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Community Pharmacists' Knowledge, Attitudes, and Practices Regarding Herbal Medicine: A Cross-Sectional Study in Libya

Hajer M. Arjaibi^{1*}, Rehab A. Sherlala², Maram H. Mansour³, Sokina A. Osman³

¹ Department of Pharmacognosy, Faculty of Pharmacy, University of Zawia, Az Zawiyah Libya

² Department of Family and Community Medicine, Faculty of Medicine, University of Zawia, Az Zawiyah, Libya

³ Graduated Student, Faculty of Pharmacy, University of Zawia, Az Zawiyah, Libya

***Corresponding Author:** Hajer M. Arjaibi
Lecturer at, department of Pharmacognosy, Faculty of Pharmacy,
University of Zawia, Az Zawiyah, Libya
Email: h.arjaibi@zu.edu.ly

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ABSTRACT

Background: Herbal medicines are becoming increasingly popular worldwide, including in the Arab world and Libya. This trend makes it imperative that pharmacists be knowledgeable enough to appropriately counsel patients about herbal products.

Objective: The aim of this study is to assess community pharmacists' knowledge, attitudes, and practices regarding herbal medicine in Libya.

Methods: : A cross-sectional study was conducted using an online questionnaire distributed to licensed community pharmacists via email, social media, and in person at local pharmacies from December 2022 to June 2023. Data were analyzed using R software version 4.2.1, with results presented in terms of frequencies and percentages, applying chi-square and regression analyses as appropriate.

Results: The results showed that community pharmacists have adequate knowledge about herbal products without significant differences between genders. However, gaps in awareness of specific side effects and contraindications were identified. The most frequently dispensed herbal products included Hedera helix, chamomile, thyme, senna, fenugreek, ginger, and clove. In addition, 88.5% of the pharmacists agreed that herbal products have beneficial effects, while 66.8% "sometimes" or "always" dispensed them, and 81% used them for self-treatment.

Conclusion: Overall, pharmacists showed good knowledge, positive attitudes, and effective practices concerning herbal products. However, to ensure public safety and health, further reform in education and the establishment of policies with clear guidelines to facilitate effective counselling and safer dispensing are imperative

KEYWORDS: Herbal Medicine, Pharmacists, Cross-Sectional Studies, Syzygium, Thymus Plant

INTRODUCTION

Community pharmacists serve as the first point of contact for the public on pharmaceutical matters and play a vital role in promoting the safe use of herbal medicine (HM). Their accessibility and trustworthiness position them as key providers of evidence-based information about HM [1, 2]. Globally, over 80% of people in developing nations rely on HM as a primary healthcare resource, underscoring its critical role in meeting healthcare needs [3]. The perceived natural benefits, affordability, and fewer side effects compared to synthetic drugs further drive HM's popularity [4]. However, many herbal products lack rigorous testing or regulatory oversight, complicating efforts to ensure safety, efficacy, and responsible use [6]. Reports of adverse events, interactions, and fatalities linked to HM—such as the FDA's documentation of over 800 ephedrine-related incidents in the 1990s and NIH's 2004 meta-analysis identifying 16,000 ephedra-associated adverse effects—highlight these risks [8-11].

In Libya, complementary and alternative medicine (CAM), including HM, was formally integrated into the healthcare system in 1995 through regulatory bodies established by the Ministry of Health. Regulations for advertising and registration followed in 1997, but lax oversight led to concerns about product quality, safety, and misuse [13]. Herbal remedies are now classified as over-the-

counter (OTC) products, widely accessible in pharmacies and herbal shops (Atar). Despite LMOH approval for many products [16], unregistered HM remains prevalent, posing patient safety risks. Studies indicate widespread HM use among Libyans, including those with type 2 diabetes, often without healthcare consultation, increasing the likelihood of adverse outcomes [15].

As frontline healthcare providers, community pharmacists globally face growing inquiries about HM, necessitating up-to-date knowledge on uses, dosing, interactions, and contraindications [18-20]. However, there is a paucity of data on Libyan pharmacists' understanding of HM. This study aims to evaluate their knowledge, perceptions, and practices regarding HM, with findings intended to guide educational initiatives and enhance pharmacy training programs in the region.

