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Ethnobotanical study of some medicinal plants used in traditional medicine in Mauritania: A case study at Ehel Adja Clinic in Nouakchott

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Medicinal plants have been traditionally used in Mauritania for generations, yet few comprehensive ethnobotanical studies have been conducted, particularly in Nouakchott. This study aims to document the traditional knowledge of medicinal plant use, focusing on seven species: *Commiphora africana* (A.Rich.) E,gl. , *Combretum glutinosum* Perr.ex DC., *Hibiscus sabdariffa* L., *Acacia senegal* (L.) Willd., *Tamarindus indica* L., *Senna italica* Mill., and *Moringa oleifera* Lam., commonly used at the Ehel Adja Clinic in Nouakchott. Ethnobotanical data were collected through semi-structured interviews with 1050 informants, aged 20 to 70, from indigenous communities in Nouakchott. Data collection focused on the therapeutic uses of plants, preparation methods, and modes of administration. Quantitative indices such as frequency of citation (FC), informant consensus factor (ICF), use value (UV), and fidelity level (FL) were calculated to assess plant significance. *Tamarindus indica* L. and *Acacia senegal* (L.) Willd. were the most frequently used species, with UV values of 0.19 and 0.096, respectively. The plants were used to treat 15 illnesses, including skin conditions (ICF= 0.90) and digestive disorders (ICF= 1.00). Leaves (38%) and fruits (30%) were the most commonly used plant parts, with maceration being the primary method of preparation (60%) and oral administration the most common route (70%). This study highlights the prominent role of traditional medicine in Nouakchott, particularly in treating skin and digestive disorders. The findings provide a basis for future pharmacological studies and conservation efforts for these medicinal plants.

Keywords: Ethnomedicine, Mauritania, Mauritanian plants, Medicinal plants, Nouakchott

INTRODUCTION

Medicinal plants have been utilized for therapeutic purposes for millennia, with their use well-documented in ancient Arabic, Chinese, Egyptian, Greek, and Roman literature (Anyanwu et al., 2015; Jamshidi-Kia et al., 2018; Salmerón-Manzano et al., 2020). Despite modern advancements in pharmacology, traditional medicine remains widely practiced, particularly in developing regions (Boukhraz et al., 2015; Yabrir et al., 2018; François et al., 2019; Mbuni et al., 2020). In Mauritania, traditional medicinal practices, relying heavily on local plant resources, are crucial in addressing healthcare needs, especially where access to formal healthcare services is limited (Holaly et al., 2015; Mamadou et al., 2020). Various plants are

utilized in traditional medicine to address multiple pathologies (Hassan-Abdallah et al., 2013; Kallo et al., 2018).

The ethnobotanical knowledge transmitted through generations is vital to traditional medicine in Mauritania. This study seeks to enhance our understanding of the medicinal plants frequently employed in Nouakchott, particularly those used to treat various ailments (Loumpangou et al., 2016; Traoré et al., 2019).

The main objective is to document this traditional knowledge, identify the most frequently used species, and analyze their therapeutic applications, particularly in gastrointestinal, dermatological, and cardiovascular treatments (El-Haoud et al., 2018; Hamel et al., 2018; Yabrir et al., 2018).

The study of traditional medicine and the use of plants for treatment is therefore of particular interest, as little research has been conducted in this area, especially regarding the use of spontaneous species in traditional medicine (Ahmad Dar et al., 2017; Fadili et al., 2017; Lawal et al., 2020). In Africa, the therapeutic power of plants has been known empirically by our ancestors and elders (N'Guessan, et al ., 2009; Savio et al., 2020).

Mauritania is known for its rich vegetation and has developed practices like those in West African countries that enhance "health coverage" amid widespread poverty and limited conventional health services (Agyare et al., 2015; Dongock et al., 2018; Yebouk et al., 2023).

This paper aims to enhance the understanding of ethnopharmacological plant resources in Mauritania's Province of Nouakchott. It explores their potential for healthcare benefits and income generation for the local population. We propose that by examining the socio-economic and historical contexts and the lack of prior studies, we can uncover valuable ethnopharmacological knowledge to compare with historical texts and those from neighboring regions.

MATERIALS AND METHODS

Study area

Nouakchott, the capital of Mauritania, is in the southwest, near the Atlantic Ocean, and covers an area of 1000km². The city has experienced rapid population growth due to rural migration.

