مجلة اكاديمية الجبل للعلوم الاساسية والتطبيقية
Al-Jabal Academy Journal of Pure and Applied Sciences
03 (1): 01-15, 2025
pISSN: 2958-857X; eISSN: 2958-8588
Journal Homepage: https://lajak.edu.ly/journals/index.php/aajpas/index

Prevalence and Use of Non-Pharmacological Home Remedies in Eastern Libya: A Cross-Sectional Survey

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Received: 25 January 2025/ **Accepted:** 22 April 2025

DOI: https://doi.org/10.58309/4r35w234

Keywords:

Non-pharmacological

Home remedies

Primary care

Eastern Libya.

ABSTRACT:

Non-pharmacological home remedies (NPHRs) have the potential to be readily accessible and widely accepted for the management of common disorders in primary care settings. This study aimed to investigate the prevalence and use of NPHRs in Eastern Libya. A self-administered questionnaire was disseminated to Eastern Libya's general population from February to July 2024, examining their knowledge, experience, health status, motivations for use or non-use, awareness, perception, and commonly used home remedies and herbs. The study included 637 participants, comprising 64.7% females and 35.3% males. NPHR use was prevalent (62.8%), and knowledge was mainly provided by parents (48.3%) and herbalists (28.0%). Only 27.5% consulted healthcare professionals regarding herbal remedies. While 36.8% knew of side effects or toxicity, 2.3% reported adverse effects. The prevalence of NPHRs in Eastern Libya highlights their cultural importance in primary health care. Future research should assess the efficacy and safety of these remedies and consider their integration into conventional medicine for more comprehensive patient care.

انتشار واستخدام العلاجات المنزلية غير الدوائية في شرق ليبيا

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الكلمات المفتاحية:

العلاجات المنزلية غير الدوائية، الرعاية الأولية، شرق ليبيا.

المستخلص:

تتمتع العلاجات المنزلية غير الدوائية بإمكانية الوصول إليها بسهولة وقبولها على نطاق واسع لإدارة الاضطرابات الشائعة في بيئات الرعاية الأولية. هدفت هذه الدراسة إلى التحقيق في انتشار واستخدام العلاجات المنزلية غير الدوائية في شرق ليبيا. تم توزيع استبيان ذاتي على عامة السكان من فبراير إلى يوليو 2024، لفحص معارفهم وخبراتهم واستخدامهم الاجتماعي وحالتهم الصحية ودوافعهم للاستخدام أو عدم الاستخدام والوعي والإدراك والعلاجات المنزلية والأعشاب المستخدمة بشكل شائع. شملت الدراسة 637 مشاركًا، منهم 64.7٪ من الإناث و35.3٪ من الذكور، وكان استخدام العلاجات المنزلية غير الدوائية سائدًا (62.8%)، وتم توفير المعرفة بشكل أساسي من قبل الوالدين (48.3%) وأخصائيي الأعشاب (28.0%). ولم يستشير سوى 27.5% من المتخصصين في الرعاية الصحية فيما يتعلق بالعلاجات العشبية. في حين أن 36.8% كانوا على علم بالآثار الجانبية أو السمية، أبلغ 2.3% عن آثار ضارة.

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INTRODUCTION

Herbal medicines include vitamins, minerals, herbs, and plant extracts, which are used for their aromatic, flavor, and therapeutic properties. Their global use has increased significantly, with many individuals managing various health conditions (El-Dahiyat et al., 2020). These preparations address numerous health issues, including preventing and treating dyslipidemia, hypertension, diabetes, cancer, and inflammatory bowel disease (Alamgir and Alamgir, 2018).
Traditional and complementary medicine has seen a global resurgence and increased demand in recent decades. It includes diverse practices, knowledge, and beliefs about various drugs and therapies for treating, diagnosing, preventing, and maintaining health. Herbal medicine, a plant-based method, has long been used to treat numerous diseases (Bekele et al., 2024).

Despite advancements in modern medicine (Zheng and George, 2018), traditional medicine (TM) and nonpharmacological home remedies (NPHR) remain common worldwide. In 2018, the World Health Organization (WHO) noted that 88% of 194 member states reported using traditional, complementary, and alternative medicines (Organization, 2019). Herbal medicine use is rising in developed countries, for instance the United States, and has stabilized in developing countries, coexisting with modern medicine, even in urban areas (Rashrash et al., 2017, Van Andel and Carvalheiro, 2013). The COVID-19 pandemic has increased awareness and use of NPHR (Lam et al., 2021). Although traditional herbal medicine is beneficial for treating COVID-19 (Aprilio and Wilar, 2021), its use outside modern medical systems indicates that it may substitute for quality health care, raising concerns about self-medication with herbal medicines (Oberoi et al., 2016, Widayanti et al., 2020).

Humans have historically relied on natural resources for medicine, habitation, food, fragrances, clothing, flavorings, fertilizers, and transportation. Medicinal plants remain crucial in healthcare, particularly in developing countries with a strong tradition of herbal remedies (Dar et al., 2017). Herbal remedies have long been used for the treatment of various ailments (Izah et al., 2024). The transmission of traditional knowledge about medicinal plants is vital for health, particularly in rural or remote communities that lack sufficient health care facilities (Da Silva et al., 2023).

