

RESEARCH ARTICLE

Knowledge, attitude and use of Complementary and Alternative Medicine in general and herbal remedy in specific among Egyptian pharmacy students and pharmacists

Rowan Tarek Mohamed Kamal Abd el latif¹, Rowan Shaaban Farghali¹, Rowan Mohamed Omar Abd el latif¹, Rowan Shady Shaaban¹, Rimon Abd el Nasser Saeed¹, Rowan Nabil Saeedi¹, Rowan Yousry Mohamed¹, Rowan Hassan Ibrahim Hassan¹, Rowan Sherif Abd el wageed¹, Riham Ahmed Mohamed¹, Hoda Fathy² 

¹ 6th Year Bachelor of Pharmacy–PharmD Students-promotion 2024/2025 of Faculty of Pharmacy, Alexandria University, Egypt

² Department of Pharmacognosy, Faculty of Pharmacy, Alexandria University, Egypt

Keywords

Complementary and Alternative Medicine
Herbal medicine
Pharmacy student
Pharmacist

Correspondence

Hoda Fathy
Department of Pharmacognosy
Faculty of Pharmacy
Alexandria University
Egypt
hoda.sherif@alexu.edu.eg

Abstract

Background: Complementary and Alternative Medicine (CAM), particularly herbal remedies, has gained widespread global use. However, the knowledge, attitudes, and practices of pharmacy professionals concerning CAM are often inconsistent. **Methods:** This cross-sectional study aimed to assess the knowledge, attitudes and practices regarding CAM among 110 pharmacy students and graduates in Egypt using a self-administered questionnaire. **Results:** Most respondents (47.27%) possessed a moderate level of CAM knowledge, primarily acquired through university courses (70%). Herbal remedies were the most commonly used CAM practice, with 39.09% of respondents reporting personal use. While a majority of participants (73.64%) supported recommending CAM under specific conditions, only 32.73% expressed a strong interest in pursuing further academic training in this field. Although most respondents (57.27%) perceived CAM treatments as moderately effective, significant concerns regarding their safety and regulation were evident. A substantial portion of participants (53.21%) advocated for stricter regulatory oversight of CAM products, and 60% believed that herbal medicines should be exclusively dispensed through pharmacies as regulated products. **Conclusion:** The findings identify gaps in formal pharmacy education concerning safe and effective application of CAM. Enhancing pharmacy curricula with evidence-based CAM content and strengthening regulatory frameworks are recommended.

Introduction

Complementary and Alternative Medicine (CAM) encompasses a wide range of medical practices and therapies that exist outside of mainstream healthcare systems. The National Centre of Complementary and Alternative Medicine (NCCAM) defines it as “a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine” (Institute of Medicine (US)

Committee on the Use of Complementary and Alternative Medicine by the American Public, 2005). These therapies are classified into five types: mind-body interventions, biological therapies, body manipulation (Qureshi *et al.*, 2018) energy-based treatments, and alternative medical systems (Qureshi *et al.*, 2018).

In recent years, the use of complementary and alternative medicine (CAM) has increased dramatically due to factors such as the Internet's accessibility to

health information, cultural interaction, and the notion that alternative therapies are both safer and more economical than pharmaceutical treatments (Møller *et al.*, 2024). Many patients, particularly those suffering from chronic diseases, use complementary and alternative medicine (CAM) as a supplement to conventional therapy or, in some cases, as a primary therapeutic choice. According to studies, the global prevalence of CAM use ranges from 9.8% to 76%, with variations depending on region and demographic (Ali *et al.*, 2024).

Despite its growing popularity, complementary and alternative medicine (CAM) remains a source of debate in the medical community, owing to the scarcity of empirical data supporting the efficacy of many alternative treatments (Van der Schee & Groenewegen, 2010; McHuges & Timmermann, 2005). Non-disclosure of CAM use to healthcare professionals is a critical safety concern, as it can lead to potential dangers, particularly when herbal or alternative medicines interact with prescription drugs (Fathy *et al.*, 2019). Pharmacists are among the most trusted healthcare professionals, as they offer direct pharmaceutical care and are expected to provide accurate information on both conventional and alternative treatments (McHuges & Timmermann, 2005; Fathy *et al.*, 2019; Khan *et al.*, 2020).