The Ehel Adja Clinic, situated in Nouakchott, served as the primary site for this study. Patients visiting the clinic for various ailments were surveyed to understand the traditional medicinal plants they used.

Study population

The study included patients from three main regions in Nouakchott: North Nouakchott (Toujounin, Dar Naim, and Teyarett), South Nouakchott (Arafat, El Mina, and Riadh), and West Nouakchott (Tevragh Zeina, Sebkha, and Ksar).

The survey targeted both Arab-Berber Moors and Black African ethnic groups, including Pulaar, Soninke, and Wolof populations (Figure 1).

Inclusion and exclusion criteria

This study included patients who consulted traditional healers in Nouakchott. Patients residing outside of Nouakchott and those who had not sought the services of traditional practitioners were excluded from the study.

Data collection

Ethnobotanical data were collected through structured interviews using a standardized questionnaire. A total of 1050 patients were interviewed at the Ehel Adja Clinic. The interviews focused on patient demographics, the illnesses they sought treatment for, and the medicinal plants they used. The questionnaire was prepared with slight modifications according to Yebouk et al. (2020), which contained twelve parameters that consisted of two sections.

The first aspect varied according to the informant's age, gender, education, social circumstances, and the source of their insights. The second focused on the therapeutic uses of the target plant, encompassing preparation methods, administration techniques, parts used collection seasons, dosages, and potential effects.

Collection of plant material and identification of specimens

The plant species were collected and identified with the assistance of the National Herbarium of the École Normale Supérieure (ENS) in Nouakchott. The scientific names of plant species were checked for accuracy and acceptance using the "Plant List Database" http://www.worldflora online.org and the family assignments follow "Angiosperm Phylogeny Group IV (APGIV)" https://www.gbif.org. Vernacular names of all species studied were reviewed and confirmed previously as described by Yebouk et al. (2023). The correct names of the plants have been verified by World Flora Online (www.worldfloraonline.org).

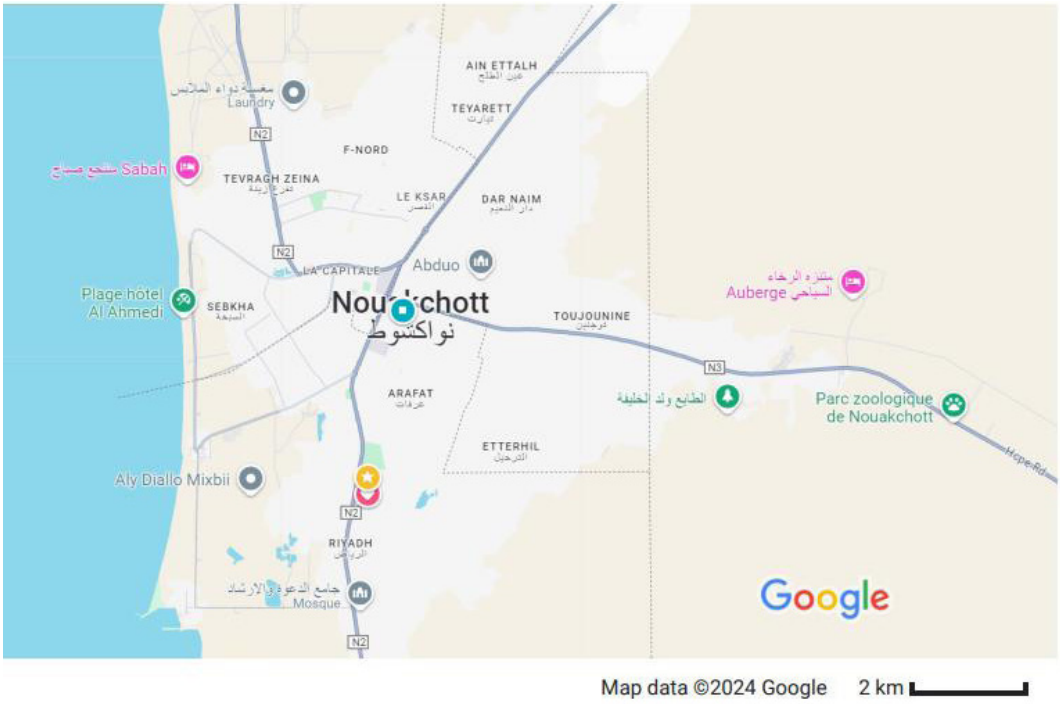

Figure 1. Map of Nouakchott

The medicinal plants, except of *Hibiscus sabdariffa* L., are cultivated in Mauritania. They are found in multiple regions of the country, principally in the eastern and southern areas. Regarding the plant's habitat, each species has the following:

Tamarindus indica L. : prefers semi-arid areas.