Globally, researchers have shown increased interest in plant-derived alternatives across various industries, such as medicinal products, pharmaceuticals, dietary supplements, wellness items, beauty products, and functional foods, owing to their potential safety, cost-effectiveness, and efficiency compared to traditional options (Ahmed et al., 2023, Vlaicu et al., 2023, Mittal et al., 2024). The World Health Organization (WHO) has reported that over 21,000 plant species have potential medicinal properties. Numerous studies have shown that medicinal plants contain bioactive compounds that are responsible for their therapeutic benefits and biological activities (Majolo et al., 2019, Banwo et al., 2021, El-Saadony et al., 2023).

In North Africa, many wild plant species show significant promise for medicinal and biotechnological uses. Globally, more than 70,000 plant species are known to have medicinal properties or are employed in traditional ethnotherapeutic practices. (Abogmaza et al., 2020a). Similar to other cultures, Libyan culture partially depends on indigenous medicinal plants to treat various ailments. For millennia, Green Mountain (Al-Jabal Al-Akhdar) inhabitants in Cyrenaica, Libya, have used native medicinal plants, creating a rich tradition of herbal medicine that has passed down through generations. Libyan medicinal plants contain active compounds that are effective against microbial infections, inflammation, cancer, and diabetes (Kollab and Alamen, 2018, El-Mokasabi et al., 2018a). Table (1) and Figure (1) show the commonly cultivated plants and trees in various Libyan regions. This study aimed to investigate the prevalence and use of non-

pharmacological home remedies in Eastern Libya.

Table 1: Traditional medicinal plants growing in Libya:

Scientific name	Common names	Arabic names	Traditional Uses	Biological Properties	References
Anethum graveolens L.	Dill	الشبت	Digestive disturbances, insomnia and urinary infections.	Insecticidal, antimicrobial, anti-inflammatory, anticancer and antidiabetic activities.	(Hamza, 2017, Abogmaza et al., 2020b)
Pelargonium graveolens L'Her.	Rose geranium	العطر	Various kinds of inflammatory diseases.	Diarrhea, diabetes, gall bladder, inflammation, liver, and gastric ulcer.	(Ennaifer et al., 2020)
Acacia saligna (Labill.)	Blue-Leaf Wattle	سنط الإكليل الذهبي	Cracks of feet and hands, Abscess and Constipation.	Antioxidant, antibacterial, antifungal and anticancer activities.	(Elansary et al., 2020, El-Mokasabi et al., 2018b)
Punica granatum L.	Pomegranate	الرمان	Anti-tapeworms, diarrhea, dysentery and hemorrhages.	Antioxidant, antibacterial, antifungal, anticancer, liver problems and allergies activities.	(Singh et al., 2018, Yahya et al., 2018)
Anastatica hierochuntica L.	Rose of Jericho	كف مريم	Labor pain, menstrual cramps and uterine hemorrhage.	Antioxidant, antimicrobial, hypoglycemic and hypolipidemic effects.	(Zin et al., 2017, Abd El-Ghani et al., 2017)
Viburnum tinus L.	Laurustinus	لوراستينوس	Gastritis and anti-inflammatory.	Neuroprotective, antioxidant, diuretic, antispasmodic and sedative properties.	(Cometa et al., 1998, Yılmaz et al., 2013)
Olea europaea L.	Olive	الزيتون	Heart disease, antidiabetic and anti-cancer activities.	Antioxidant, antidiabetic, cardioprotective and anti-inflammatory activities.	(Zern and Fernandez, 2005, Maalej et al., 2017)
Trigonella foenum-graecum L.	Fenugreek	الحلبة	Anti-diabetic and digestive disturbances.	Anti-inflammatory, cholesterol lowering, antidiabetic, liver disorder and as an anti-fertility agents.	(Kadam and Technology, 2018)
Scabiosa arenaria Forssk	Scabiosa arenaria Forssk.	–	Anti-diabetic and respiratory problems.	Antidiabetic, bronchial pneumonia, bronchitis, influenza and asthma.	(Kılınç et al., 2020)
Rosmarinus officinalis L.	Rosemary	اكليل الجبل	Otitis, auricular, liver, dermatoses, cough cold, and asthma.	Antioxidant, anticancer, anti-inflammatory and antimicrobial activities.	(Mena et al., 2016)
Artemisia herba-alba	Desert Wormwood	لشيح	Ant tapeworms, diarrhea, and digestive disturbances.	Antinociceptive, antiviral, antidiabetic, anticancer, antibacterial and antioxidant	(Bellili et al., 2017)

Figure: 1: Medicinal and Aromatic Plants growing in Libya and North Africa.

MATERIALS AND METHODS

Study area and period: This cross-sectional survey, conducted from February to July 2024, used a self-administered questionnaire targeting the general population in the Eastern Libyan municipalities of Benghazi, Al Marj, Al Jabal Al Akhdar, Derna, and Al Butnan (Figure 2).

Figure 2: Map of the study area.

Study design and data collection: A self-administered paper questionnaire was distributed using two methods: direct participant completion approached opportunistically by a researcher in various public locations (shopping malls, universities, schools, hospitals, health centers, workplaces, and corporate offices) and via an electronic link on the Internet. After data collection, 637 out of 650 questionnaires were analyzed, and 13 were excluded because of response inaccuracies.