Pharmacists' awareness and role in CAM

Pharmacists are important healthcare providers who are regularly consulted regarding the use of pharmaceuticals as well as herbal and alternative remedies. Their knowledge is critical to ensure the safe and effective use of CAM, particularly in preventing dangerous interactions between herbal medicines and prescription pharmaceuticals (McHuges & Timmermann, 2005). However, research has shown that pharmacists' knowledge and confidence in discussing complementary and alternative medicine (CAM) vary widely. While some have received formal education in herbal medicine and alternative remedies, many others lack sufficient training and rely on personal experience or anecdotal evidence rather than scientific facts (McHuges & Timmermann, 2005).

One of the most significant issues is the absence of standardised CAM instruction in pharmacy courses. Instead of conventional academic training, many pharmacists learn informally through self-study or experience. This knowledge gap may impair their capacity to deliver reliable advice to patients, resulting in inconsistent recommendations and significant safety risks (Tiralongo & Wallis, 2008). Given the growing reliance on complementary and alternative medicine (CAM), it is critical to analyse pharmacists' awareness,

information sources, and strategies for counselling patients about alternative medicines. A 2008 Australian study demonstrated that integrating complementary medicine into pharmacy education successfully improved students' knowledge and evidence-based practice (Tiralongo & Wallis, 2008).

CAM in Egypt

Egypt has a long and rich history of traditional medicine, with herbal treatments serving as an integral element of therapeutic techniques for thousands of years. Ancient Egyptian medical knowledge was far ahead of its time, with plant-based therapies used to cure a variety of health ailments. The Ebers Papyrus, a medical manuscript from around 1550 BC, is one of the most notable records of this knowledge. It contains hundreds of herbal formulations and therapeutic treatments. ("Ebers papyrus," 2019; Metwaly *et al.*, 2021)

In modern Egypt, CAM is still frequently used, particularly in rural areas where access to conventional healthcare treatments is restricted. (Fathy *et al.*, 2019) Before 2016, Egyptian regulations allowed the traditional use of local herbal remedies without requiring extensive documentation, provided they met safety and efficacy standards when marketed. In 2016, the regulations were revised to define traditional herbal medicines as products used in Egypt for at least 15 years and supported by evidence of safety and effectiveness. However, these rules apply only to pharmacies regulated by the Ministry of Health, while herbal products remain widely available in herb stores without regulatory oversight.

Despite its prominence, little research has examined how well pharmacists understand CAM or how confidently they advocate for or warn against it. Given the increased public interest in alternative medicine, it is critical to assess Egyptian pharmacists' knowledge, opinions on CAM, and the degree to which they incorporate it into their professional practice. The purpose of this study is to identify gaps in pharmacists' knowledge of CAM and highlight areas where additional training and professional development may be required. In Egypt, the pharmacy programme includes three academic courses on herbs introduced at the third year level. These courses are the pharmacognosy course, which introduces students to medicinal herbs, their constituents, methods of collection, drying, preparation and preservation, as well as uses and two pharmacotherapy courses (1 & 2) that focus on the biosynthesis and chemical and physical properties of the principal classes of natural compounds used in therapy.

The aim of the current study is to assess Egyptian pharmacists' and pharmacy students' knowledge, use, and recommendation of CAM in general and herbal remedies in particular.

Methods

A cross-sectional study was conducted during October 2024-january 2025 as a graduation project for sixth-year students. A self-administered, questionnaire-based survey was distributed to 110 randomly selected participants to assess knowledge, attitudes, and use of Complementary and alternative medicine in general and herbal remedies in particular among pharmacy students and pharmacists. Students were randomly enrolled across year levels to assess the impact of education on herbal medicine use.

Participant recruitment process

An invitation containing a link to the online questionnaire was distributed through the official social media groups of pharmacy students. Participation was voluntary, and eligible students who agreed to participate completed the survey electronically.

Ethical approval and informed consent

The present study is based on the graduation project of the first ten authors. The Ethics Committee of Scientific Research, Faculty of Pharmacy, Alexandria University, Egypt, approved this study (1 August 2024). Participation was voluntary, and all participants provided informed consent before completing the questionnaire.