Senna italica Mill. : occurs in regions of tropical.

Hibiscus sabdariffa L.: is an introduced species. It adapts to tropical and subtropical zones, including arid and semi-arid regions.

Moringa oleifera Lam. (Moringa): is widely cultivated and naturalized throughout the tropical and subtropical regions. This plant can grow in different habitats.

Acacia senegal (L.) Willd.: this species is naturally occurring in arid regions.

Commiphora africana (A.Rich) Engl. : this is a typical species found in tropical regions.

Combretum glutinosum Perr. ex DC. predominantly, prefers light soils with good drainage.

Regarding preparation methods, maceration, infusion, and decoction are the most commonly used methods. There are also some other methods of preparation, but the most commonly used methods are the ones we mentioned previously. Concerning the use of medicinal plants, the parts most often used are leaves, fruits, flowers, and roots, and often the entire plant. These medicinal plants treat many diseases present at the Ehel Adja clinic in Nouakchott. In general, 15 diseases are treated using parts of plants. The most prevalent diseases among patients are: gastrointestinal diseases, skin diseases, and also various diseases such as diabetes and hypertension. The results concerning the preparation methods, usages, and plant parts used, are available in Figure 3.

Data analysis

The data were entered into Excel 2007 for analysis, using descriptive statistics like frequency counts and percentages. SPSS software was used to analyze the frequency of plant use among patients and their demographics.

Quantitative index
Fidelity level (FL)

The Fidelity level (FL) percentage is employed to determine the species most used by respondents in the treatment of a specific condition. It is calculated based on the following formula (Yebouk et al., 2023):

$$FL\,(\%) = (NP / N) \times 100$$

where, NP represents the number of informants who claimed to have used a specific plant species for a specific ailment, and N represents the total number of informants who used the species for any disease.

Informant consensus factor (ICF)

Also known as informant agreement ratio (IAR), was determined for each disease category to assess the consistency, homogeneity, and agreement of the informants' responses about a certain treatment for a given disease category. It was calculated by the following formula (Al Fatimi, 2019):

$$ICF = (Nur - Nt) / (Nur - 1)$$

where, Nur= number of citations for each category, Nt= number of species for this same category. ICF value ranges usually from 0 to 1 (total homogeneity).

Use value (UV)

According to Chaachouay et al. (2019), UV is a quantitative method that illustrates the relative importance of species known locally, which is calculated as follows:

$$UV = \Sigma Ui / N$$

where, N is: the total number of informants interviewed for a particular plant species, and Ui is: the number of use reports indicated by each informant (i).

Frequency of citation (FC)

The (FC) indicates the absolute number of informants who cited that they used a particular plant species for a particular event. It ranges from 0 (none of the informants use this plant species in a particular event) to 198 (maximum number of informants who use this plant species in a particular event) for a single event (Schultz et al., 2020).

RESULTS AND DISCUSSION

The fieldwork was conducted in Nouakchott City, Mauritania, to explore the interest in and traditional uses of seven medicinal plants from seven different botanical families, each with high therapeutic potential. A total of 1050 respondents from Indigenous communities, varying in age, gender, family status, and educational level, were interviewed, as illustrated in Table 1. The findings from this research provide a foundation for further pharmacological and phytochemical studies, as well as a conservation strategy for these plant species.

Sociodemographic profile of informants

In Table 1, a total of 1050 informants participated in the survey, comprising 577 females (55.00%) and 473 males (45.00%). The sex ratio was 0.82, indicating a slightly lower representation of males. This result is comparable to the one found in Mauritania in 2023, which shows that women are in the majority 58%, while men account for 42% (Yebouk et al., 2020).

The age distribution of the informants shows a significant majority (75.24%) in the [41-50] age group. This result is not in line with a study carried out in Bamako in 2020, which found that the average age was 52.52 and the most represented age group was 52-60 with a percentage of 25%, followed by 61-69 (18.33%); the under-25s were very poorly represented (3.33%) (Savio et al., 2020), in Morocco in 2015 (40-49 age group predominates with a percentage of 30.77%) (Fatima et al., 2015), and in Mauritania (the most represented age group was 45-59 with a percentage of 25 %) (Yebouk et al., 2020).