Sample size determination: The sample size was determined using by KREJCIE and MORGAN (1970). Based on the original population size of 1,386,266 from the latest 2006 census, a sample of 650 participants was selected. Stratified sampling distributed participants across geographical areas (Benghazi, Al Marj, Al Jabal Al Akhdar, Derna, and Al-Butnan) with sample sizes of 316, 87, 97, 76, and 74, respectively (Cochran, 1977).

Data processing and analysis: Descriptive analysis was performed using IBM SPSS Statistics 26 for data entry and analysis and Microsoft Office Excel 2016 for graphical representation, with frequencies and percentages calculated for the relevant variables. Inferential statistics, including chi-squared tests, assessed relationships, and statistical significance among variables. These findings are derived from the interpretation of the statistical indicators.

RESULTS AND CONCLUSION

The findings of the present investigation offer significant insights into the health status, medication utilization, and employment of herbal and home remedies within the studied population. The high prevalence of self-reported "Excellent" or "Good" health status, in conjunction with the relatively low usage of multiple medications, indicates a generally healthy population.

Distribution of sociodemographic characteristics:
Existing research indicates that a high proportion of patients in primary care settings employ non-drug-based treatment approaches. (Parisius et al., 2014, Picking et al., 2011, Agbabiaka et al., 2018). The study surveyed 637 participants, comprising 412 females (64.7%) and 225 males (35.3%), (Table 2 and Figure 3). This distribution is comparable to that reported by Tolo et al. (2023), in which the respondents were predominantly females (62.5%). The preponderance of female participants reflects their primary role as caregivers, particularly for children. Furthermore, in regions lacking modern medical facilities, these women assume the responsibility of safeguarding their offspring from illnesses, necessitating their familiarity with the use of medicinal plants (Torres-Avilez et al., 2016). The responsibility for drying, storing medicinal herbs, and creating remedies for family healthcare often falls on women, which could explain this phenomenon. Most participants were under 30 years of age (48.4%), followed by those aged 30–60 years (43.2%), with only 8.5% over 60 years. The findings of our study align with those reported in ethnobotanical research conducted in other parts of Morocco (Bouyahya et al., 2017).

A substantial proportion of respondents had undergraduate education (70.6%), 11.9% had primary education or below, 10.7% had secondary education, and 6.8% held postgraduate qualifications. Similar findings have also been reported in other studies (Kachmar et al., 2021, Chaachouay et al., 2019). However, this finding does not preclude other age groups from possessing valuable knowledge about herbal remedies. Indeed, individuals with undergraduate education are expected to provide more reliable information because of their greater exposure to ancestral knowledge transmitted orally. Regarding residential distribution, the majority (49.0%) resided in Benghazi, followed by Al-Jabal Al-Akhdar (15.1%), Al-Marj (13.5%), Derna (11.3%), and Al-Butnan (11.1%). The majority of participants were Libyan nationals (96.9%), while a minority were non-Libyan nationals (3.1%). Approximately 46.3% of participants were employed, 25.0% were students, 16.0% were unemployed, 8.3% were self-employed, and 4.4% were retired. These sociodemographic characteristics indicate a predominantly young, educated, and employed cohort with substantial representation from various regions across the country, primarily comprising of Libyan citizens (Table 2).

Table 2: Distribution of the studied population according to sociodemographic characteristics (n=637):

Socio-demographic Characteristics (n=637)		Frequency	Percent (%)
Gender	Male	225	35.3
	Female	412	64.7
Age	Under 30	308	48.4
	30 to 60	275	43.2
	Over 60	540	8.50
Educational Status	Primary or lower	760	11.9
	Secondary	680	10.7
	Undergraduate	450	70.6
	Postgraduate	430	6.80
Place of Residence	Benghazi	312	49.0
	Al-Marj	860	13.5
	Al-Jabal Al-Akhdar	960	15.1
	Derna	720	11.3
	Al-Butnan	710	11.1
Nationality	Libyan	617	96.9
	Non-Libyan	200	3.10
Employment Status	Student	159	25.0
	Employee	295	46.3
	Retired	280	4.40
	Unemployed	102	16.0
	Self-employed	530	8.30

Health status and medication use among participants:

The health status of the participants exhibited variation: 35.3% reported excellent health, 44.9% reported good health, and 19.8% reported health issues. The most prevalent health conditions were diabetes (37.3%), hypertension or cardiovascular disease (30.2%), endocrine disorders (11.1%), respiratory problems (11.1%), renal disorders (4.0%), and other conditions (34.1%) (Table 3). This finding aligns with the results of Winkler et al. (2022), wherein the majority of participants reported regular utilization of home remedies primarily for preventive purposes.

Table 3: Health status and health issues treated with home remedies in the study population (N = 637):

Health		Frequency	Percent (%)
Health status	Excellent	225	35.3
	Good	286	44.9
	Some health issues	126	19.8
	Total	637	100
Health issues	Blood pressure or heart diseases	38	30.2
	Diabetes	47	37.3
	Endocrine disorders	14	11.1
	Kidney	05	04.0
	Respiratory system	14	11.1
	Other	43	34.1

The majority of participants reported regular medication use: 56.5% utilized one medication, 25.3% utilized two medications, 8.9% utilized three medications, and 8.3% used four or more medications. Only 0.9% of patients did not use any medication. Descriptive characteristics of the three latent classes are presented in Table 4.

