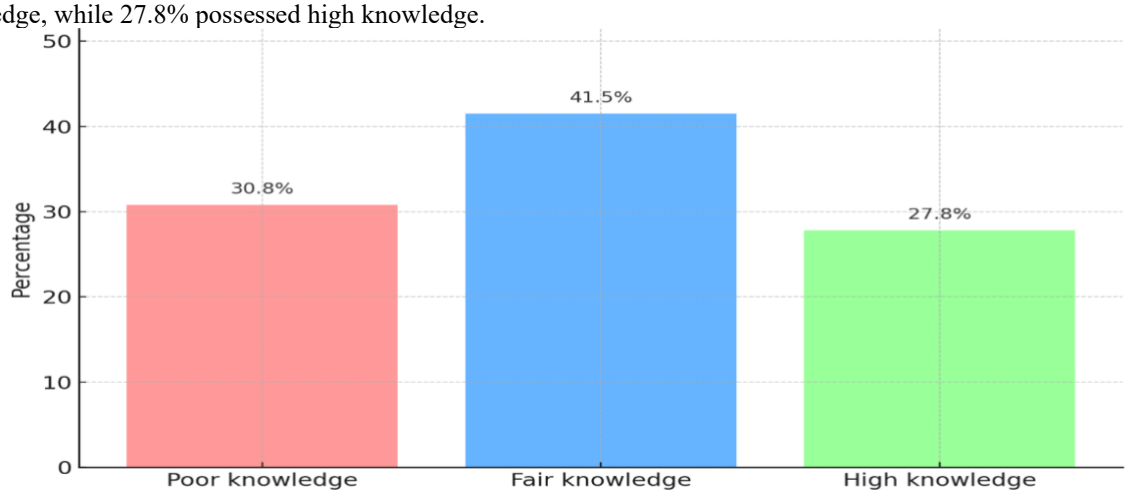

Figure 1. Level of knowledge of the participants

Table 3. examines the relationship between pharmacists' practice levels concerning herbal medicine and their demographic and professional characteristics. Private use of herbal medicine emerged as the sole demographic factor which predicted practice levels at a statistically significant level (P =0.016). The survey results showed that pharmacists who used herbal medicine personally demonstrated both higher practice levels (19.2%) and lower rates of poor practice (44.6%) compared to non-users (8.8% and 57.5% respectively). All other variables, such as area of practice, gender, marital status, income, satisfaction with income, education level, and religion, were not statistically significantly related to practice levels (all P >0.05).

Table 3. Practice Levels by Demographic and Professional Variables

Variable	**Poor Practice n (%)**	**Fair Practice n (%)**	**High Practice n (%)**	**P-value**
Area of practice				
Private	128 (51.2%)	84 (33.6%)	38 (15.2%)	0.312
Public	65 (43.3%)	58 (38.7%)	27 (18.0%)	
Gender				
Male	60 (48.4%)	40 (32.3%)	24 (19.4%)	0.450
Female	133 (48.2%)	102 (37.0%)	41 (14.9%)	

Marital status				
Single	82 (46.6%)	65 (36.9%)	29 (16.5%)	0.688
Married	111 (49.8%)	76 (34.1%)	36 (16.1%)	
Monthly income				
≤500K ID	52 (52.5%)	35 (35.4%)	12 (12.1%)	0.114
500K-1M ID	84 (50.3%)	61 (36.5%)	22 (13.2%)	
>1M ID	57 (42.5%)	46 (34.3%)	31 (23.1%)	
Income satisfaction				
Satisfy	98 (52.7%)	58 (31.2%)	30 (16.1%)	0.168
Not satisfy	88 (46.6%)	72 (38.1%)	29 (15.3%)	
Exceeds	7 (28.0%)	12 (48.0%)	6 (24.0%)	
Education level				
Bachelor	171 (49.6%)	123 (35.7%)	51 (14.8%)	0.131
Master	19 (45.2%)	14 (33.3%)	9 (21.4%)	
PhD	3 (23.1%)	5 (38.5%)	5 (38.5%)	
Religion				
Muslim	182 (47.8%)	136 (35.7%)	63 (16.5%)	0.646
Christian	11 (57.9%)	6 (31.6%)	2 (10.5%)	
Use of herbal medicine				
Yes	128 (44.6%)	104 (36.2%)	55 (19.2%)	0.016
No	65 (57.5%)	38 (33.6%)	10 (8.8%)	

The self-reported practice distribution of participants in herbal medicine appears in Figure 2 The majority of pharmacists (35.5%) demonstrated fair practice levels while 48.3% had poor practice levels. The survey revealed that 16.3% of pharmacists demonstrated the lowest level of practice in counseling and problem management regarding herbal medicine. Most pharmacists show interest in herbal medicine and hold moderate information levels, yet this knowledge does not translate to practical application in their work. The gap between theoretical knowledge and practical implementation in pharmacy practice requires better guidelines and clinical training and in-practice procedures for herbal medicine.