In terms of educational levels, most informants had achieved a primary level education (34.95%), followed by graduates (30.00%). These results are not in line with those found in Morocco in 2015 (illiterate 84.21%, university 1.16%, primary 7,9%, and secondary 6.73%) (Fatima et al., 2015), in Brazil in 2016 (illiterate 43.6%, secondary 7.4%, secondary 1.1% and primary (12.5%) (Alves Pereira et al., 2016), in Morocco in 2020 (university 1.67%, illiterate 65.27%, secondary 3.77%, and primary (29.29%) (Lachkar et al., 2020), and in Mauritania in 2023 (illiterate 23.33%, university 16.67%, primary 25%, and secondary 22.5%) (Yebouk et al., 2023).

The ethnic composition of the informants revealed a dominant group, the Moor, accounting for 80.19% of the total, followed by the Fulani (9.90%), Soninke (6.86%), and Wolof (3.05%). These results are consistent with other recent ethnobotanical works such as Yebouk et al. (2020, 2023).

Most of our patients were of urban origin, around 893/1050, with a percentage of 85%. Patients of rural origin represented 15%. This result is similar to that found in Nigeria in 2020 (urban 90%, and rural 10%) (Lawal et al., 2020).

Table 1. Demographic and sociocultural profile of the surveyed population for ethnopharmacologically used plants in Mauritania (n=1050 informants)

Variable	Categories	Number of informants N= 1050	Percentages (%)
Gender	Male	473	45
	Female	577	55
Age groups	<20	6	0.57
	[21-30]	112	10.67
	[31-40]	126	12.00
	[41-50]	790	75.24
	[51-60]	13	1.24
	>60	3	0.29
Educational level	Illiterate	105	10.00
	Primary level	367	34.95
	Secondary level	189	18.00
	Graduate level	315	30.00
Ethnic groups	Moor	842	80.19
	Fulani	104	9.90
	Wolof	32	3.05
	Soninke	72	6.86

Distribution of patients according to the diseases they suffer from

In our study, patients with gastrointestinal diseases represent around 50%, followed by patients suffering from various illnesses such as diabetes and arterial hypertension with a percentage of 30% and patients suffering from dermatological diseases represent 20% (Figure 2).

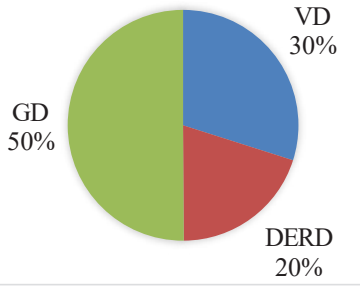

Figure 2. Distribution of patients according to the diseases they suffer from for ethnopharmacologically used plants in Mauritania [GD: gastrointestinal diseases, DERD: dermatological diseases, VD: various diseases]

A study carried out in Ivory Coast in 2016 shows that various diseases such as malaria 32.14% most common parasitic diseases, dermatosis 2%, abdominal problems 8.2%, and intestinal disorders 2% (Kouadio et al., 2016), and in Bamako in 2020 shows that malaria is the most treated disease with a percentage of 20.18%, followed by arterial hypertension with a percentage of 7.34% and finally diabetes and dermatological diseases with a rate of 5.5% each (Savio et al., 2020).

Preparation methods, plant part used, and route of administration

Local communities use various methods in traditional medicine to treat ailments, including decoction, infusion, cooking, and fresh plants or powders. Maceration (60%) and infusion (15%) are the preferred methods, followed by decoction preparation (8%), powdered plants (7%), and cooked preparations (4%). Other methods, like cooking, account for 3 % (Figure 3). These results are in contrast to those obtained by a study carried out by Yebouk et al. (2020, 2023) which demonstrated that the population investigated in the regions of Adrar northern of Mauritania predominantly uses the powder method.

The results presented in Figure 3 indicate that leaves and fruits were the most used plant parts, accounting for 70% and 12% of cases, respectively. These were followed by roots (6%), stems (5%), and flowers (4%). Leaves are favored due to the ease of preparation and collection. However, harvesting roots leads to the loss of the bark, as it halts physiological processes.

These findings are agreed with previous ethnomedicinal studies by Yebouk et al. (2020, 2023) and Redouan et al. (2020, 2022), who also reported that leaves were the most frequently cited plant part in remedy preparations.