Table 4: Frequency and percentage of medications taken by participants:

Do you take any medications?	Frequency	Percent (%)
0	006	0.9
1	360	56.5
2	161	25.3
3	057	8.9
4<	053	8.3
Total	637	100

Participant's expectations and reasons for the using (or not using) of NPHRs:
Most participants (62.8%) reported using NPHRs, whereas 37.2% did not. This finding suggests a high prevalence of herbal and home remedies among the surveyed population, with over 60% employing alternative healthcare methods (Table 5). This result is similar to that of Parisius et al. (2014), who found that approximately 42% of respondents used home remedies in Germany. Furthermore, a subsequent investigation by Winkler et al. (2021), demonstrated that 64.4% of participants incorporated home remedies into their health management strategies.

The primary motivations for using NPHRs were preventive health and illness avoidance (33.8%), complementary use of traditional medicine (21.5%), seeking alternatives to conventional treatments (13.3%), reducing the intake of traditional medications (12.8%), and avoiding the side effects of conventional medications (8.8%). A minor proportion employed herbal remedies for self-treatment without consulting a specialist (8.5%), whereas factors such as distrust of traditional medicine, difficulty in accessing healthcare, and high medication costs were cited less frequently (Table 5). This finding aligns with the results of Winkler et al. (2022), wherein the majority of participants reported regular utilization of home remedies primarily for preventive purposes.

The primary reasons for avoiding NPHRs included a preference for specialist physicians (43.9%), predilection for conventional medicine over herbal remedies (16.9%), and limited knowledge regarding herbal remedies (16.5%). Additional factors included perceptions of the inefficacy of herbal remedies (7.2%), accessibility of medical services (3.8%), and miscellaneous reasons (11.8%) among the surveyed population (Table 5).

Use of NPHRs or herbal remedies by sociodemographic characteristics:
The results indicated a statistically significant association between sex and use of herbal or home remedies. Notably, 66.5% of the female participants reported employing such remedies compared to 56.0% of the male participants. Conversely, 44.0% of males reported not utilizing these remedies, unlike 33.5% of females. This statistically significant difference suggests that female participants demonstrated a higher propensity to use herbal or home remedies than their male counterparts did (Table 6).

The results demonstrated a statistically significant correlation between age and the use of herbal or home remedies, with the usage increasing with age. Among participants under 30 years of age, 54.2% employed herbal or home remedies, whereas 45.8% did not. In the 30–60 years age group, 69.8% used these remedies and 30.2% did not. Among those over 60 years of age, 75.9% reported using herbal or home remedies and only 24.1% reported not utilizing them. This significant increase in usage with age indicates that older individuals are more inclined to utilize these remedies than are younger individuals (Table 6).

The results indicated no statistically significant association between the place of residence and

the use of herbal or home remedies. Utilization rates were comparable across various locations; 59.9% employed herbal or home remedies, whereas 40.1% did not. In Al Marj, 61.6% used such remedies and 38.4% did not. In Al-Jabal and Al-Akhdar, 70.8% employed them, whereas 29.2% did not. In Derna, 61.1% used these remedies and 38.9% did not. In Al Butnan, 67.6% employed them and 32.4% did not. Despite these variations, these differences were not statistically significant, suggesting consistent utilization of herbal or home remedies across geographic locations within the study area (Table 6).

A chi-square test was conducted to examine the association between employment status and utilization of NPHRs or herbal remedies. The results were as follows: Among the students, 50.3% (80 out of 159) used herbal or home remedies. Retired individuals exhibited a 60.7% (17 out of 28) utilization rate. Unemployed individuals demonstrated the highest utilization rate of 73.5% (75 out of 102). Self-employed individuals reported a 58.5% (31 out of 53) utilization rate. These findings indicated a statistically significant association between employment status and the use of herbal or home remedies, with the highest prevalence observed among unemployed individuals (Table 6).

Table 5. Participant's expectations and reasons for the using (or not using) of NPHRs:

		Frequency	Percent (%)
Do you use NPHRs?	Yes	400	62.8
	No	237	37.2
	Total	637	100
What is the reason for using NPHRs?	For preventive purposes and to avoid illness	135	33.8
	Because I can treat myself without visiting a specialist doctor	34	8.5
	As an alternative to traditional medicine	53	13.3
	To reduce the intake of traditional medications	51	12.8
	To avoid side effects of traditional medications	35	8.8
	Because I don't trust traditional medicine	11	2.8
	Due to difficulty accessing a treating doctor and obtaining a prescription	08	2.0
	As an additional and complementary treatment with traditional medicine	86	21.5
	Because of the high prices of medications in pharmacies	11	2.8
	Other reasons	55	13.8
	Total	479	100
What is the reason for not using NPHRs?	I don't know any type of herbal remedies	39	16.5
	I prefer using traditional medicine over herbal remedies	40	16.9
	I prefer visiting a specialist doctor	104	43.9
	I have easy access to medical services and don't need to take herbal remedies	09	3.8
	I believe herbal remedies are not effective	17	7.2
	Other reasons	28	11.8
	Total	237	100

