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Ethnobotanical study of medicinal plants in traditional healthcare of Nairiyah Governorate, Saudi Arabia

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Abstract. *Salim IA, Ismail RA, Alrubyyi A, Mansour AA, Ageeb SA. 2026. Ethnobotanical study of medicinal plants in traditional healthcare of Nairiyah Governorate, Saudi Arabia. Asian J Ethnobiol 9 (1): y090115. https://doi.org/10.13057/asianjethnobiol/y090115.* Traditional medicinal knowledge remains central to primary healthcare in rural Saudi Arabia, yet systematic ethnobotanical documentation is limited, particularly in the Eastern Province. This study documents medicinal plants used in Nairiyah Governorate, with special emphasis on women's roles as custodians of traditional knowledge. Between August and December 2024, 120 semi-structured interviews were conducted using purposive and snowball sampling among informants with at least 10 years of experience in medicinal plant use. Plant species were identified using published floras and herbarium records and documented in terms of collection, preparation, and therapeutic applications. Quantitative ethnobotanical indices, including Use Value (UV) and Informant Consensus Factor (ICF), were applied. Thirteen medicinal plant species were recorded, with leaves as the most frequently used plant part. *Anastatica hierochuntica*, *Calligonum comosum*, and *Krameria triandra* showed the highest UV (0.11), while *C. comosum* exhibited the strongest consensus for gynecological disorders (ICF=0.842). The findings highlight the urgency of safeguarding traditional medicinal practices amid socio-cultural change and knowledge erosion. This study provides a foundational ethnobotanical record for an underrepresented region, supports Saudi Vision 2030 objectives, and underscores the importance of involving women and local communities in the stewardship and sustainable use of medicinal heritage.

Keywords: Ethnobotanical survey, gendered knowledge, Informant Consensus Factor, traditional medicine, Use Value

INTRODUCTION

Ethnobotany, the interdisciplinary study of the relationships between people and plants, has long been recognized as a vital field for understanding how traditional knowledge systems contribute to healthcare, biodiversity conservation, and cultural continuity (Martin 1995; Balick and Cox 1996; Cita et al. 2020). More than a catalog of species, ethnobotany examines the cultural frameworks in which plants are collected, prepared, and administered, revealing how communities adapt ecological resources to meet social and medical needs. As Heinrich (2000) and Albuquerque and Hurrell (2010) argue, ethnobotanical research must integrate both qualitative and quantitative approaches, situating plant use within broader cultural and ecological contexts. This perspective underscores the importance of documenting indigenous practices not only for their therapeutic value but also for their role in sustaining cultural identity and ecological resilience.

Globally, ethnobotanical studies have demonstrated that traditional medicinal knowledge remains central to primary healthcare, particularly in rural and semi-arid regions where access to modern medical facilities is limited (Pieroni and Quave 2005; Tardío and Pardo-de-Santayana 2008). Such knowledge is often transmitted orally across generations, with women frequently serving as custodians of household remedies and community health practices (Howard 2003). The persistence of these traditions highlights their resilience in the face of modernization, while also revealing their vulnerability to socio-economic change, urbanization, and the erosion of oral heritage. Documenting these practices is therefore essential for both cultural preservation and the identification of potential pharmacological resources.

In Saudi Arabia, ethnobotanical scholarship has expanded significantly in recent decades, reflecting growing interest in traditional medicine, biodiversity conservation, and sustainable development. Studies in regions such as Aseer, Al-Baha, Jeddah, and the Hijaz have cataloged dozens of medicinal species, providing insights into preparation methods, therapeutic applications, and conservation challenges (Alqethami and Aldhebiani 2021; Al-Robai et al. 2022). These investigations have revealed the richness of Saudi Arabia's flora, with over 2,290 plant species documented, many of which hold medicinal or economic value (Al Masoudi 2024). However, despite this progress, ethnobotanical research remains unevenly distributed across the Kingdom.