In contrast, studies, Nour et al. (2020), René et al. (2020) and Javad et al. (2022), identified roots as a commonly used plant part.

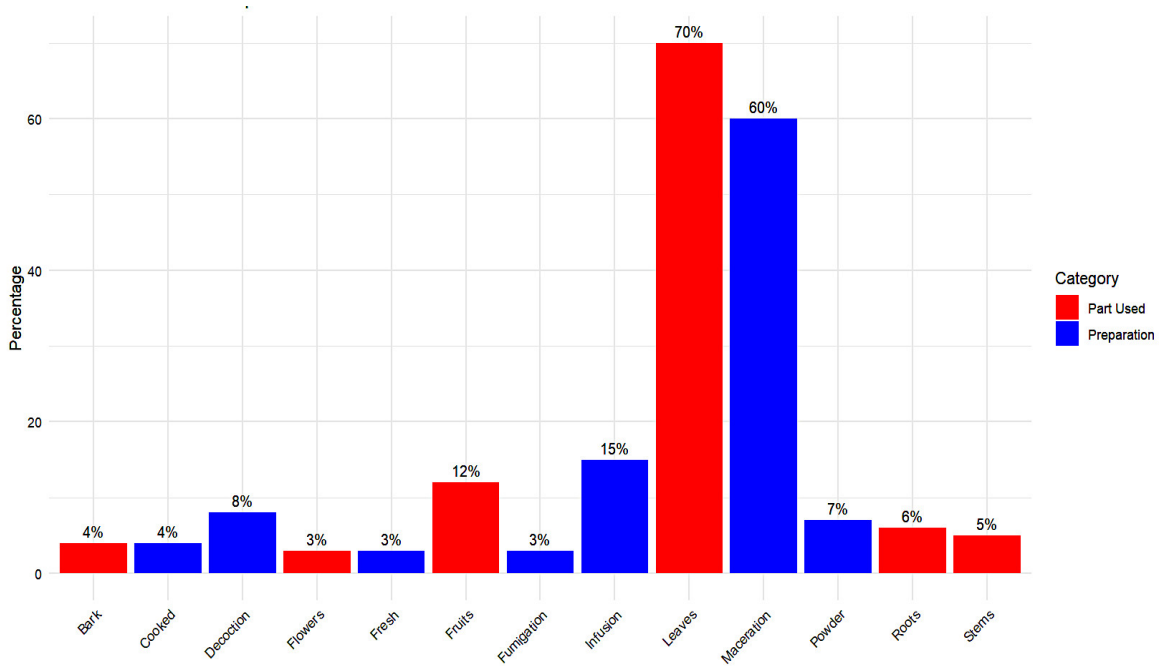

Figure 3. Plant part used and different methods of preparation for ethnopharmacologically used plants in Mauritania

The oral route is exclusively the primary method of administering herbal remedies, as reported by respondents (Figure 4). This finding aligns with the studies of Yebouk et al. (2020) and Sall et al. (2024).

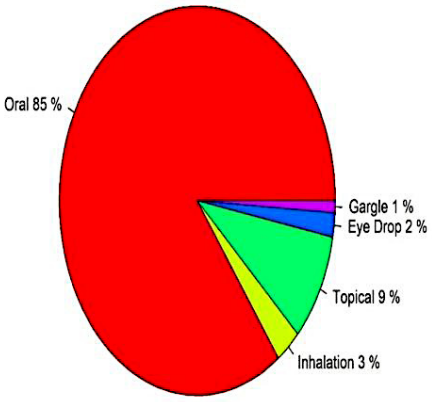

Figure 4. Routes of administration for ethnopharmacologically used plants in Mauritania

Quantitative index result

Use Value (UV)

The Use Value (UV) is a quantitative parameter used to evaluate the relative significance of a medicinal plant, determined by the frequency of references made by informants in a specific.

In Table 2, a higher UV indicates a species' increased importance in traditional medicine and indicates its incidence among the local population. In this study, UV values ranged from 0.006 for *Combretum glutinosum* Perr. Ex DC., indicating its limited usage, to 0.19 for *Tamarindus indica* L., which is frequently used, particularly for diabetes and digestive problems. The moderate to high UV values recorded for species such as *Acacia Senegal* (L.) Willd. (0.096) and *Commiphora africana* (A.Rich.) Engl. (0.094) indicate their frequent application in the treatment of various illnesses, including gastrointestinal and skin conditions. *Senna italica* Mill. is lower UV value (0.010) indicates reduced usage, showing that although these plants may still be significant, their use in the investigated community is either less common or less well-known.