Table 6: Frequently use nonpharmacological home remedies (NPHRs) by sociodemographic characteristics:

			Frequency	Percent (%)	Chi-Square	P-Value
Gender	Male	Yes	126	56.0	6.874	0.009
		No	99	44.0		
	Female	Yes	274	66.5		
		No	138	33.5		
Age	Under 30	Yes	167	54.2	19.483	0.000
		No	141	45.8		
	30 to 60	Yes	192	69.8		
		No	83	30.2		
	Over 60	Yes	41	75.9		
		No	13	24.1		
Place of residence	Benghazi	Yes	187	59.9	4.588	0.332
		No	125	40.1		
	Al-Marj	Yes	53	61.6		
		No	33	38.4		
	Al-Jabal Al-Akhdar	Yes	68	70.8		
		No	28	29.2		
	Derna	Yes	44	61.1		
		No	28	38.9		
	Al-Butnan	Yes	48	67.6		
		No	23	32.4		
Employment status	Student	Yes	80	50.3	18.108	0.001
		No	79	49.7		
	Al-Employee	Yes	197	66.8		
		No	98	33.2		
	Retired	Yes	17	60.7		
		No	11	39.3		
	Unemployed	Yes	75	73.5		
		No	27	26.5		
	Self-employed	Yes	31	58.5		
		No	22	41.5		

Sources of knowledge about NPHRs:

Regarding sources of knowledge of NPHR usage, respondents reported the following: parents (48.3%), herbalists (28.0%), internet (19.8%), doctors or pharmacists (12.3%), friends (6.3%), and other unspecified sources (6.8%). These findings suggest that NPHR utilization is influenced by traditional familial knowledge, professional advice from traditional practitioners, and contemporary sources, such as the Internet (Table 7 and Figure 4). This result is consistent with that of Parisius et al. (2014), who found that the respondent group's knowledge about home remedies primarily originated from family members.

Table 7: Sources of knowledge about NPHRs:

	Sources	Frequency	Percent (%)
How did you learn about the usage of these herbal remedies?	Herbalist	112	28.0
	Internet	079	19.8
	Friend	025	06.3
	Parents	193	48.3
	Doctor or pharmacist	049	12.3
	Other	027	06.8

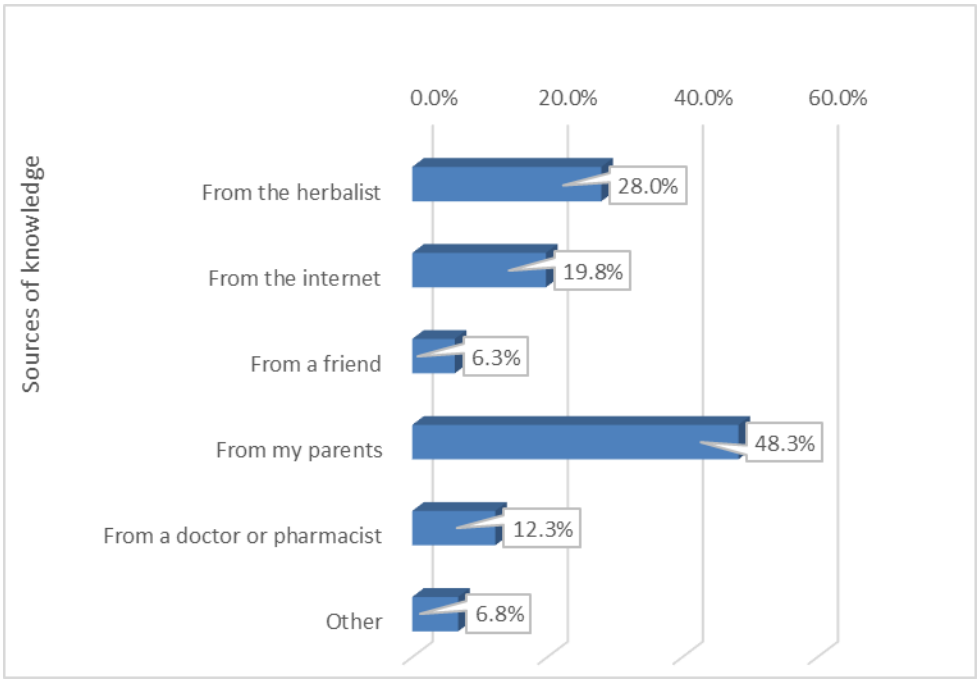

Figure 4: Sources of knowledge about NPHRs.

Pharmacist consultation patterns and awareness of side effects in NPHR Use:

Despite the high use of herbal remedies, the data revealed some concerns. A low rate of healthcare professional consultations and limited awareness of potential side effects or toxicity raises safety and efficacy questions. Additionally, reasons for not using herbal remedies, such as preference for specialist care and distrust in their effectiveness, indicate the need for better education and integration of herbal medicines in mainstream healthcare.