MATERIAL AND METHODS:**Study design:**

This descriptive cross-sectional study surveyed licensed community pharmacists from Libya's General Syndicate of Pharmacy. An anonymous self-administered online questionnaire was created using Google Forms. After the study was granted approval from the Faculty of Pharmacy, University of Zawia, the questionnaire was distributed to pharmacists through social media platforms such as Facebook, Messenger, Telegram, and WhatsApp, as well as in

person at local pharmacies. The sample size was estimated at 367 pharmacists, determined by the count of licensed community pharmacists in Libya (8,000), and was determined by using the Raosoft sample size calculator (<http://www.raosof.com/samplesize.html>) with a margin of error of 5% and a confidence level of 95%. A total of 400 surveys were successfully completed, resulting in an impressive response rate exceeding 90%. The data collection process was conducted over a six-month period, from December 2022 to June 2023. The distributed questionnaire was adapted from previous studies [21–23] and consisted of four domains. The initial section consisted of questions regarding demographics, including age, gender, educational background, place of employment, and years of work experience. The second domain, which comprises two components, evaluated pharmacists' understanding of herbal medicine: the initial component featured four self-assessment questions utilizing a 4-point scale (Poor, acceptable, good, very good), while the subsequent component included true/false or "I don't know" questions that measured knowledge about the indications, adverse effects, and uses of three of the most commonly utilized and accessible herbal medicines (HM) found in Libyan pharmacies, including fenugreek, chamomile, and senna. The third section included five questions that employed a five-point Likert scale— (1) strongly disagree, (2) disagree, (3) agree,

(4) strongly agree, and (5) I don't know — to assess pharmacists' perceptions of HM. The final domain used a scale of "never, rarely, sometimes, and always" to assess the practice of HM. In addition to the main domains, multiple-choice questions were included regarding herbal products that are dispensed most frequently in community pharmacies.

Statistical analysis

The collected data were systematically input, cleaned, and analyzed using R software version 4.2.1. Descriptive statistics, including frequency distributions, were computed, and categorical variables were presented as frequencies and percentages. The mean and median for the Knowledge score were calculated with a minimum score of 4 as poor and a highest score equal to or greater than 12 as good. Linear regression analysis was calculated to assess factors such as "Age, Sex, Education level, Work experience, and place" that are associated with knowledge score as an outcome. Logistic regression analysis was performed to measure the association between personal use of herbal medicine as self-treatment with demographic factors (Age, Sex, Education level, Work experience, and place) and knowledge score. Categorical variables are presented as frequency and percentages. The Chi-squared test was carried out to assess participants' differences by gender, and P-value < 0.05 was considered significant.

RESULTS

Demographic characteristics of participants

In this study, 400 community pharmacists from different regions of Libya took part. The majority of participants, accounting for 71.3%, were aged between 20 and 30 years. Their educational backgrounds varied, with 16.3% holding a postgraduate diploma, 78.5% possessing a bachelor’s degree in pharmacy, and 5.3% having a master’s degree. Most respondents were female (73.2%), while

males comprised only 26.7%. Most Community pharmacists had 1 to 5 years of practical experience as community pharmacists (76.0%), with statistically significant differences between gender (P-value=0.028) and years of work experience. In addition, the largest proportion worked in Tripoli (35.8%) with a statistically significant difference between genders in terms of workplace with a P-value <0.001. A comprehensive summary of the socio-demographic characteristics of the participants is presented in Table

Table 1: Descriptive Table of Participants (n=400) Stratified by Gender.