While western and southern provinces of Saudi Arabia have received considerable scholarly attention, the Eastern Province-and particularly the Nairiyah Governorate-remains underrepresented in the literature. This absence constitutes a clear research gap. Nairiyah, located in a semi-arid desert ecosystem, is home to Bedouin tribes and

settled families who rely heavily on oral traditions for healthcare. The region's ecological conditions, dominated by xerophytic species and seasonal wadis, shape the availability and use of medicinal plants. Yet, little is known about the diversity of species employed, the ailments treated, or the cultural priorities guiding their application. Without systematic documentation, the medicinal heritage of Nairiyah risks being overlooked in both scientific and conservation agendas. Moreover, the gendered dimensions of knowledge transmission-particularly the role of women as primary caregivers and custodians of herbal remedies-have not been adequately explored in this context.

Addressing such gap is particularly relevant in light of Saudi Vision 2030 and the Saudi Green Initiative, which prioritize biodiversity conservation, ecological restoration, and the preservation of intangible cultural heritage. Vision 2030 aims to rehabilitate degraded ecosystems, enhance native plant diversity, and protect 30% of the Kingdom's land and sea by 2030. These national strategies create new opportunities for ethnobotanical research, linking local knowledge systems to broader goals of sustainability and community empowerment. By situating Nairiyah within the national ethnobotanical landscape, this study contributes to these objectives while safeguarding traditional practices that remain vital to community healthcare. Furthermore, the integration of quantitative ethnobotanical metrics such as Use Value (UV) and Informant Consensus Factor (ICF) strengthens the scientific validity of this research. UV provides a measure of the relative importance of each species based on frequency of citation, while ICF assesses the degree of agreement among informants regarding plant use for specific ailments (Heinrich 2000; Albuquerque et al. 2014). These tools allow for cross-comparison with other regional studies, highlighting both shared practices and unique cultural adaptations. In addition, qualitative insights into preparation methods, dosage practices, and cultural interpretations of illness enrich the analysis, ensuring that the study captures both statistical patterns and lived experiences.

Therefore, to address the knowledge gap, this study was conducted to achieve several objectives: (i) To document the medicinal plants used by local communities in Nairiyah Governorate, including their collection, preparation, and therapeutic applications; (ii) To analyze the cultural significance of these plants and assess their relative importance using ethnobotanical metrics such as Use Value (UV) and Informant Consensus Factor (ICF); (iii) To examine the role of women in preserving and transmitting traditional medicinal knowledge, thereby contributing to the safeguarding of Saudi Arabia's intangible cultural heritage and informing future pharmacological and conservation strategies.

MATERIALS AND METHODS

Study area

The study was carried out in Nairiyah Province, located in the Eastern Region of Saudi Arabia (Figure 1). This area is characterized by a hot desert climate, semi-arid conditions, and sparse vegetation dominated by xerophytic species. Additionally, seasonal wadis and desert-adapted flora significantly shape the ecological landscape. The population includes Bedouin tribes and settled families, who rely heavily on oral traditions for healthcare. Notably, traditional herbal knowledge is particularly prevalent among older generations and nomadic communities, who rely on native plants as their primary source of medicine. These practices reflect broader ethnobotanical patterns observed across Saudi Arabia, where indigenous plant use is deeply intertwined with cultural heritage and adapted to arid ecosystems (Aati et al. 2019).