Question types included in the survey

The questionnaire consisted primarily of structured closed-ended questions, including multiple-choice, multiple-response, dichotomous (yes/no), and ordinal response items assessing participants' knowledge, attitudes, perceptions, experiences, and regulatory views regarding CAM and herbal products. A limited number of questions included an optional "other, please specify" response.

The questionnaire was developed after reviewing relevant literature and field-tested for applicability and comprehensiveness with a sample of 10 participants. It comprised 37 questions divided into five sections. The first section included written consent to participate in the survey. The second section covered participant demographics: age, gender, area of residence, and year of study. The third section assessed general knowledge about CAM and the patterns of use of herbs, while

sources of information were investigated by providing students with options to choose from, including university courses, personal experience, friends, family, research articles, social media, and the internet. The fourth section explored personal experiences with CAM, examining the use of herbs as an alternative to drug therapy, whether for prophylaxis or self-directed treatment, versus visiting a doctor. The final section addressed CAM regulation, participants' opinions and knowledge about it, and the reasons behind their use of CAM.

Participants were instructed to select the option they deemed most appropriate. Completed questionnaires were collected, and the data were analysed and expressed as counts and percentages. Confidentiality of the results was assured.

Statistical analyses

The data were analysed using Microsoft Excel 365.

Results

Descriptive statistics

A total of 110 respondents participated in this study, with a nearly equal distribution of females (54.55%) and males (45.45%). Most (72.73%) were aged 18–24 years. Most participants were in their fifth year or above (46.36%), while pharmacists represented 32.73%. Most respondents resided in urban areas (70%) (Tables I and II).

Table I: Demographic profile distribution for pharmacy students, n = 74

Question	Response	Count	Percentage (%)
1 Gender	Female	45	40.9
	Male	29	26.36
2 Age group	18-24	71	64.54
	25-34	3	2.7
3 Pharmacy programme level	First year	6	5.45
	Fifth year	51	46.36
	Fourth year	10	9.09
	Second year	3	2.73
	Third year	4	3.64
4 Residence	Urban area	47	42.72
	Suburban area	18	16.36

	Rural area	9	8.18
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Table II: Demographic profile distribution of pharmacists, n = 36

Question	Response	Count	Percentage (%)
1 Gender	Female	15	13.64
	Male	21	19.1
2 Age group	18-24	9	8.18
	25-34	16	14.54
	35-44	3	2.73
	45-54	6	5.45
	55-64	2	1.82
3 Residence	Urban area	30	27.27
	Suburban area	3	2.727
	Rural area	3	2.727
4 Years of experience	1-3 years	0	0
	3-5 years	11	10
	More than 5 years	25	22.72

Regarding general knowledge about CAM

Regarding knowledge of CAM, 47.27% of respondents reported knowing the term "Complementary and Alternative Medicine (CAM)" somewhat well, while an equal proportion (47.27%) indicated that they knew it very well. Only 5.45% reported no knowledge of the term. Among the CAM therapies listed, herbal medicine was the most commonly recognised (25.75%), followed by aromatherapy (20.00%) and acupuncture (15.25%) (Figure 1).