	Male (n=107)	Female (n=293)	Overall (n=400)	P-value
Age Groups (Years)				0.07
20-30	69 (64.5%)	216 (73.7%)	285 (71.3%)	
30-40	30 (28.0%)	68 (23.2%)	98 (24.5%)	
>40	8 (7.5%)	9 (3.1%)	17 (4.3%)	
Level of Education				0.08
Diploma	17 (15.9%)	48 (16.4%)	65 (16.3%)	
Bachelor’s degree	80 (74.8%)	234 (79.9%)	314 (78.5%)	
Master’s degree	10 (9.3%)	11 (3.8%)	21 (5.3%)	
Workplace				<0.001*
Tripoli	47 (43.9%)	96 (32.8%)	143 (35.8%)	
Az Zawiyah	20 (18.7%)	108 (36.9%)	128 (32.0%)	
Benghazi	18 (16.8%)	23 (7.8%)	41 (10.3%)	
Others	21 (19.6%)	66 (22.5%)	87 (21.8%)	
Missing	1 (0.9%)	0 (0%)	1 (0.3%)	
Work experience in CP in Years				0.028*
1-5	77 (72.0%)	227 (77.5%)	304 (76.0%)	
6-10	12 (11.2%)	43 (14.7%)	55 (13.8%)	
>10	18 (16.8%)	23 (7.8%)	41 (10.3%)	

Note: n=number of participants, CP=Community Pharmacy. * = statistically significant P-value <0.05.

Participants' Knowledge Related to Herbal Medicines (HM)

Table 2 presents participants' self-rated knowledge about HM. More than half (81.3%) of respondents rated their general knowledge of HM as acceptable or good, while only 8.9% rated their knowledge as poor. The study revealed that 37.5% of the respondents rated their knowledge of HM interaction and side effects as acceptable, while 33.3%, 26.3%, and 24.3% rated their knowledge of HM interaction, side effects, and precautions as poor, respectively. There was no statistically significant difference between genders. Furthermore, about 82% of participants had knowledge scores of less than 12, with mean and median scores of 8.8 and 9, respectively. In addition, regression analysis revealed that educational levels were negatively associated with Knowledge score with $\beta = -0.64$ and $P = 0.04$, but there was no statistical significance with age, sex, work experience, or place (data not shown). In addition to inquiries related to the designated knowledge area, participants were evaluated on their familiarity with four specific herbal products: Fenugreek, Ginger, Chamomile, and Senna (Figures 1, 2, and 3). Participants answered three questions concerning the therapeutic applications, contraindications, interactions with drugs and herbs, and the most common side effects of the selected herbal remedies products. The participants demonstrated a remarkable understanding of the medicinal

applications of chamomile, with 88.5% providing accurate responses (Figure 1). Additionally, 55.8% of participants were knowledgeable about the contraindications and interaction risk of blood clotting medication and overconsumption of fenugreek and ginger (Figure 2). However, 73.3% were unaware of the potential side effects associated with increased potassium levels and long-term consumption of Senna (Figure 3).

Table 2 Participants' Knowledge Regarding Herbal Medicine (n=400) Stratified by Gender.

Statement	Male (n=107)	Female (n=293)	Overall (n=400)	P-value
knowledge about HM in general.	n (%)	n (%)	n (%)	0.9
Poor	9 (8.4%)	30 (10.2%)	39(9.8%)	
Acceptable	40 (37.4%)	106 (36.2%)	146(36.5%)	
Good	48 (44.9%)	131 (44.7%)	179(44.8%)	179
Very good	10 (9.3%)	26 (8.9%)	36 (9.0%)	
Knowledge about HM interactions	n (%)	n (%)	n (%)	0.8
Poor	32 (29.9%)	101 (34.5%)	133(33.3%)	
Acceptable	43 (40.2%)	107 (36.5%)	150(37.5%)	
Good	26 (24.3%)	72 (24.6%)	98(24.5%)	
Very good	6 (5.6%)	13 (4.4%)	19 (4.8%)	
Knowledge about HM side effects	n (%)	n (%)	n (%)	0.3
Poor	27 (25.2%)	78 (26.6%)	105(26.3%)	
Acceptable	47 (43.9%)	103 (35.2%)	150(37.5%)	
Good	26 (24.3%)	92 (31.4%)	118(29.5%)	
Very good	7 (6.5%)	20 (6.8%)	27 (6.8%)	
Knowledge about HM precautions	n (%)	n (%)	n (%)	0.3
Poor	24 (22.4%)	73 (24.9%)	97(24.3%)	
Acceptable	45 (42.1%)	120 (41.0%)	165(41.2%)	
Good	36 (33.6%)	84 (28.7%)	120(30.0%)	
Very good	2 (1.9%)	16 (5.5%)	18 (4.5%)	