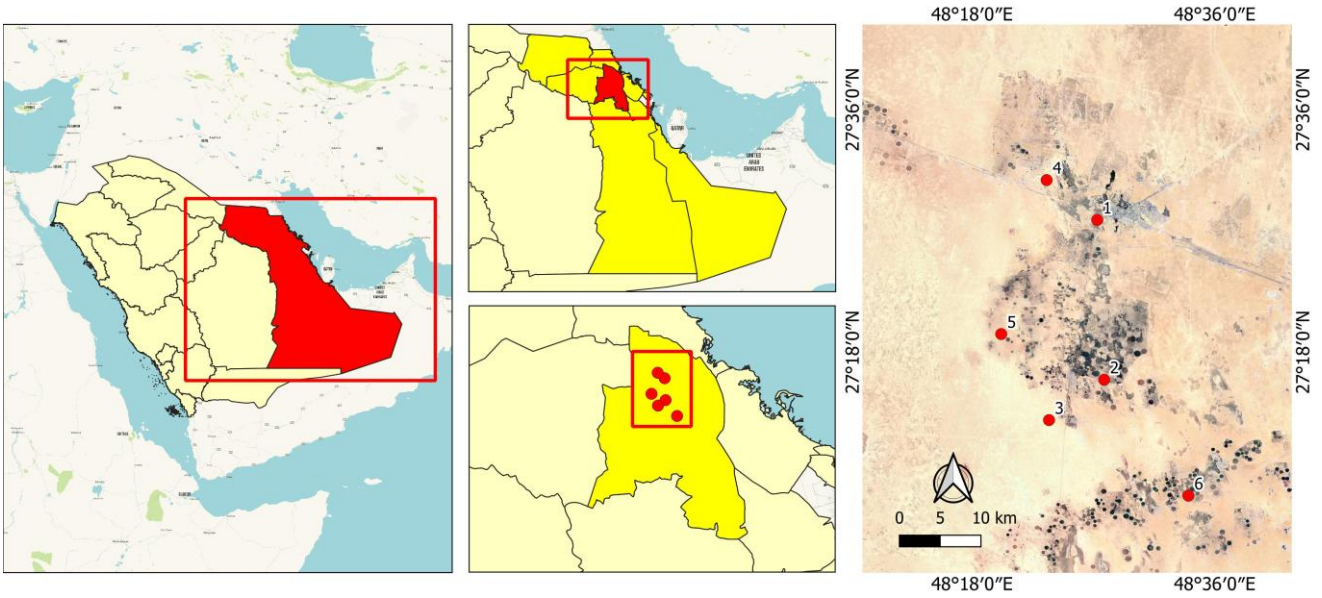

Figure 1. Map of study area in Nairiyah Province, Saudi Arabia showing villages where the survey was carried out. 1. Nairiyah, 2. Mulayjah, 3. Nata, 4. Alsalmanyah, 5. Alkhhfah, 6. Alhusayy

Data collection

Fieldwork was conducted from August to December 2024. A total of 120 informants (77 females, 43 males) aged between 27 and 85 years were interviewed using semi-structured interviews. Official approval to conduct the study was obtained from the administration of University of Hafr Al Batin, Saudi Arabia. The study was reviewed and approved according to the applicable research regulations under approval number HPO-05-FT-25/26." All participants were informed of the study's purpose, and verbal consent was obtained prior to interviews in accordance with the ethical standards available. Purposive and snowball sampling techniques were employed to identify knowledgeable informants. Inclusion criteria required participants to have at least 10 years of experience in using, preparing, or transmitting knowledge of medicinal plants within their communities. This ensured that the sample represented individuals recognized locally as custodians of traditional healthcare practices. Semi-structured interviews were conducted in Arabic, focusing on plant names, therapeutic uses, preparation methods, and ailments treated. Structured questionnaires were also used to collect demographic data and frequency of use, enabling statistical analysis and cross comparison across age groups, gender, and occupations.

Plant identification was performed using the Flora of Saudi Arabia (Collenette 1999), local herbarium records, and cross-referencing with published ethnobotanical studies (Aati et al. 2019). Identification was further validated through detailed morphological descriptions provided by experienced informants and cross-checked against herbarium records and taxonomic databases. Due to environmental and institutional constraints, the collection and deposition of voucher specimens were not permitted in the study area. However, taxonomic verification was ensured through multiple independent sources to minimize misidentification. This methodological approach integrates standard ethnobotanical procedures while addressing local constraints and maintaining scientific rigor. All interviews were conducted in Arabic, the native language of the informants, allowing for natural and accurate expression. The integration of semi-structured interviews with structured questionnaires enabled a dual approach: open-ended discussions captured nuanced cultural insights, while standardized questions facilitated quantitative analysis across demographic groups.

Data analysis

Use Value (UV)

This metric quantifies the relative importance of a plant species by how often informants mention or use it in a study. The frequency of each plant's use in the entire province was calculated as follows (Evane and Balinado 2021):

$$UV = \frac{Nur}{Ni}$$

Where, Nur is the number of plant use-reports in the study area and Ni is the total number of informants surveyed.

Informant Consensus Factor (ICF)

To assess how consistently informants suggested plants for each reported ailment category, the Informant Consensus Factor (ICF) was calculated using the formula (Evane and Balinado 2021):

$$ICF = \frac{(Nur - Nt)}{Nur - 1}$$

Where, Nur is the number of use-reports per ailment or plant-use classification, and Nt is the number of plant species reported for that category. Each report of plant species use was counted as one use-report. ICF values range from 0 to 1, with "1" indicating the highest informant agreement.