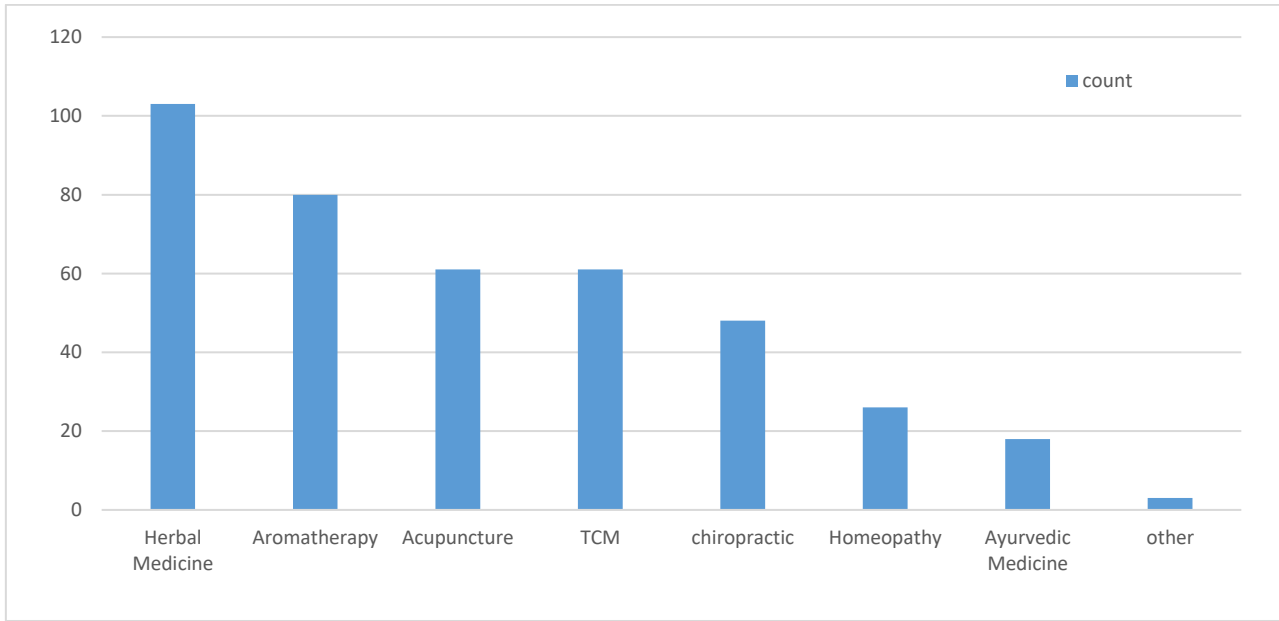


Figure 1: Representation of the most recognised and used CAM

The most common source of awareness about CAM was university courses (70%), followed by social media (14.55%) and personal experience (6.36%). Most

respondents (74.55%) believed CAM was useful in some cases, while 20.91% considered it essential and transformative (Figure 2).

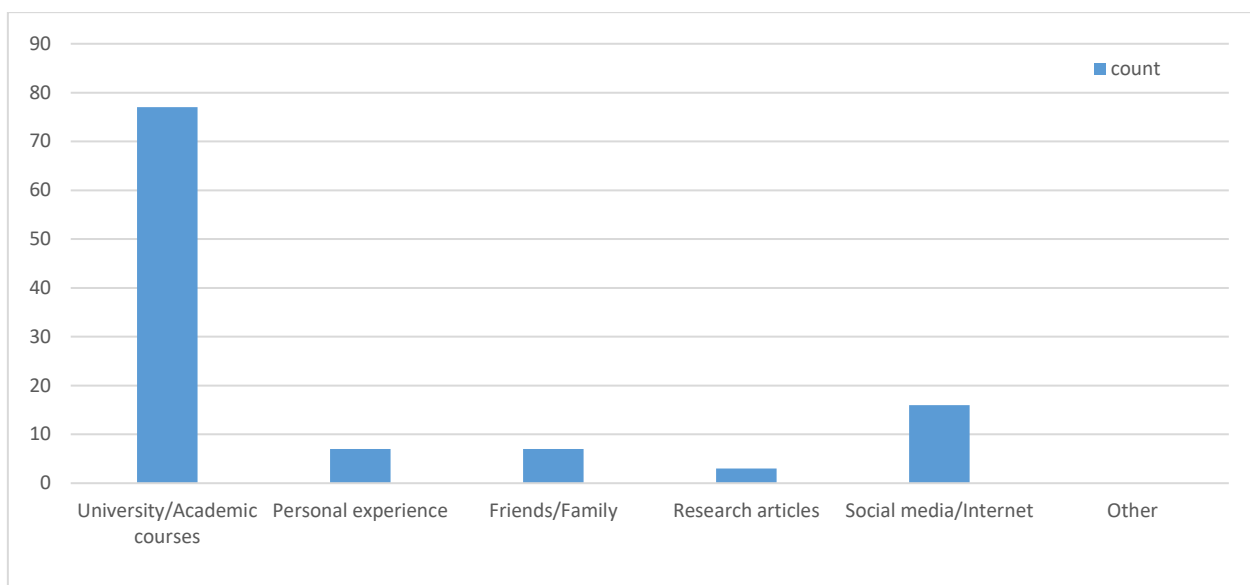


Figure 2: Source of awareness

Attitudes toward CAM usage and practice

Regarding confidence in recommending CAM therapies for specific medical conditions, 73.64% of respondents indicated that they would recommend them only under certain circumstances, whereas 15.45% reported that