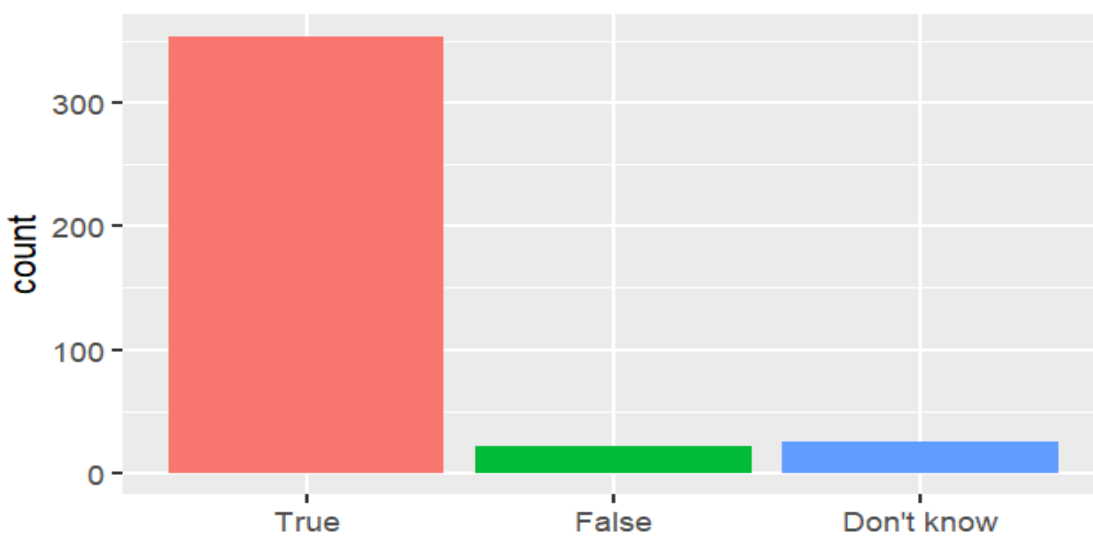


Figure 1. Participants' knowledge about the use of chamomile in treating insomnia, anxiety, and gastrointestinal conditions such as stomach upset.

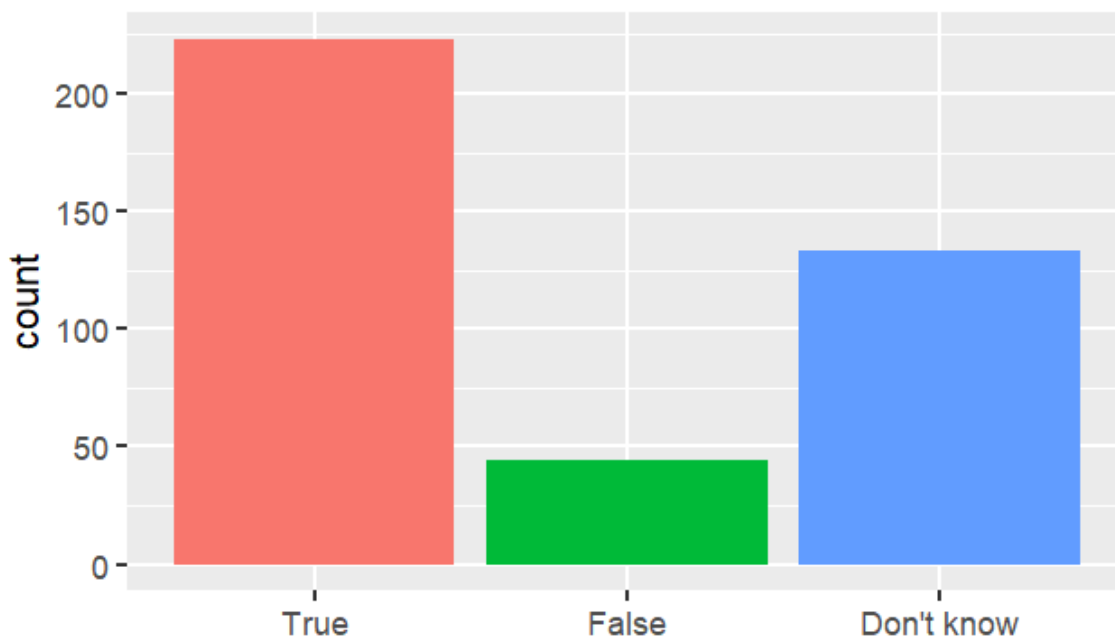


Figure 2. Participants' knowledge about the interaction risk of blood clotting medication and overconsumption of fenugreek and ginger