Statistical analysis

All statistical analyses, including UV and ICF calculations, were performed using Microsoft Excel 365 for data tabulation and SPSS v27 for cross-tabulation and demographic analysis. GraphPad Prism was used to generate visual representations of ethnobotanical metrics.

RESULTS AND DISCUSSION

Demographic profile of informants

A total of 120 participants (43 men and 77 women) were interviewed. The demographic data is summarized in Table 1. The high participation rate of women (64.2%) reflects their prominent role as primary caregivers and custodians of herbal knowledge within the household. The majority of informants were aged 41-64 (62.5%), and nearly half (47.5%) had no formal education, indicating that deep traditional knowledge is often held by elders and healers and transmitted orally.

The number of female participants in this study is notably higher than that of male participants. This shows the important role women play in traditional healthcare practices within the local community. Women often lead in identifying, preparing, and sharing knowledge of medicinal plants. In many households, they are the main caregivers and keepers of herbal remedies. Their contributions are especially valuable in ethnobotanical research. Their active involvement also fits the study's aim to highlight and empower female voices in scientific and cultural documentation.

Participants with no formal education, often elders and healers, usually possess deep traditional knowledge passed down orally. Those with primary or basic education tend to use medicinal plants in daily life and have practical, experience-based insights. Individuals with secondary education can articulate their practices and beliefs clearly and may effectively blend traditional views with modern perspectives. Participants with university-level education offer scientific and analytical perspectives, which are useful for cross-validating traditional uses.

Medicinal plant diversity

A total of 13 medicinal plant species belonging to 12 botanical families were documented in this study. Scientific names, families, local names, and ethnobotanical details

were verified and are presented in Tables 2 and 3. This diversity highlights the ecological adaptability of Nairiyah's plants and the community's deep traditional knowledge. Similar patterns have been observed in other arid regions of Saudi Arabia and the Arabian Peninsula, where shrubs and herbs dominate ethno-medicinal use. Local tribal communities still consider folk medicine as an important alternative for treating some health disorders (Tounekti et al. 2019).

Compared to other ethnobotanical investigations in Saudi Arabia, such as those in Aseer Province (Alqethami and Aldhebiani 2021) and Al Baha (Al-Robai et al. 2022), which cataloged 80 and 97 species, respectively, the present study in Nairiyah documents a more focused set of species. However, it offers distinctive value by providing deeper cultural specificity and more detailed preparation information for an underrepresented region. The use of quantitative metrics aligns with national standards, and the emphasis on gendered knowledge transmission is a significant contribution.

Analysis of the documented species shows that leaves, roots, and seeds are the most frequently used plant parts in traditional preparations. The predominance of leaf use aligns with global ethnobotanical trends, largely due to the ease of harvesting and high phytochemical content. Also, the total percentage of growth forms exceeds 100% because some plant species were reported to have more than one growth form (e.g., *Artemisia absinthium* was described as both a shrub and an herb) and were therefore counted in multiple categories.

Use Value and Informant Consensus Factor

The Use Value (UV) and Informant Consensus Factor (ICF) were calculated to determine the relative importance of each species and the consensus among informants regarding their use for specific ailments. The results are summarized in Table 4.

Traditional knowledge of medicinal plants in Nairiyah reflects a rich ethnobotanical heritage. As shown in Table 4, *Anastatica hierochuntica*, *Calligonum comosum*, and *Krameria triandra* showed the highest Use Values (UV=0.11), indicating their frequent and diverse applications within the community. The Informant Consensus Factor (ICF) as shown in Table 5 was highest for gynecological disorders (ICF=0.842), indicating a strong consensus on the use of certain plants for this category. This was followed by digestive system ailments (ICF=0.755) and fever (ICF=0.721). All ICF values were relatively high, suggesting that these ailment categories are of significant interest in local folk medicine. The high ICF values indicate strong consensus among informants, suggesting reliability and cultural continuity.