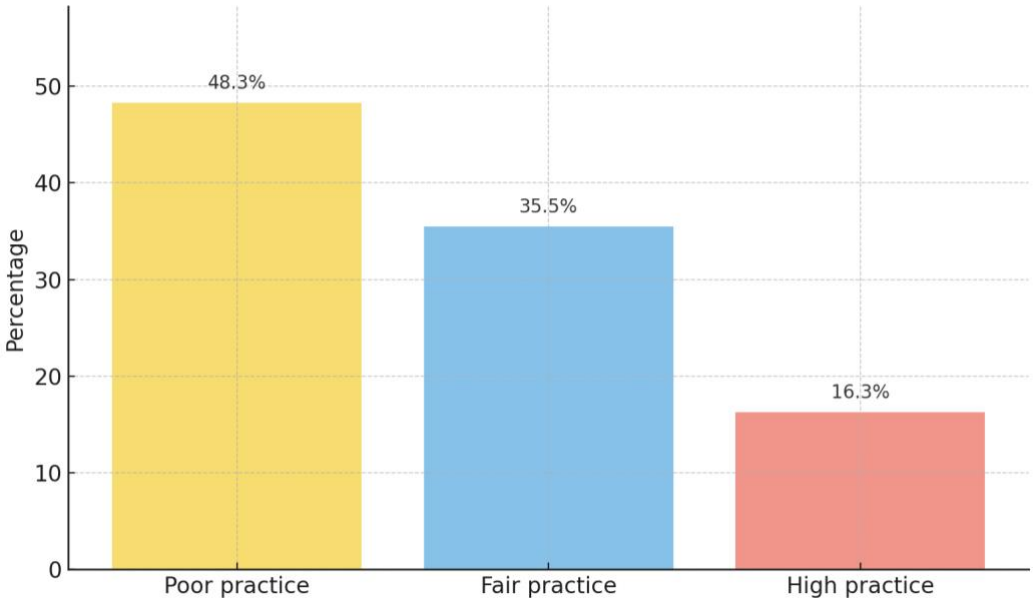

Figure 2. Level of Practice of the participants

Discussion

The current study shows that pharmacists have varying levels of knowledge about herbal medicine. While 41.5% of them possessed fair knowledge, 30.8% of them were poor, and only 27.8% demonstrated high knowledge. This is evidently a knowledge gap, though most of the pharmacists are aware and even utilize herbal products actively.

Looking beyond Erbil, the same patterns are also observed in other countries. In Riyadh, Saudi Arabia, 56% of pharmacists express concerns over the safety of herbal medications, however they possess insufficient knowledge concerning herb-drug interactions, highlighting an educational deficiency. [12]. In Palestine, pharmacists employed herbal medicine as a convenient alternative to conventional therapy; nonetheless, their attitudes frequently exhibited a lack of comprehensive understanding, underscoring the impact of personal perspectives on scientific facts [13]. In the current study, most of the pharmacists (78.5%) reported that cough preparations were the most dispensed herbal product. This reflects a high public demand for the consumption of herbal medicine for respiratory complications, namely coughs and colds. The same trends have been observed elsewhere. For instance, a survey in Baghdad, Iraq found that more than 70% of the pharmacists also extensively dispensed herbal cough syrups, particularly during epidemic diseases [14].

Generally, the pharmacists mainly dispensed herbal medicines for respiratory symptoms, mainly due to traditional practices and patient familiarity with the local herbs [15]. In addition, in this research, 71.8% of the pharmacists also reported using herbal medicines themselves. Physicians or pharmacists may create conflict of interest and bias since it affects their professional conduct and judgment. This was also the case elsewhere. that the most of the pharmacists used herbal medicine themselves, and users of them were more likely to prescribe them to patients [16]. There is widespread lack of knowledge about herbal medicine around the world. This may be explained by the unique knowledge and perspective that pharmacy practitioners have regarding pharmacological care. Just 38.5% of those pharmacists were properly aware of the parallels and discrepancies between pharmaceutical care and clinical pharmacy [17], which is in line with the findings of a study in Qatar, where (35%) of pharmacists demonstrated such awareness [18], While in China (21.5%) the knowledge was too low [19]. Although these two ideas seem to have the same objectives, they emphasize different facets of practice. The high recognition of Ginkgo biloba's role in cognitive health (77.5%) and its interaction with warfarin (75.0%) in terms of general awareness is consistent with findings from other study conducted in the united status, which they reported that Ginko biloba's has been recognized to made a similar risk, especially bleeding complications [20]. Sennoside A (SA) is a natural dianthrone glycoside mainly from medicinal plants of Senna and Rhubarb and used as a folk traditional irritant laxative and slimming health food. Accumulating evidences suggest that SA possesses numerous pharmacological properties, such as laxative [21]. In the current study 92.3% of participants' identification of senna as a natural laxative. On the other hand, ginseng knowledge varied more between studies. Although 61.8% of participants in the current survey recognized its interaction with oral hypoglycemics, previously it has been fully informed about that ginseng's involvement in managing diabetes [22,23].