they would do so without hesitation. Regarding their interest in further CAM education, 32.73% reported being very eager to learn more, while 55.45% indicated that they were somewhat interested, although it was not a priority (Figure 3).

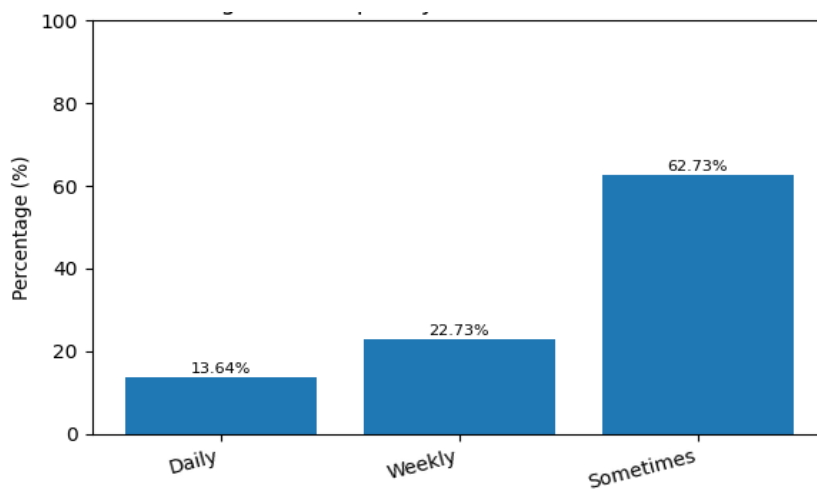


Figure 3: Frequency of herbal medicine use among pharmacists and pharmacy students

Regarding the incorporation of CAM into future pharmacy practice, 45.45% of respondents indicated that they were unsure, while 37.27% reported that they would incorporate CAM into their future practice. When asked about the type of CAM education or training they considered most beneficial, 46.36% selected evidence-based research on CAM, followed by practical use of CAM therapies in clinical settings

(42.73%). Regarding physician education, 47.27% believed that CAM education is essential for all physicians, whereas 37.27% thought it should be limited to specific specialties. Furthermore, 50.91% of respondents believed that cultural or traditional treatments should be integrated into contemporary medical care only after further study and regulation.

Personal experiences with CAM

Regarding personal use of CAM practices, herbal remedies were the most commonly used modality (39.09%), followed by aromatherapy (8.18%) and acupuncture (2.73%). When asked about the effectiveness of CAM methods for the conditions for which they are used, 57.27% of respondents considered them moderately effective, while 29.09% regarded them as highly successful.

Regarding the frequency of herbal treatment use, 62.73% of respondents reported using herbal treatments "sometimes," while 22.73% reported weekly use and 13.64% reported daily use (Figure 3).

The most common forms used were herbal preparations (51.82%) and raw herbs (40%). Among herbal users, 69.09% were satisfied with their results.

The primary reasons for choosing herbal medicine included the belief that they are natural (50.91%), safer (23.64%), and free from side effects (13.64%). However, 60% of respondents believed herbal medicines should be available only in pharmacies as regulated products.

Research has shown that countries differ in their understanding and usage of complementary and alternative medicine (CAM) due to cultural, geographic, and educational variations. For instance, herbal medicine was the most popular CAM therapy in Ghana and America, while acupuncture was the most popular in Singapore. This study also revealed that the majority of the pupils used medicinal herbs (Guyen, 2019).

Regulation of CAM

Regarding the perceived safety of herbal remedies, 35.45% of respondents indicated that the safety of herbal remedies depends on the therapy, while 33.64% considered them mostly safe. When asked whether it is safer to use alternative medicine alongside conventional medicine, 44.55% responded "Yes," whereas 32.73% responded "No."