Figure 3. Participants' Knowledge about the association between increasing potassium levels due to long-term consumption of Senna

Participants were also asked about their knowledge of community pharmacies' most commonly dispensed herbal medicine. Figure 4 shows that the most common herbal products dispensed

through the community pharmacy are heder a helix (57.5%), followed by chamomile (56.8%), thyme (45.2%), senna (44.8%), fenugreek (30%), ginger (26.5%), and clove (24.5%).

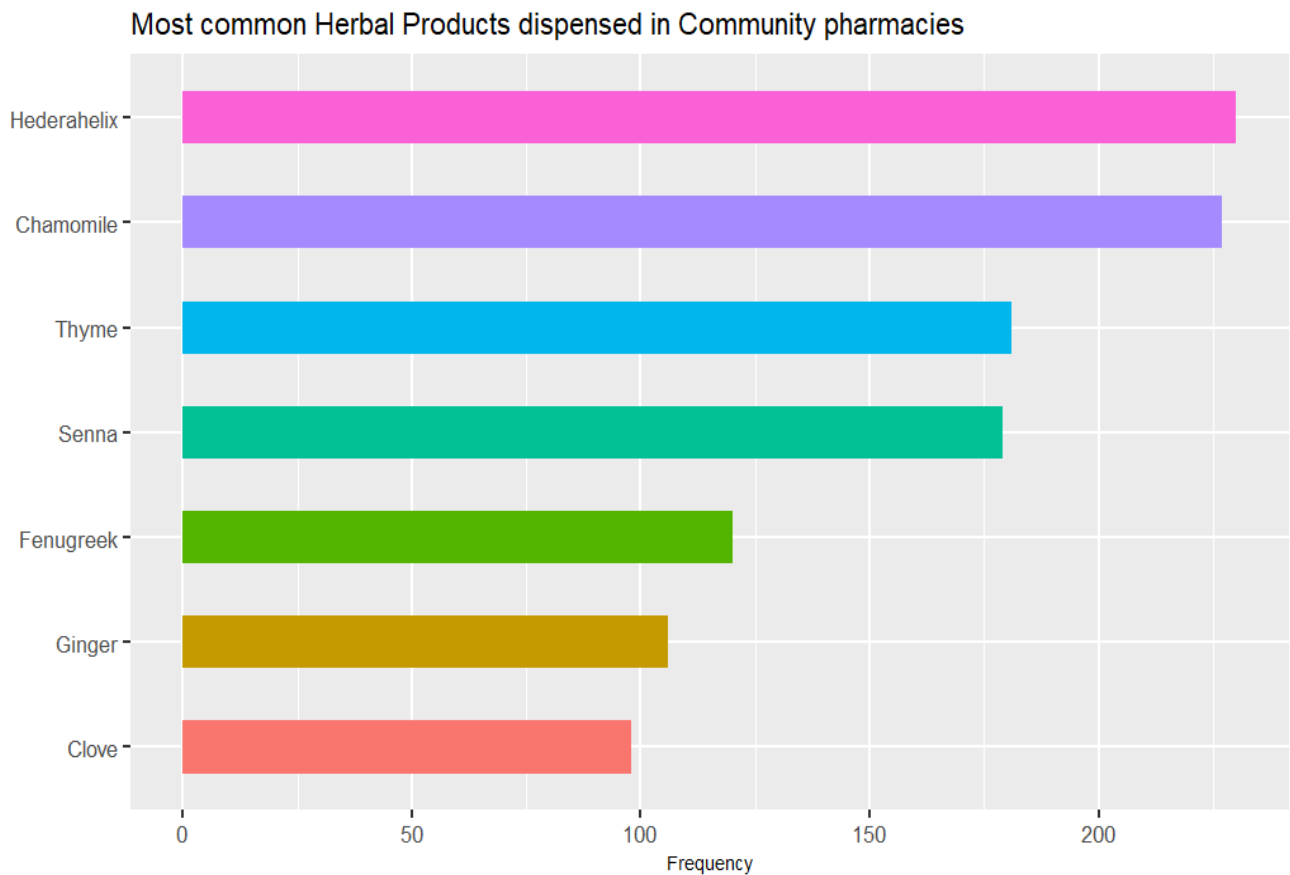


Figure 4 shows the most dispensed herbal medicine in community pharmacies based on participants’ knowledge and opinions

Participants’ attitude toward using herbal medicines (HM)

As presented in Table 3 regarding participants’ attitudes toward HM, 88.5% agreed or strongly agreed that HM has beneficial effects; however, 34.3% acknowledged the placebo effect of such preparations. In addition, while only 30.3 % of participants disagreed or strongly disagreed that HM has fewer side effects than conventional medicine, 73.6% agreed or strongly agreed that HM interacts with conventional medicines. Furthermore, half of the respondents (50.3%) agreed or strongly agreed that

HM is sufficiently studied. In addition, the Chi-squared test shows no statistically significant difference ($P > 0.05$) between gender’s beliefs or attitudes toward the questions (Table 3). The study results also showed that participants who agreed or strongly agreed that HM has beneficial effects were more likely to disagree or