Table 1. Demographic profile of informants

Demographic data of the informants (n =120)		Number of informants	Percentage (%)
Gender	Male	43	35.8
	Female	77	64.2
Age (years)	40-25	23	19.2
	64-41	75	62.5
	85-65	22	18.3
Education	No formal education	57	47.5
	Primary	32	26.7
	Secondary	20	16.7
	University level	11	9.2
Occupation	Traditional healers	32	26.7
	Homemakers	54	45.0
	Collectors and sellers	5	4.2
	Elders	22	18.3
	Researchers	7	5.8
Location/Residence	Nairiyah	51	42.5
	Mulayjah	27	22.5
	Nata'a	19	15.8
	Alsalmanyah	10	8.3
	Alkhhfah	9	7.5
	Alhusayy	4	3.3

Table 2. Medicinal plants documented in Nairiyah Governorate, Saudi Arabia

Sample	Family	Scientific name	Common name	Habit
Rose of Jericho	Brassicaceae	*Anastatica hierochuntica* L.	Kuf Mariam	Shrub
Tamarisk	Tamaricaceae	*Tamarix aphylla* (L.) H.Karst.	Athil	Shrub
Arta	Polygonaceae	*Calligonum comosum* L'Hér.	Arti	Tree
Common sage	Lamiaceae	*Salvia officinalis* L.	Marameia	Herb
Yarrow	Asteraceae	*Achillea millefolium* L.	AlQaisum	Herb
Evening primroses	Onagraceae	*Oenothera* sp.	Ashrag	Herb
Wormwood	Asteraceae	*Artemisia absinthium* L.	Shaiba/shuna	Shrub/herb
Sagebrush	Asteraceae	*Artemisia judaica* L.	Buaithran	Shrub
Ruta	Rutaceae	*Ruta graveolens* L.	Shazap	Shrub/herb
wolf-feet	Rosaceae	*Alchemilla vulgaris* L.	wolf-feet Lady's mantle	Herb
Costus	Asteraceae	*Saussurea costus* (Falc.) Lipsch.	Alqust alhindi	Herb
Rhatany	Krameriaceae	*Krameria triandra* Ruiz & Pav.	Khawajawa	Tree
toothpick-plant	Apiaceae	*Ammi visnaga* (L.) Lam.	toothpick-plant	Herb

Source: Aati et al. (2019) and Ullah et al. (2020)

Table 3. Preparation and administration methods for medicinal plants documented in Nairiyah Governorate, Saudi Arabia

Sample	Scientific name	Ailments	Part used	Preparation	Dosage	Route	Duration
Rose of Jericho	*Anastatica hierochuntica* L.	Anti-diabetic activity Facilitate maternity.	Whole herb	Crushed and soaked in water over night.	100 mL One time daily.	Oral	3-7 months
Tamarisk	*Tamarix aphylla* (L.) H.Karst.	Fever, toothache Infection of wound, Stomachache.	Leaves and sugar liquid from stems	Dried in room temp and crushed.	2-3 spoon full one time daily.	Oral	One week
Arta	*Calligonum comosum* L'Hér.	Toothache, Anti-inflammatory and anti-ulcer effect.	Whole herb	Dried in room temp and crushed.	Mouth washed at AM PM, Drinking one time daily.	Mouth wash, Oral	One week
Common sage	*Salvia officinalis* L.	Gas repellent anti-inflammatory, Treatment of heartburn and bloating.	Leaves	boiled leaves	1-2 g 3 times daily	Oral	3 months
Yarrow	*Achillea millefolium* L.	Fever, anti-inflammatory and fungi and bacteria activity.	Leaves	Picked up flowers, dried in room temp and crushed, soaked in aqua tepida 5 g in 1L water.	4-7 times daily	Oral	1 month
Evening primrose	*Oenothera* sp.	Constipation disease	Leaves	Boiling in water	0.5 L	Oral	If necessary
Wormwood	*Artemisia absinthium* L.	Intestinal cleansing and improving digestion.	Leaves	Boiling in water	100 mL Taken once daily.	Oral	Week
Sagebrush	*Artemisia judaica* L.	Treating stomachaches and colic Antipyretic, menstruation regulator, for nerve system, carminative and emmenagogue.	Whole plant	Soaked in aqua tepida for 12 hours.	100 mL Taken once daily.	Oral	Week
Ruta	*Ruta graveolens* L.	Neurological diseases, Relieve snake bite, headache, sore ears, rheumatism & wound healing.	Aerial parts	Soaked in boiling water for 10 minutes.	Not specified	Oral	0.5 g in the day and night.
Wolf-feet	*Alchemilla vulgaris* L.	Obstetrics and gynecology, Slimming	Leaves	Soaked in boiling water.	100 mL three times daily.	Oral	4 weeks
Costus	*Saussurea costus* (Falc.) Lipsch.	Thyroid disease	Roots	Roots crushed to fine powder.	Not specified	Oral	1 year
Rhatany	*Krameria triandra* Ruiz & Pav.	Inflammatory disease of the reproductive system burns.	Roots	Roots crushed to fine powder 50 g boiled in 100 ml olive oil for 5 minutes.	Topical lotion.	Dermal	Not specified
Toothpick-plant	*Ammi visnaga* (L.) Lam.	Renal colic and coronary insufficiency.	Seeds	Urinary tract stones.	One spoon in 500 mL water.	Oral	5-7 days