Table 8 shows that 27.5% of respondents consulted a healthcare professional about herbal remedies, whereas 72.5% did not. Regarding the awareness of side effects or toxicity, 36.8% of the participants reported being cognizant, whereas 63.2% did not indicate such awareness. Moreover, only 2.3% of patients reported experiencing adverse effects, whereas 97.8% did not report such occurrences. This aligns with a UK survey that found that only 12% of such cases involved general practitioner consultation (Elliott et al., 2011).

Table 8: Pharmacist consultation patterns and awareness of side effects in NPHR Use:

Questions	Answers	Frequency	Percent (%)
Did you consult a pharmacist or doctor about your use of herbal remedies?	Yes	110	27.5
	No	290	72.5
	Total	400	100
Are you aware of any side effects or toxicity of these remedies?	Yes	147	36.8
	No	253	63.2
	Total	400	100
Have you experienced any side effects from using these home remedies?	Yes	09	02.3
	No	391	97.8
Total		400	100

The Commonly Medicinal Plants Used NPHRs and Herbs:

The study included 24 plant species that were used for therapeutic purposes by Libyan participants. The most frequently employed home remedies were honey (28.5%), Mint (21.0%) followed by anise (19.3%), thyme and lemon (18.0%), and lavender (16.0%), whereas coriander seeds (2.5%), turmeric, and coriander (2.8%), and flax seeds (3.0%), respectively were the least commonly, used (Table 9 and Figure 7). This result is similar to that of Segall (1990), who reported findings comparable to those of the present study, with research conducted in Winnipeg, indicating that the most frequently used home remedies in Canada were teas, followed by honey and hot lemon beverages.

On the other hand, the plant species were categorized into 11 families; the most prevalent families were Fabaceae (8 species), followed by Apiaceae (3 species), Asteraceae, Myrtaceae, Umbelliferae, and Zingiberaceae (2 species each), and Linaceae, Oleaceae, Ranunculaceae, Rutaceae, and Vitaceae (1 species each), as presented in Table 9 and Figure 7. Research conducted in Libya (El-Mokasabi et al., 2018a) and southeastern Morocco (Kamagaju et al., 2013) has demonstrated the prevalence of these families, and their substantial influence was evident in both investigations.

Table 9: The commonly medicinal plants used NPHRs and Herbs in Libya:

Plant families	Scientific names	Vernacular names	Frequency	Percent (%)
Honey	Honey	Honey	114	28.5
Apiaceae	*Cuminum cyminum*	Cumin	41	10.3
	Petroselinum crispum	Parsley	17	4.30
	Pimpinella anisum	Anise	77	19.3
Asteraceae	*Artemisia absinthium*	Wormwood	34	8.50
	Saussurea lappa	Costus	14	3.50
Fabaceae	*Trigonella foenum-graecum*	Hilba	51	12.8
	Rosmarinus officinalis	Rosemary	22	5.50
	Thymus capitatus	Thyme	72	18.0
	Lavandula multifida	Lavender	64	16.0
	Salvia officinalis	Sage	25	6.30
	Mentha piperita	Mint	84	21.0
	Origanum majorana	Marjoram	15	3.80
	Cinnamomum verum	Cinnamon/Gerfa	50	12.5
Linaceae	*Linum usitatissimum*	Seeds Flax	12	3.00
Myrtaceae	*Syzygium aromaticum*	Clove	50	12.5
	Psidium guajava	Guava	21	5.30
Oleaceae	*Olea europaea*	Olive/Zaytun	45	11.3
Ranunculaceae	*Nigella sativa*	Black seeds	14	3.50
Rutaceae	*Citrus limon*	Lemon	72	18.0
Umbelliferae	*Coriandrum sativum*	Coriander	11	2.80
	Coriandrum sativum	Coriander Seeds	10	2.50
Vitaceae	*Vitis vinifera*	Raisins	12	3.00
Zingiberaceae	*Zingiber officinale*	Ginger	36	9.00
	Curcuma longa	Turmeric	11	2.80

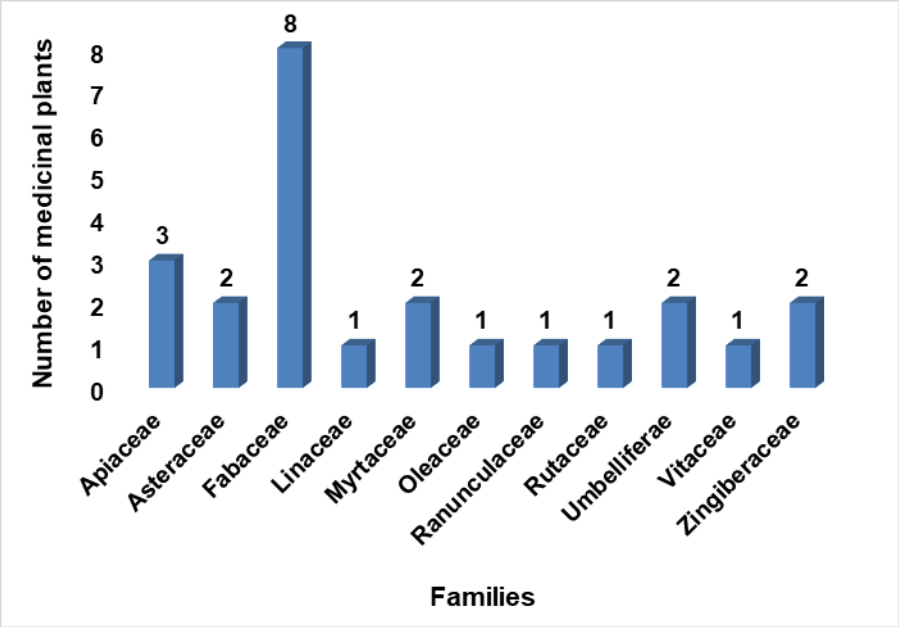

Figure 5: Number of medicinal plants in each family mentioned by the respondents.