Most respondents (94.55%) believed that patients should inform their physicians about their use of herbal medicines. Regarding the regulation of CAM, 53.21% believed that CAM should be strictly controlled, while 35.78% supported moderate regulation. However, 36.70% reported that they were unaware of any existing legal regulations concerning the use of medicinal herbs or herbal products.

Regarding whether medicinal herbs/herbal products should be regulated in the same manner as conventional drugs, 50.46% agreed, whereas 33.94% disagreed. Finally, when asked about the most common type of CAM used, 75.23% selected nutritional

supplements, while 24.77% selected prayer/spiritual healing.

Statistical analysis of CAM knowledge and usage

Chi-square tests and regression analysis were conducted to determine relationships between demographic factors and CAM-related attitudes.

1. Age vs. CAM Knowledge: No significant association was found ($p = 0.292$).
2. Study Level vs. CAM Usage: No significant relationship was observed ($p = 0.951$).
3. Gender vs. Confidence in Recommending CAM: No significant difference was noted ($p = 0.193$).
4. Awareness of Regulations vs. Perception of CAM Safety: No significant association was detected ($p = 0.126$).
5. Study Level vs. Willingness to Use CAM: No significant relationship was found ($p = 0.712$).
6. CAM Knowledge vs. Confidence in Recommending CAM: No significant correlation was observed ($p = 0.503$).

Cross-tabulation analysis indicated that higher study levels correlated with better CAM knowledge, with fifth-year and graduate students demonstrating greater awareness. However, study level did not significantly predict CAM knowledge in regression analysis ($R^2 = 0.011$, $p = 0.281$). In terms of willingness to use CAM, males exhibited higher uncertainty (50%) compared to females (41.67%). However, females (40%) were slightly more likely to incorporate CAM into their practice than males (34%).

Discussion

Knowledge and awareness of CAM

This study found that a significant proportion of respondents were familiar with CAM, with 47.27% reporting they knew the term "somewhat well" and another 47.27% stating they knew it "very well." The analysis revealed a correlation between study level and CAM knowledge, where higher academic levels exhibited greater familiarity. Graduate students and fifth-year students demonstrated the highest levels of knowledge, whereas first-year students showed the least awareness. Other similar studies carried out in Lebanon (Hijazi *et al.*, 2019), Palestine (Shraim *et al.*, 2017), Saudi Arabia (Alnaim *et al.*, 2018) and Singapore (Koh *et al.*, 2003) showed fair knowledge among pharmacists regarding CAM, while poor knowledge of herbal supplements among respondents was observed in some studies in Egypt (Fathy *et al.*, 2019) Nigeria (Ibrahima & Lawal, 2022), Sierra Leone (James & Bah,

2014), Jordan (Jalil *et al.*, 2022), and Iraq (Humadi, Hassan, & Ahjel, 2024).

The findings from this study suggest an association between formal education and improved CAM knowledge; however, due to the cross-sectional design, causality cannot be established, and further interventional studies are required, aligning with previous research that emphasises the role of structured learning in increasing CAM awareness. However, students' confidence in their CAM knowledge may not reflect their actual understanding. Further research is required to assess their knowledge accurately and identify key gaps for improvement.

Confidence in recommending CAM

Despite relatively high familiarity with CAM, no statistically significant relationship was found between CAM knowledge and confidence in recommending it ($p = 0.503$). This suggests that knowing about CAM does not necessarily translate into a willingness to integrate it into practice. Other factors, such as clinical exposure, regulatory clarity, and professional guidelines, may have a more significant impact on pharmacists' confidence in recommending CAM therapies (Figure 4).