The UV score directly correlates with the number of informants who mentioned the species, and plants with higher UV values are considered crucial in local pharmacopeias. Hence, those species with higher UV values, such as *Tamarindus indica* L, should be the subject of future phytochemical and pharmacological studies to investigate their bioactive compounds.

Fidelity level (FL)

The fidelity level (FL) measures the percentage of use of a species for a particular ailment. Plants such as *Tamarindus indica* L., with a high FL value (20%), showed significant consistency in their use for specific conditions like diabetes. This indicates a strong agreement among informants about the efficacy of these species for treating a particular health problem.

Table 2. Medicinal uses of the studied species used for ethnopharmacological application in Mauritania and related Quantitative indices (FC, UV, and FL indices) in the study area

Scientific name Voucher No/ Code	Medicinal uses	FC	UV	FL%
Tamarindus indica L. HNM02414	Non-insulin-dependent diabetes T90	198	0.19	20
	Digestive and gastrointestinal disorders D99			
	Skin diseases S29			
Senna italica Mill. HNM02519	Digestive and gastrointestinal disorders D99	11	0.010	27
	Breast pain female X18, Urinary disease U99			
Hibiscus sabdariffa L.	Digestive and gastrointestinal disorders D99	73	0.070	35
	Hypertension K86			
	Pain and Respiratory Disorders R01			
Acacia senegal (L.) Willd. HNM02517	Digestive and gastrointestinal disorders D99, Hypertension K8	101	0.096	25
	Headache N01, Eye/adnexa disease E99, Urinary disease U99			
Moringa oleifera Lam.	Digestive and gastrointestinal disorders D99	49	0.047	45
	Diabetes non-insulin-dependent (T90), Hypertension K86			
	Urinary disease U99, Pain Respiratory Disorders R01			
Commiphora africana (A.Rich) Engl.HNM02408	Skin diseases S29	99	0.094	60
	Digestive and gastrointestinal disorders D99			
	Headache N01, Back disorders symptom L02, Eye/adnexa disease E99			
Combretum glutinosum Perr. ex DC. HNM02406	Digestive and gastrointestinal disorders D99, Skin diseases S29, Back disorders symptom L02	7	0.006	37
	Hypertension K86			

Quantitative indices: Frequency of citation (FC), informant consensus factor (ICF), use value (UV), and fidelity level (FL)

Frequency of citation (FC)

High FC values (e.g., *Tamarindus indica* L*, Acacia Senegal* (L.) Willd. Their high citation could be attributed to their accessibility, cultural significance, and versatility in treating multiple conditions.

Moderate FC values (e.g., *Hibiscus sabdariffa* L.).

Low FC values (e.g., *Moringa oleifera* Lam*., Senna italica* Mill.)

The frequency of citation (FC) reflects how many times a plant was mentioned by the informants. For example, *Tamarindus indica* L. had an FC of 198, highlighting its popularity and widespread recognition for medicinal purposes.

Informant consensus factor (ICF)

The analysis of medicinal plants based on disease categories and ICF values provides significant insights into the traditional knowledge systems of the local community. High ICF values in categories like diabetes (0.992), digestive issues (0.985), and skin diseases (0.983) suggest a strong consensus among informants, highlighting the reliability and importance of species such as *Moringa oleifera* Lam*.*, *Tamarindus indica* L., and *Acacia Senegal* (L.) Willd. in treating these conditions (Table 3). This indicates that these plants are not only well-known but are perceived to be effective by the community, making them central to ethnomedicinal practices. The high usage frequency also suggests that these ailments are prevalent in the region, and the community has developed effective remedies over time. In contrast, lower ICF values for conditions like back pain (0.5) and urinary diseases (0.5) indicate a lack of consensus among informants, which could suggest either variability in plant effectiveness or limited traditional knowledge of these specific health issues. This may also reflect the lower incidence or cultural significance of these ailments, leading to fewer well-known treatments.