strongly disagree with the placebo effect of HM (Figure 5.A). The study results also revealed participants’ opinions toward HM benefits and whether HM has few side effects. (Figure 5.B) shows that most participants agree that HM has beneficial effects and few side effects.

Table 3 :Participants’ Attitudes toward using Herbal Medicine (n=400) stratified by gender.

	Male (n=107)	Female (n=293)	P-value
Do you agree that HM has a beneficial effect?			
Strongly Disagree	3 (2.8%)	14 (4.8%)	0.5
Disagree	2 (1.9%)	10 (3.4%)	
Agree	60 (56.1%)	178 (60.8%)	
Strongly Agree	36 (33.6%)	80 (27.3%)	
Don't Know	6 (5.6%)	11 (3.8%)	
Do you agree that HM has few side effects?			
Strongly Disagree	8 (7.5%)	28 (9.6%)	0.1
Disagree	16 (15.0%)	69 (23.5%)	
Agree	57 (53.3%)	146 (49.8%)	
Strongly Agree	18 (16.8%)	30 (10.2%)	
Don't Know	8 (7.5%)	20 (6.8%)	
Do you agree that HM has a placebo effect?			
Strongly Disagree	12 (11.2%)	38 (13.0%)	0.8
Disagree	39 (36.4%)	113 (38.6%)	
Agree	32 (29.9%)	87 (29.7%)	
Strongly Agree	7 (6.5%)	11 (3.8%)	
Don't Know	17 (15.9%)	44 (15.0%)	
Do you agree that HM being sufficiently studied?			
Strongly Disagree	8 (7.5%)	13 (4.4%)	0.4
Disagree	37 (34.6%)	98 (33.4%)	
Agree	41 (38.3%)	129 (44.0%)	
Strongly Agree	11 (10.3%)	20 (6.8%)	
Don't Know	10 (9.3%)	33 (11.3%)	
Do you agree that HM has significant interaction with conventional medicine?			
Strongly Disagree	8 (7.5%)	14 (4.8%)	0.3
Disagree	17 (15.9%)	30 (10.2%)	
Agree	51 (47.7%)	168 (57.3%)	
Strongly Agree	22 (20.6%)	53 (18.1%)	
Don't Know	9 (8.4%)	28 (9.6%)	