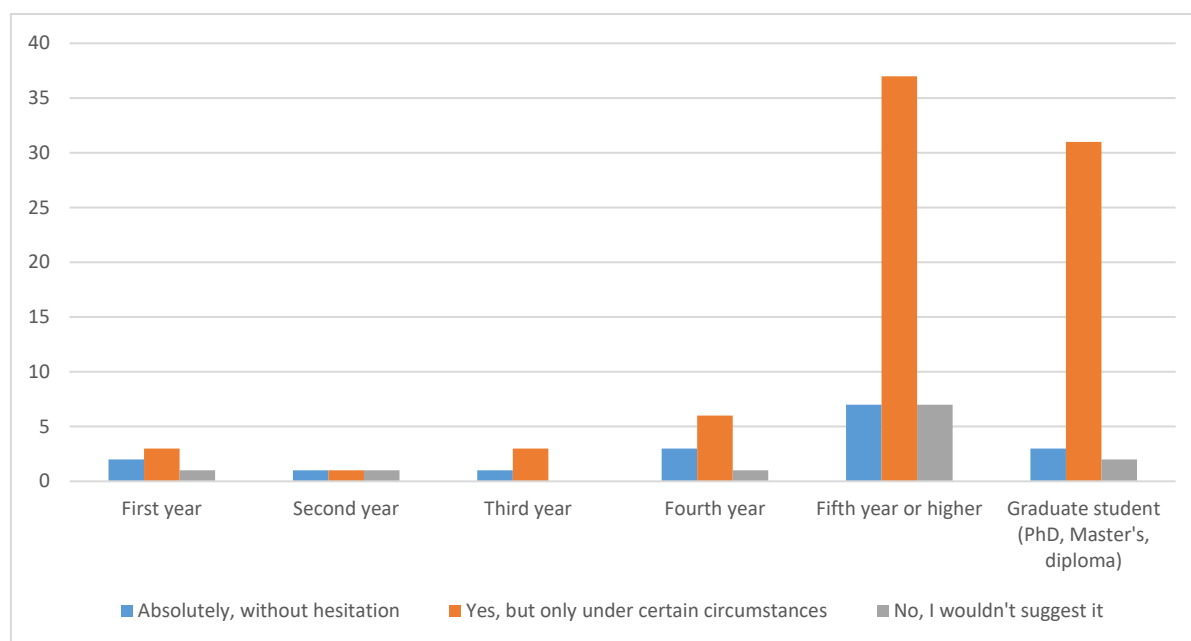


Figure 4: Confidence in recommending CAM therapies according to academic level

This aligns with earlier research indicating that while healthcare professionals often have satisfactory CAM knowledge, they tend to be hesitant in recommending such therapies due to concerns over the quality of scientific evidence, potential herb–drug interactions, and patient safety.(Amorha *et al.*, 2017) These observations imply that professional confidence is shaped not only by knowledge but also by hands-on experience and the ability to critically appraise available evidence. Conversely, other studies have demonstrated a positive link between CAM education and confidence in making recommendations (Alnaim *et al.*, 2018), suggesting that pharmacists who receive structured CAM training—whether through undergraduate programmes or continuing professional development—are more inclined to feel equipped for patient counselling and therapy recommendations. The

divergence between these earlier reports and our current findings could be attributed to variations in pharmacy curricula, clinical exposure, healthcare settings, and the existence of national regulatory frameworks for CAM practice.

Use of herbal medicine

When asked about the timing of their most recent herbal product use, 69.09% of respondents reported using a herbal product within the past year. Herbal preparations (51.82%) and raw herbs (40.00%) were the most commonly used forms. The main reasons for preferring herbal medicine over conventional treatments were its natural origin (50.91%) and perceived safety (23.64%). However, perceptions of herbal medicine safety varied, with 35.45% stating that safety depends on the specific therapy, 33.64%

considering herbal medicine mostly safe, and 17.27% viewing it as somewhat risky. These findings highlight the ongoing debate regarding the safety and standardisation of herbal medicine, emphasising the need for further research to establish clear guidelines for its use.

Research has shown that countries differ in their understanding and usage of complementary and alternative medicine (CAM) due to cultural, geographic, and educational variations. For instance, acupuncture was the most well-known CAM therapy in Singapore, whereas herbal medicine was the most popular in Ghana and America (Güven, 2019).

According to previous research, community pharmacists and their families use herbal supplements at relatively high rates (above 70%) (Bushett *et al.*, 2011; Amorha *et al.*, 2017) and our study also revealed this. This is to be expected given how readily available these agents are at nearby pharmacies and herbal stores.