Note: Some dosage and duration information were not specified by informants

Therapeutic applications and cultural priorities

The documented plants are used to treat a wide range of ailments, which can be categorized as follows

Women's health: *Anastatica hierochuntica* and *Alchemilla vulgaris* are used for premenstrual dysphoric disorder (PMDD), dystocia, and other gynecological disorders. These uses align with global ethnobotanical records of *A. hierochuntica* for hormonal regulation (Abdelhalim and Saleem 2021; Mendes et al. 2022).

Digestive and metabolic disorders: *Artemisia absinthium*, *Artemisia judaica*, and *Salvia officinalis* are used for intestinal cleansing, colic relief, and anti-inflammatory effects. *Artemisia* species are widely recognized for their antispasmodic and antimicrobial properties (Liu et al. 2023).

Neurological and respiratory conditions: *Ruta graveolens* and *C. comosum* are used for neurological disorders and "shivering disease," respectively. Furthermore, *C. comosum* has been shown to exhibit anti-inflammatory and gastric protect effects in pharmacological studies (D'Amato and Cimaglia 2020; Alzahrani 2021). These findings highlight the gendered and culturally specific nature of traditional healing in Nairiyah, where certain plants are prioritized for reproductive health and chronic conditions managed primarily by women.

Preparation methods and dosage practices

Preparation methods reflect practical knowledge adapted to local resources. The dominant preparation methods include boiling and soaking in water (hot or lukewarm), often overnight and crushing and drying at room temperature to preserve phytochemicals as detailed in Table 6. Dosage ranges from measured volumes, such as 100 mL, to spoonfuls and grams, indicating a blend of empirical knowledge and intuitive dosing. Oral administration is the most common route, while topical and mouthwash applications are used less frequently, consistent with the administration patterns presented in Table 7. These methods align with ethnobotanical practices in other regions, where simplicity and accessibility guide preparation (Applequist and Moerman 2011; Jedidi et al. 2018). Treatment durations range from short-term (one week) to long-term (up to several months or one year), particularly for chronic conditions, including thyroid disease (*Saussurea costus*) and gynecological disorders (*A. vulgaris*). Consequently, traditional medicine in Nairiyah is not limited to acute care but is also used for sustained therapeutic management.

Furthermore, *S. costus* has been validated for its anti-inflammatory, hepatoprotective, and anticancer properties, thereby supporting its long-term use (Pandey et al. 2007; Kumari et al. 2023). *Calligonum comosum* is used for "shivering disease," a culturally specific ailment not recognized in biomedical literature but significant in local healing traditions. Its use for toothaches and as a source of firewood reflects its multifunctional role in desert communities. *Krameria triandra* is administered as a topical lotion blended with olive oil for the treatment of burns and reproductive inflammation. This preparation demonstrates local integration of culinary and medicinal resources, while known antimicrobial and antioxidant properties support its dermal application. The use of *S. officinalis* as an anti-inflammatory is supported by findings from Sharma et al. (2019), *Achillea millefolium* as antibacterial for wound healing (Applequist and Moerman 2011), *A. absinthium* as antiparasitic for digestive aid (Hosam 2022), and *Ammi visnaga* as vasodilator and anti-urolithic. These findings suggest strong candidates for phytochemical analysis, clinical trials, and integration into modern healthcare. Comparative analysis with studies from Aseer and Al-Baha reveals overlaps in species such as *Artemisia herba-alba* and *Senna alexandrina*; however, Nairiyah's arid ecology introduces unique species, including *Prosopis juliflora* (Alqethami and Aldhebiani 2021; Al-Robai et al. 2022).