Table 3. Informant consensus factor (ICF) values for the International Classification of Primary Care, 2nd edition (ICPC-2) ailment categories used for ethnopharmacological application in Mauritania

Disease category	Plant species	Number of uses	Nt	ICF
Non-insulin-dependent diabetes (T90)	*Tamarindus indica* L. (8), *Moringa oleifera* Lam.(122)	130	2	0,99
Digestive and gastrointestinal disorders D99	*Tamarindus indica* L.(108), *Senna italica* Mill.(21), *Hibiscus sabdariffa* L. (29), *Acacia senegal* (L.) Willd.(164), *Moringa oleifera* Lam. (2), *Commiphora africana* (A.Rich.) Engl.(56), *Combretum glutinosum* Perr.ex DC. (44)	424	7	0,98
Headache N01	*Commiphora africana* (A.Rich.) Engl.(5), *Acacia Senegal* (L.) Willd.(5)	10	2	0,88
Hypertension K86	*Hibiscus sabdariffa* L. (44), *Acacia senegal* (L.) Willd. (3), *Moringa oleifera* Lam.(2), *Combretum glutinosum* Perr.ex DC. (3)	52	4	0,94
Pain and Respiratory Disorders R01	*Hibiscus sabdariffa* L. (7), *Moringa oleifera* Lam. (10)	17	2	0,93
Skin diseases S29	*Tamarindus indica* L. (82), *Commiphora africana* (A.Rich.) Engl.(41) *Combretum glutinosum* Perr.ex DC. (2)	125	3	0,98
Back disorders symptoms L02	*Commiphora africana* (A.Rich.) Engl.(3), *Combretum glutinosum* Perr.ex DC. (4)	7	2	0,83
Urinary disease U99	*Senna italica* Mill., *Acacia Senegal* (L.) Willd.	3	2	0,5
Eye/adnexa disease E99	*Acacia senegal* (L.) Willd., *Commiphora africana* (A.Rich.) Engl.	5	2	0,75
Breast pain female X18	*Senna italica* Mill.	3	1	1

Informant consensus factor (ICF), Nt = number of species for this same category.

The findings suggest that the plants with high UV and ICF values could be promising candidates for further pharmacological studies to confirm their efficacy, particularly for conditions like diabetes and digestive disorders, where traditional knowledge is well-supported. Conversely, the lower ICF values in some categories highlight potential areas for further ethnobotanical investigation to document and understand less established or emerging traditional remedies.

Bibliographical comparison

Table 4 presents a comparison of the traditional medicinal uses of seven plant species, based on the current study's findings and previous bibliographic data, primarily from Yebouk et al. (2020) and Sall et al. (2024).

This comparison highlights both commonalities and differences in the reported uses of each species, showcasing the breadth of knowledge across studies and regions.

***Tamarindus indica* L.**

In the current study, *Tamarindus indica* L. is primarily used for treating vomiting and headaches, consistent with Yebouk et al. (2020). The absence of *Tamarindus indica* L. in Sall et al. (2024) suggests its use may be more regionally specific, with a focus on these ailments in Nouakchott and nearby regions.

***Senna italica* Mill.**

This plant is used across studies for a range of digestive disorders, with *Senna italica* Mill. noted for treating constipation and abdominal pain in both Yebouk et al. (2020) and Sall et al. (2024). However, additional conditions like skin color change are mentioned only in Yebouk et al., while diarrhea is cited exclusively in Sall et al., indicating some regional variation in its therapeutic use.

***Hibiscus sabdariffa* L.**

Hibiscus sabdariffa L. has consistent uses in treating abdominal pain and respiratory disorders like cough in both the current study and Yebouk et al. (2020). Sall et al. (2024) do not mention this species, implying that its traditional use may be more localized, particularly in communities with specific dietary practices, such as using hibiscus in drinks.

Table 4. Pharmacological data on identified medicinal plants used for ethnopharmacological application in Mauritania