Misconceptions about its safety in diabetic patients are a persistent problem that was also brought to light in an Ethiopian study, which focused on the incomplete knowledge of herb-drug interactions [24]. Participants' perceptions of safety and

natural origin were widespread (85.8%), which is consistent with findings in the US [25], and in Italy [11], which found that both patients and pharmacists believed herbal medicines were safe because of their natural status. In the current study, the pharmacists had low compliance with inquiring about the use of herbal medicine from patients systematically, with only 22.8% of them inquiring often and 17.3% never inquiring, a result that reveals a lost opportunity for patient-centered care and monitoring for safety. This is also consistent with research from other countries. For instance, in Nigeria surveyed and found that although 85.9% of the pharmacists acknowledged the need to counsel regarding the use of herbal medicine, just some 21% conveyed it on a consistent basis [26]. Similarly, in Malaysia also found that fewer than 29% of pharmacists inquired regularly from patients regarding the use of herbal or traditional medicine, and they cited lack of training and time as a barrier [27].

For this research, 37.8% of pharmacists reported having occasional attempts to study herbal medicines, 57% reported having sporadic attempts, and a mere 5.3% reported never having tried. Furthermore, 72.8% of the pharmacists occasionally prescribed herbal medicines while a mere 18.8% regularly prescribed them. Similarly, studies elsewhere have established the same. In Germany, the researchers noted that very few pharmacists updated themselves on a regular basis on herbal medicines mainly because training was not available [28]. In Iraq, a study noted that even though the percentage of pharmacists recommending herbal products was high, they did so hesitantly and less frequently due to lack of knowledge on dosage, interaction, and regulation [29]. These results complement the worldwide demand for systematic, continuous education and training systems that enable pharmacists to have more assurance in prescribing herbal medicines responsibly and safely. The results also indicate variation in frequency of pharmacists' confidence during counseling on herbal medicine. While 60.5% reported being confident sometimes only, 33.3% reported being confident in their counseling function, and a small percentage (6.3%) reported rarely being confident. These rates are consistent with rates that have been identified in other studies. For example, a study in Saudi Arabia and identified that despite there being most pharmacists favoring the practice of herbal medicine, only a small percentage of them felt at ease giving extensive advice [30].

A systematic review identified that the community pharmacists felt they were not prepared to give herbal medicine counseling due to lack of knowledge and regulatory ambiguity [31]. These variations highlight the necessity for advanced training courses, continuous professional education, and more defined guidelines to enhance the confidence and consistency of herbal medicine counseling among pharmacists across the globe. The research found that most of the pharmacists showed suboptimal practice. Specifically, 48.3% showed poor practice, 35.5% showed fair practice, and only 16.3% were in the lowest category, a highly excessive shortfall from active herbal medicine work in a professional environment. These findings are consistent with most other international studies. For instance, in one of the Iraqi studies, most of the pharmacists had poor hands-on engagement in counseling herbal medicine, primarily because of lack of confidence and low formal education [32] . Likewise, a systematic review and meta-analysis in Sudia Arabia that despite the pharmacists' overall favorable attitude towards herbal medicine, counseling and intervention practice remained poor, primarily due to the deficiency of evidence-based training and ambiguous regulations [33]. Collectively, these indicate a worldwide problem where herbal products are increasingly being utilized. The practitioners themselves do not have the hands-on resources, regulations, and confidence to provide quality patient care, and so there needs to be combined training and more definitive standards of practice through pharmacy education.

Conclusion

The research revealed that pharmacists utilize herbal medicine for both personal and professional reasons, although they frequently possess poor knowledge regarding herb-drug interactions and applications. This deficiency in understanding underlines the necessity for enhanced training and instruction. Furthermore, pharmacists frequently express concerns with herbal medicines due to insufficient regulations and training. Levels of expertise are affected by wealth and gender. Community pharmacists have to inform patients about herbal medicines, addressing possible interactions, adverse effects, and safety concerns. They have to keep records of patient utilization to enhance accountability.

Conflict of interest

The authors don’t have conflict of interest

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