Based on participant responses, several plants are associated with multiple therapeutic uses and are prepared using more than one method. As a result, individual species may appear repeatedly across different categories of use and preparation, contributing to the increased data count.

Table 4. Use Value (UV) and Informant Consensus Factor (ICF) for documented medicinal plants in Nairiyah Governorate, Saudi Arabia

Scientific Name	Use Value (UV)	Informant Consensus Factor (ICF)
Anastatica hierochuntica L.	0.11	0.7
Tamarix aphylla (L.) H.Karst.	0.10	0.3
Calligonum comosum L'Hér.	0.11	0.8
Salvia officinalis L.	0.08	0.7
Achillea millefolium L.	0.075	0.6
Oenothera sp.	0.1	0.2
Artemisia absinthium L.	0.06	0.1
Artemisia judaica L.	0.075	0.1
Ruta graveolens L.	0.06	0.3
Alchemilla vulgaris L.	0.10	0.5
Saussurea costus (Falc.) Lipsch.	0.09	0.6
Krameria triandra Ruiz & Pav.	0.11	0.7
Ammi visnaga (L.) Lam.	0.06	0.5

Table 5. Informant Consensus Factor (ICF) for major ailment categories treated with medicinal plants in Nairiyah Governorate, Saudi Arabia

Ailment category	Number of use reports (Nur)	Number of taxa (Nt)	ICF Value
Gynecological Disorders	20	4	0.842
Digestive System Ailments	33	9	0.755
Fever	12	4	0.721
Inflammatory Conditions	25	8	0.708
Neurological & Respiratory Conditions	15	6	0.643
Skin Diseases and Burns	9	4	0.500

Table 6. Method of preparation of medicinal plants in Nairiyah Governorate, Saudi Arabia

Method of preparation	Frequency of response	Percentage (%)
Fluids extraction	71	59.2
Crushed and pounded	15	12.5
Ointment	6	5.0
Dried and powdered	16	13.3
Small cut of fresh part to be rubbed	7	5.8
Dried for smoke bath	5	4.2

Note: The sum of percentages is greater than 100% as individual plant species were counted in multiple categories based on their reported growth forms or usable parts

Table 7. Route of administration of medicinal plants in Nairiyah Governorate, Saudi Arabia

Rout of administration	No. of species	Percentage (%)
Oral drink	9	69.2
Oral eaten	2	15.4
Herbal bath	4	30.8
Smoke bath	2	15.4
Steam bath	3	23.07

Note: The sum of percentages is greater than 100% as individual plant species were counted in multiple categories based on their reported growth forms or usable parts

Discussion

This study documents valuable traditional knowledge of medicinal plants in Nairiyah. This ethnobotanical study documents 13 medicinal plant species traditionally used in Nairiyah, Eastern Saudi Arabia, revealing a rich tapestry of indigenous knowledge and therapeutic practices. The prominence of female informants, particularly elder herbalists and homemakers, underscores the gendered nature of ethnomedical knowledge in Nairiyah. Their role as custodians of tradition suggests that future conservation and educational initiatives should prioritize female engagement and intergenerational dialogue.

The high Informant Consensus Factor (ICF) values across major ailment categories-particularly gastrointestinal and gynecological disorders-indicate strong cultural agreement and reliability of use. Such consensus supports the validity of these remedies and highlights their potential for pharmacological exploration. Use Value (UV) analysis identified *A. hierochuntica*, *A. judaica,* and *S. costus* as the most culturally significant species. Their frequent citation and diverse applications suggest both therapeutic versatility and deep-rooted trust within the community. Notably, *A. hierochuntica* was widely used for premenstrual dysphoric disorder and dystocia, reflecting gender-specific health priorities and the central role of women in knowledge transmission. The high Use Value (UV) of *A. hierochuntica* and *C. comosum* reflects their cultural prominence. These species are not only frequently cited but also embedded in local traditions, particularly women's healthcare practices, underscoring their symbolic and practical salience.