Scientific Name	Family	Therapeutic use and some properties based on bibliographic data
Tamarindus indica L.	Fabaceae	Vomiting, Headache Low bile production, ulcers, and dermatitis (Ursula et al., 2012; Pankaj et al ., 2012).
Senna italica Mill.	Fabaceae	Constipation, Abdominal pain epigastric, Skin color change, and Diarrhea. Intestinal bacterial flora disorders and cancer (Deise et al., 2011; Shabina et al.,2016).
Hibiscus sabdariffa L.	Malvaceae	Abdominal pain, antioxidant, hypotensive, and diuretic (Manisha et al., 2021; Irena et al., 2023).
Acacia senegal (L.) Willd.	Fabaceae	Abdominal pain epigastric, Skin injury, and Heartburn (Yebouk et al., 2020; Muataz et al., 2022; Javad et al., 2022).
Moringa oleifera Lam.	Moringaceae	Skin irritation; anemia; hypertension; sterility; diabetes; and sexual dysfunction (Sall et al., 2024) Antioxidant activity, hepatoprotective, and metabolic disorders (Suaib et al., 2012; Nour et al., 2020; René et al., 2020 ; Naima et al., 2021).
Commiphora africana (A.Rich) Engl.	Burseraceae	Breast cancer, Constipation, Mouth disorders, laceration, abdominal pain epigastric, and Teethache (Yebouk et al., 2020), Toothache; Weakness; Bone and joint pain, skin problems, Antioxidant, antiseptic, and antidiabetic (Ali et al., 2021; Abeer et al ., 2022 ; Sall et al., 2024).
Combretum glutinosum Perr. ex DC.	Combretaceae	Non-insulin-dependent diabetes, Abdominal pain epigastric, diarrhea (Yebouk et al., 2020), Menstrual disorders; constipation; Diabetes; anemia; Hepatitis (Madieye et al., 2019; Placide et al., 2021; Sall et al., 2024).

***Acacia senegal* (L.) Willd.**

Acacia Senegal (L.) Willd. demonstrates a wider range of uses in Sall et al. (2024), where it is employed for treating malaria, jaundice, and toothache. In contrast, Yebouk et al. (2020) focus on its use for digestive disorders and skin injuries. This difference suggests that *Acacia Senegal* (L.) Willd. has multiple roles depending on the community, with certain uses tied to localized knowledge of its properties.

***Moringa oleifera* Lam.**

The current study aligns with Sall et al. (2024) in recognizing *Moringa oleifera* Lam. for its use in treating a variety of conditions, including skin irritation, anemia, and diabetes. This consistent application of *Moringa oleifera* Lam. across regions highlights its broad medicinal value, particularly in addressing chronic and systemic disorders like hypertension and sexual dysfunction, which are absent in Yebouk et al. (2020).

***Commiphora africana* (A.Rich.) Engl.**

Both Yebouk et al. (2020) and Sall et al. (2024) report Commiphora africana (A.Rich.) Engl. for treating a wide range of conditions, but with notable differences. Yebouk et al. emphasize its use for digestive and oral conditions (constipation, mouth symptoms), while Sall et al. highlight its role in managing joint pain and weakness. This suggests that Commiphora africana (A.Rich.) Engl. is a versatile plant whose use depends heavily on the specific health priorities of different communities.

***Combretum glutinosum* Perr.ex DC.**

In both studies, *Combretum glutinosum* Perr.ex DC. is commonly used for diabetes and digestive disorders. However, Sall et al. (2024) expand its use to menstrual disorders, anemia, and hepatitis, which are not mentioned in Yebouk et al. (2020). This indicates a growing recognition of its broader therapeutic potential, especially for managing chronic conditions in different regions.

This comparison shows that while many plants have consistent uses across regions, there are variations in the ailments they treat depending on the specific needs and knowledge of local communities. The overlap in conditions like digestive and metabolic disorders (e.g., diabetes) points to widespread reliance on certain species, while differences in the treatment of conditions like menstrual disorders and joint pain highlight

the adaptive use of these plants across different cultural and ecological contexts. Further studies can deepen understanding of these variations, supporting both conservation and potential pharmacological development.

CONCLUSION

This ethnobotanical study demonstrates the rich traditional knowledge and widespread use of medicinal plants in Nouakchott, particularly for treating prevalent ailments such as digestive disorders, skin diseases, and diabetes. The high Informant Consensus Factor (ICF) values and frequency of citation (FC) for species like *Tamarindus indica,* L, *Acacia Senegal* (L.) Willd.. and *Moringa oleifera* Lam. reflect their cultural importance and perceived therapeutic efficacy within the community. These plants, with their strong local endorsement, hold significant potential for further pharmacological and phytochemical investigations, which could validate their medicinal properties and support their integration into modern healthcare. Additionally, the documentation of this knowledge contributes to the preservation of traditional practices, which are at risk of being lost due to socio-economic changes. Conservation efforts should also focus on sustainably managing these plant resources to ensure their availability for future generations.

List of abbreviations: FL: Fidelity level; FC: Frequency of citation; ICF: Informants Consensus Factor; UV: Use Value.

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