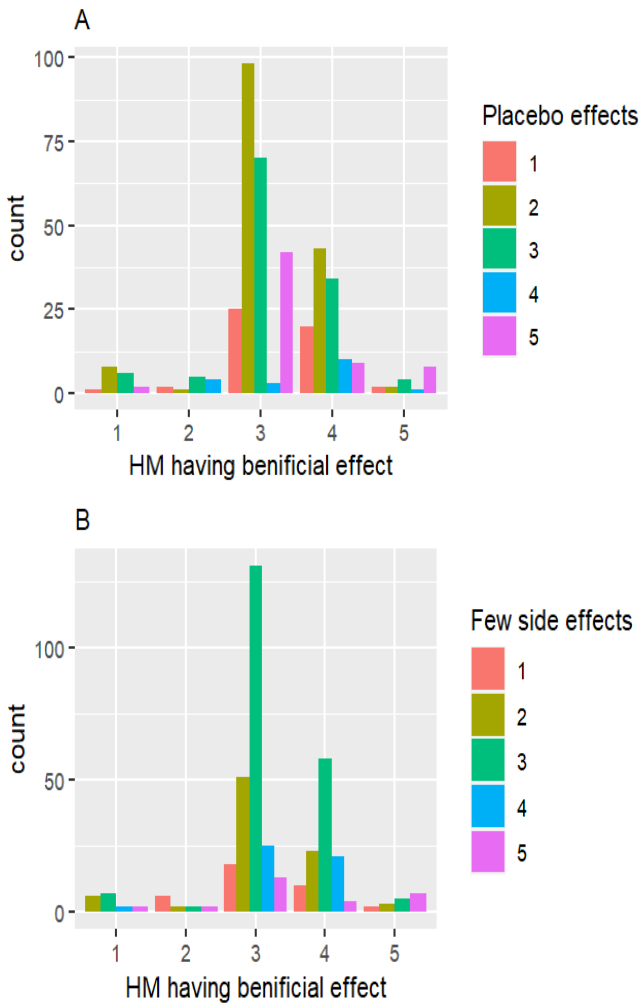


Figure 5 (A) Participants' opinion toward HM (Herbal Medicine) benefits and having a placebo effect. (B) Participants' opinions toward HM (Herbal Medicine) benefits and have few side effects. 1= strongly disagree, 2= disagree, 3= agree, 4= strongly agree, 5= don't know

Participants practice related to herbal medicines (HM)

As shown in Table 4, more than half of the participants (81.0%) indicated that they sometimes or always use HM for self-treatment, and 66.8% reported that they sometimes or always dispense HM. Most of the respondents (74.3%) reported that they sometimes or always counseled clients regarding HM, and 61.3 % have received inquiries related to HM. Overall, the difference in perception between genders was statistically not significant, with a *P*-value > 0.05 (data not shown). Logistic regression analysis was statistically not significant in measuring the association between personal use of HM in self-treatment and the demographic factors and knowledge score with *P*-value >0.05.

Table 2 Participant’s Practice Related to Herbal Medicine (n=400) Stratified by Gender.

Question	Male (n=107)	Female (n=293)	Overall(n=400)	P-value
Dispensing HM in the pharmacy				
Never	9 (8.4%)	50 (17.1%)	59(14.8%)	0.1
Rarely	18 (16.8%)	56 (19.1%)	74(18.5%)	
Sometimes	59 (55.1%)	156 (53.2%)	215(53.8%)	
Always	21 (19.6%)	31 (10.6%)	52 (13.0%)	
Using HM for self-treatment				
Never	7 (6.5%)	9 (3.1%)	16(4.0%)	0.3

Rarely	19 (17.8%)	41 (14.0%)	60(15.0%)	
Sometimes	56 (52.3%)	192 (65.5%)	248(62.0%)	
Always	25 (23.4%)	51 (17.4%)	76 (19.0%)	
Counseling customers about using of HM				
Never	4 (3.7%)	23 (7.8%)	27(6.8%)	0.6
Rarely	26 (24.3%)	50 (17.1%)	28(19.0%)	
Sometimes	52 (48.6%)	150 (51.2%)	202(50.5%)	
Always	25 (23.4%)	70 (23.9%)	95 (23.8%)	
Receiving inquiries related to HM				
Never	14 (13.1%)	30 (10.2%)	44(11.0%)	0.7
Rarely	35 (32.7%)	76 (25.9%)	111(27.8%)	
Sometimes	47 (43.9%)	159 (54.3%)	206(51.5%)	
Always	11 (10.3%)	28 (9.6%)	39 (9.8%)	

DISCUSSION

This study provides valuable insights into the demographic characteristics, knowledge, and attitudes of community pharmacists in Libya regarding herbal medicines (HM). The findings align with and expand upon previous research conducted in different regions, highlighting both similarities and unique trends in pharmacists' engagement with HM [21].