The distribution of plant parts used highlights clear preferences among informants, which can be further explained by examining the most frequently cited categories. Leaves were commonly employed for infusions and decoctions, reflecting their accessibility and high concentration of bioactive compounds. Roots were often used in remedies for chronic ailments, while seeds were valued for their nutritional and medicinal properties. Examples include the use of leaves from *A. hierochuntica* and *A. judaica*, roots of *K. triandra*, and seeds of *C. comosum*. While most species were locally abundant, concerns were raised regarding the sustainability of *S. costus*, which faces pressure from overharvesting. This highlights the need for community-based conservation strategies and potential cultivation programs. Oral administration and fluid-based preparations (infusions, decoctions) dominated, underscoring the practicality and cultural familiarity of these methods.

This study uniquely documents medicinal plant knowledge in the underrepresented region of Nairiyah, Saudi Arabia, compared to Riyadh, where surveys documented more than 260 medicinal plant species, Nairiyah communities rely on a smaller set of hardy desert shrubs such as *A. hierochuntica* and *C. comosum*. This reflects ecological constraints but also strong cultural consensus in their use. In Asir Province, ethnobotanical studies highlight a broader diversity of species and the application of multiple indices (RFC, FL, ICF). In contrast, Nairiyah's narrower repertoire emphasizes the importance of UV and ICF in capturing species significance and consensus. Together, these comparisons show that Nairiyah's ethnobotany is shaped by desert ecology yet remains culturally resilient. The ethnobotanical findings from Nairiyah Governorate can be interpreted through several well-established frameworks.

The dominance of hardy desert shrubs in Nairiyah aligns with the ecological apparency hypothesis, which posits that plants most visible and abundant in a given environment are more likely to be incorporated into local pharmacopoeias. Limited biodiversity in the desert ecosystem has shaped reliance on species adapted to arid conditions. Interviews revealed generational differences, with older informants reporting broader plant knowledge compared to younger participants. This suggests ongoing erosion of traditional knowledge, driven by modernization, healthcare accessibility, and socio-cultural change. Documenting this knowledge is therefore urgent to prevent its loss with a strong focus on women as key knowledge holders. It provides detailed data on plant preparation, dosage, and treatment duration, offering valuable insights for future pharmacological research and conservation efforts aligned with Saudi Vision 2030.

In conclusion, this study represents the first ethnobotanical documentation of Nairiyah communities, focusing on the cultural significance of medicinal plants through Use Value (UV) and Informant Consensus Factor (ICF). The findings highlight the prominence of hardy desert shrubs such as *A. hierochuntica* and *C. comosum*, which showed the highest UV and ICF values, underscoring their central role in local healthcare practices.

Women were identified as key custodians of ethnobotanical knowledge, particularly in pediatric and gynecological remedies, reflecting gendered patterns of knowledge transmission. By classifying ailments into physiological systems and analyzing preparation methods, the study demonstrated strong cultural consensus despite ecological constraints and limited species diversity. These results align with broader ethnobotanical frameworks, including cultural salience, ecological apparency, and knowledge erosion, situating Nairiyah's practices within both Saudi Arabian and global ethnobotanical discourse. Limitations of the study include the relatively small sample size and reliance on self-reported data, which may not capture the full breadth of traditional knowledge. Additionally, generational differences suggest that younger participants possess less knowledge, pointing to ongoing erosion of ethnobotanical traditions.

Based on the findings of this study, the following recommendations are proposed: (i) Promote sustainable harvesting and community-based cultivation programs for high-use species, especially those under ecological pressure, such as *S. costus*. Ensure the engagement of local communities, particularly women, in conservation planning for success; (ii) Encourage laboratory-based phytochemical and pharmacological studies to validate the efficacy and safety of the most cited plants (e.g., *A. hierochuntica, A. judaica*). This research could support their potential integration into formal healthcare systems or the development of sustainable herbal products; (iii) Expanding surveys to other communities in the Eastern Province, conducting pharmacological validation of the most culturally salient species, and exploring strategies for safeguarding traditional knowledge against loss. Comparative studies across Saudi regions would further contextualize Nairiyah's practices and highlight the diversity of ethnobotanical adaptation to different ecological settings.

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