In a cross-sectional study conducted in Alexandria, Egypt, herbal medicine use was highly prevalent among the public, with 51.2% of participants reporting a preference for herbal remedies and 46.7% indicating previous use. The internet was the primary source of information on herbal products, followed by family and friends and television/media. Herbal remedies were obtained mainly from herb stores (61.2%), whereas pharmacies accounted for a smaller proportion (24.1%). The most commonly reported reasons for herbal use were perceived safety (41.7%), effectiveness, affordability, and ease of access. Furthermore, 26% of herbal users reported experiencing adverse effects, predominantly gastrointestinal symptoms, and herbal medicine use was slightly more common among women than men (Fathy *et al.*, 2019).

Regulatory concerns and integration into medical practice

The study found strong support (94.55%) for patients informing their physicians about CAM use, reflecting an understanding of the potential interactions between CAM and conventional treatments. Additionally, 53.21% of respondents believed that CAM should be strictly regulated. However, awareness of existing CAM regulations was relatively low, with 36.70% of participants stating they were unaware of any legal frameworks governing CAM use.

Limitation

There were some limitations in this study. First, the findings are based on self-reported information; thus,

it may contain inaccuracies due to social desirability bias or memory recall. Second, the small number of respondents, with a slight increase in the number of females, may be because women are more open and receptive to health concerns and tend to share problems. Future studies should focus on testing a larger sample with equal percentages of males and females percentages in order to avoid gender bias. A limitation of this study is the unequal representation of academic years among participants, with most respondents recruited from the fifth year, followed by the fourth and first years, while no students from the second or third years participated. This imbalance may limit the generalisability of the findings across all academic levels.

Conclusion

This study found that Egyptian pharmacy students and pharmacists hold generally favourable attitudes toward CAM (74.55% viewed it as useful), yet significant gaps remain in knowledge, regulatory uncertainties, and hesitancy in recommending CAM therapies remain key challenges. Future efforts should focus on incorporating comprehensive CAM education into pharmacy curricula, emphasising evidence-based practice and safety considerations. Additionally, increased awareness of regulatory frameworks and standardised guidelines could enhance pharmacists' confidence in integrating CAM into their professional practice.

Recommendations

Enhancing CAM education in pharmacy curricula:

The findings from this study suggest that formal education plays a crucial role in improving pharmacists' knowledge of complementary and alternative medicine (CAM). Therefore, it is recommended that pharmacy schools integrate comprehensive, evidence-based CAM education into their curricula. This should include not only theoretical knowledge but also practical training, particularly in the safe use of herbal medicine and other CAM therapies. Introducing specialised courses that focus on CAM interactions with conventional therapies could enhance students' confidence in recommending and safely integrating CAM into their practice.

Standardising CAM regulation and safety protocols:

A significant portion of respondents expressed concerns about the safety and regulation of CAM

therapies, particularly herbal remedies. Given the widespread use of herbal medicine and its potential interactions with conventional treatments, it is crucial to develop and implement standardised safety guidelines for CAM use. Pharmacists should be educated on the latest regulations surrounding CAM to ensure they can effectively communicate these to patients and other healthcare providers. Additionally, policymakers should consider stricter regulations to ensure the quality and safety of CAM products available to the public.

Promoting public awareness and patient-pharmacist communication:

The study revealed that many respondents believed patients should disclose their use of CAM to healthcare providers. To improve patient safety and therapeutic outcomes, it is recommended that awareness campaigns be launched to educate the public about the importance of sharing their CAM use with healthcare professionals. Pharmacists should actively engage with patients about their use of alternative therapies, offering guidance on potential interactions with prescription medications.

Addressing gaps in pharmacist awareness of CAM regulations:

In light of the finding that 36.70% of participants were unaware of existing legal frameworks governing CAM use, we recommend that regulatory authorities and academic institutions place greater emphasis on disseminating information about CAM regulations and integrate these topics more thoroughly into pharmacy education to better prepare future pharmacists for informed practice in this area.

Conflict of interest

The authors declare no personal or financial conflicts of interest that could inappropriately influence the study.

Source of funding

The authors did not receive any funding.

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