CONCLUSION

In conclusion, this study significantly contributes to the understanding of herbal and home remedy utilization within the study population and elucidates important sociodemographic patterns, health status, and the prevalence of non-prescribed herbal remedies (NPHRs) among the Libyan population, emphasizing the necessity for enhanced awareness and integration of traditional and modern healthcare practices. Future research endeavors should prioritize longitudinal studies to monitor changes in traditional medicine use as well as clinical trials to evaluate the efficacy and safety of specific traditional remedies, thereby ensuring their judicious integration into the national healthcare system.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the Department of Pharmacology and Toxicology, Faculty of Pharmacy, Derna University, Derna, Libya.

Grant support
This research received no external funding.

Author contributions
Conceptualization, M.A.A., T.I.S., S.A.A., A.M.A., A.M.R., S.M.S., and A.M.A.; proposed and designed compounds, M.A.A., T.I.S., S.A.A., A.M.A., A.M.R., S.M.S., and A.M.A.; conducting experiments, M.A.A., and T.I.S.; writing-original draft preparation, M.A.A, T.I.S., A.M.R. and A.M.A.; writing-review and editing, M.A.A., T.I.S., S.A.A., A.M.A., and A.M.R. All authors reviewed and approved this study.

REFERENCES

ABD EL-GHANI, M. M., HUERTA-MARTÍNEZ, F. M., HONGYAN, L. & QURESHI, R. 2017. *Plant responses to hyperarid desert environments*, Springer.

ABOGMAZA, A. F., KEER, K. F., TAKRIZZAH, A. & YAHYA, E. B. J. I. R. J. S. T. 2020. A review on the medicinal and aromatic plants growing in Libya and their therapeutic properties. 2**,** 327-334.

AGBABIAKA, T. B., SPENCER, N. H., KHANOM, S. & GOODMAN, C. 2018. Prevalence of drug–herb and drug–supplement interactions in older adults: a cross-sectional survey. *British Journal of General Practice,* 68**,** e711-e717.

BELLILI, S., JAZI, S., HRIRA, M. Y., LAMARI, A., DHIFI, W., DIOUANI, M. F., ARAUJO, M. E., CIONI, P. L., FLAMINI, G. & CHERIF, A. J. M. G. C. 2017. Phytochemical identification of volatile fraction, essential oil and screening of antioxidant, antibacterial, allelopathic and insecticidal potential from Artemisia herba-alba leaves. 16**,** 95-109.

BOUYAHYA, A., ABRINI, J., ET-TOUYS, A., BAKRI, Y. & DAKKA, N. 2017. Indigenous knowledge of the use of medicinal plants in the North-West of Morocco and their biological activities. *European Journal of Integrative Medicine,* 13**,** 9-25.

CHAACHOUAY, N., BENKHNIGUE, O., FADLI, M., EL AYADI, R. & ZIDANE, L. 2019. Ethnobotanical study of medicinal plants used to treat osteoarticular diseases in the Moroccan Rif, Morocco. *J Pharm Pharmacogn Res,* 7**,** 454-470.

COCHRAN, W. G. 1977. Sampling techniques. *Johan Wiley & Sons Inc*.

COMETA, M., MAZZANTI, G., TOMASSINI, L. J. P. R. A. I. J. D. T. P. & DERIVATIVES, T. E. O. N. P. 1998. Sedative and spasmolytic effects of Viburnum tinus L. and its major pure compounds. 12**,** S89-S91.

EL-MOKASABI, F. M., AL-SANOUSI, M. F. & EL-MABROUK, R. M. 2018a. Taxonomy and ethnobotany of medicinal plants in eastern region of Libya. *J. Environ. Sci. Toxicol. Food Technol,* 12**,** 14-23.

EL-MOKASABI, F. M., AL-SANOUSI, M. F. & EL-MABROUK, R. M. J. J. E. S. T. F. T. 2018b. Taxonomy and ethnobotany of medicinal plants in eastern region of Libya. 12**,** 14-23.

ELANSARY, H. O., SZOPA, A., KUBICA, P., EKIERT, H., A. AL-MANA, F. & AL-YAFRSI, M. A. J. P. 2020. Antioxidant and biological activities of Acacia saligna and Lawsonia inermis natural populations. 9**,** 908.

ELLIOTT, A. M., MCATEER, A. & HANNAFORD, P. C. 2011. Revisiting the symptom iceberg in today's primary care: results from a UK population survey. *BMC Family Practice,* 12**,** 1-11.