The demographic distribution of our participants indicates a predominant presence of younger pharmacists (71.3% aged 20–30 years), which is consistent with studies conducted in other countries, such as Saudi Arabia and Egypt, where young pharmacists also formed the majority of respondents [22]. Additionally, the higher proportion of female pharmacists (73.2%) in our study mirrors findings from studies suggesting a broader regional trend of female dominance in the community pharmacy sector [23]. Notably, the significant

gender disparity in workplace distribution observed in our study ($P < 0.001$) has not been widely reported in other studies, indicating potential location-specific workforce dynamics [24,25].

Regarding pharmacists' knowledge of HM, our study reveals that 81.3% of participants rated their general knowledge as acceptable or good, a result comparable to findings from studies in Bahrain and the UAE, where community pharmacists demonstrated moderate to high levels of HM awareness [26, 27]. However, our study found that 33.3% of pharmacists rated their knowledge of HM interactions as poor, aligning with research from serbian study that identified gaps in pharmacists' understanding of HM-drug interactions [28]. The observed negative association between higher education levels and knowledge scores ($\beta = -0.64, P = 0.04$) contrasts with findings from previous studies, where postgraduate education was associated with increased HM knowledge [29]. This discrepancy

suggests that the educational curricula in Libya may not sufficiently emphasize HM training, warranting further curriculum development. Pharmacists' knowledge of specific herbal products, particularly chamomile (88.5%), fenugreek, and ginger interactions (55.8%), is in line with findings from similar studies, where similar herbs were commonly recognized for their medicinal applications. The widespread dispensing of herbal products such as *Hedera helix*, chamomile, and thyme in Libyan community pharmacies aligns with previous research from Mediterranean regions, emphasizing the preference for locally available herbal remedies [30]. The attitudes of Libyan pharmacists toward HM were largely positive, with 88.5% agreeing or strongly agreeing that HM has beneficial effects. This percentage is slightly higher than that reported in a South African study (79.6%) but comparable to findings in Saudi Arabia, 31.8% of people use herbs to treat liver illness, while 76% of people use them to treat skin conditions including psoriasis and allergies. On the other hand, this study shows (73.6%) of respondents agreed that HM has significant interaction with conventional medicine. As a result, there is a need for the availability of more comprehensive HM information resources to ensure good and effective patient counseling regarding HM because community pharmacists are the most accessible healthcare professionals [31, 32].

Overall, our study underscores the need for enhanced HM education and training among community pharmacists in Libya. The observed gaps in knowledge, particularly regarding HM interactions and side effects, highlight an area for targeted educational interventions [33-36]. Future studies should explore the integration of HM-related topics into pharmacy curricula and continuing education programs to ensure pharmacists are well-equipped to provide safe and effective counseling on herbal medicine use.

CONCLUSION

This study assessed the knowledge, perceptions, and practices of community pharmacists in Libya regarding herbal medicines. The findings indicate that pharmacists generally hold positive attitudes toward herbal products and take their role in patient counseling seriously. Their knowledge of herbal medicines, including their uses, contraindications, and potential drug interactions, was found to be adequate. However, to ensure safe and effective patient care, pharmacists should continuously update their understanding of herbal therapies. This can be achieved through targeted education, ongoing professional development, and curriculum enhancements in pharmacy schools. Strengthening these aspects will contribute to safer and more informed use of herbal medicines in the community.

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Ethical approval

This research was conducted after getting ethical approval from the ethical committee University of Zawia, Libya, there is no human samples or cells used in this research only research questionnaires

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None

Conflict of interest

None

Data Availability

Underlying data

Zenodo. Data Community Pharmacists' Knowledge, Attitudes, and Practices Regarding Herbal Medicine: A Cross-Sectional Study in Libya

DOI:[10.5281/zenodo.14833336](https://doi.org/10.5281/zenodo.14833336)

Contains the file : survey.xlsx which contains questionnaire result

These data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0) [36].

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