ENNAIFER, M., BOUZAIENE, T., MESSAOUD, C. & HAMDI, M. J. N. P. R. 2020. Phytochemicals, antioxidant, anti-acetyl-cholinesterase, and antimicrobial activities of decoction and infusion of Pelargonium graveolens. 34**,** 2634-2638.

HAMZA, L. F. J. W. 2017. Anethum graveolens: Physicochemical properties, medicinal uses, antimicrobial effects, antioxidant effect, anti-inflammatory and analgesic effects: A review. 5.

KACHMAR, M. R., NACEIRI MRABTI, H., BELLAHMAR, M., OUAHBI, A., HALOUI, Z., EL BADAOUI, K., BOUYAHYA, A. & CHAKIR, S. 2021. Traditional knowledge of medicinal plants used in the Northeastern part of Morocco. *Evidence-Based Complementary and Alternative Medicine,* 2021**,** 6002949.

KADAM, V. B. J. J. O. P. R. S. & TECHNOLOGY 2018. Phytochemical Profile of Trigonella foenum graecum Linn. 2**,** 1-4.

KAMAGAJU, L., BIZURU, E., MINANI, V., MORANDINI, R., STÉVIGNY, C., GHANEM, G. & DUEZ, P. 2013. An ethnobotanical survey of medicinal plants used in Rwanda for voluntary depigmentation. *Journal of Ethnopharmacology,* 150**,** 708-717.

KıLıNÇ, H., MASULLO, M., D'URSO, G., KARAYILDIRIM, T., ALANKUS, O. & PIACENTE, S. J. P. 2020. Phytochemical investigation of Scabiosa sicula guided by a preliminary HPLC-ESIMSn profiling. 174**,** 112350.

KREJCIE, R. & MORGAN, D. 1970. Determining sample size for research activities. measurement.

MAALEJ, A., BOUALLAGUI, Z., HADRICH, F., ISODA, H., SAYADI, S. J. B. & PHARMACOTHERAPY 2017. Assessment of Olea europaea L. fruit extracts: Phytochemical characterization and anticancer pathway investigation. 90**,** 179-186.

MENA, P., CIRLINI, M., TASSOTTI, M., HERRLINGER, K. A., DALL'ASTA, C. & DEL RIO, D. J. M. 2016. Phytochemical profiling of flavonoids, phenolic acids, terpenoids, and volatile fraction of a rosemary (Rosmarinus officinalis L.) extract. 21**,** 1576.

PARISIUS, L. M., STOCK-SCHRÖER, B., BERGER, S., HERMANN, K. & JOOS, S. 2014. Use of home remedies: a cross-sectional survey of patients in Germany. *BMC Family Practice,* 15**,** 1-8.

PICKING, D., YOUNGER, N., MITCHELL, S. & DELGODA, R. 2011. The prevalence of herbal medicine home use and concomitant use with pharmaceutical medicines in Jamaica. *Journal of ethnopharmacology,* 137**,** 305-311.

SEGALL, A. 1990. A community survey of self-medication activities. *Medical Care,* 28**,** 301-310.

SINGH, B., SINGH, J. P., KAUR, A. & SINGH, N. J. F. C. 2018. Phenolic compounds as beneficial phytochemicals in pomegranate (Punica granatum L.) peel: A review. 261**,** 75-86.

TOLO, C. U., KAHWA, I., NUWAGIRA, U., WEISHEIT, A. & IKIRIZA, H. 2023. Medicinal plants used in treatment of various diseases in the Rwenzori Region, Western Uganda. *Ethnobotany Research and Applications,* 25**,** 1-16.

TORRES-AVILEZ, W., MEDEIROS, P. M. D. & ALBUQUERQUE, U. P. 2016. Effect of Gender on the Knowledge of Medicinal Plants: Systematic Review and Meta-Analysis. *Evidence-Based Complementary and Alternative Medicine,* 2016**,** 6592363.

WINKLER, N. E., SEBO, P., HALLER, D. M. & MAISONNEUVE, H. 2022. Primary care patients' perspectives on the use of non-pharmacological home remedies in Geneva: a cross-sectional study. *BMC Complementary Medicine and Therapies,* 22**,** 126.

YAHYA, E. B., ALHAWARI, S. M., AMHIMMID, K., ABUAESHAH, R. H. A., SAADA, A. O. J. J. O. S. & TECHNOLOGIES 2018. Evaluation of in-vitroantibacterial activity of aqueous and alcoholic extracts of the peels punica granatum and olea europaea leaves. 2**,** 36-44.

YıLMAZ, B. S., ALTUN, M. L., ORHAN, I. E., ERGENE, B. & CITOGLU, G. S. J. F. C. 2013. Enzyme inhibitory and antioxidant activities of Viburnum tinus L. relevant to its neuroprotective potential. 141**,** 582-588.

ZERN, T. L. & FERNANDEZ, M. L. J. T. J. O. N. 2005. Cardioprotective effects of dietary polyphenols. 135**,** 2291-2294.

ZIN, S. R. M., KASSIM, N. M., ALSHAWSH, M. A., HASHIM, N. E., MOHAMED, Z. J. B. & PHARMACOTHERAPY 2017. Biological activities of Anastatica hierochuntica L.: A systematic review. 91**,** 611-620.