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Quantitatıve Ethnobotany of Medicinally Important Plants used by Indigenous People from Kumbhalgarh Wıldlıfe Sanctuary, Rajasthan, India

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Abstract. Rajasthan is home to a significant tribal population living in the enduring deciduous forests of the Aravalli and Vindhyan ranges. Despite facing various changes over time, many communities still thrive in traditional ways. Among these groups, the Bhils are the largest, followed by the Garasias, Damor and Meena. Living in close harmony with nature, these tribes possess unique knowledge about the properties and uses of wild plants, much of which is unfamiliar to the outside world. Until about two decades ago, the ethnobotanical knowledge of tribes of Rajasthan was largely unknown. Comprehensive fieldwork in tribal villages has revealed fascinating insights into their lives. This research highlights the diverse uses of wild plants by tribes of Kumbhalgarh Wildlife Sanctuary, Rajasthan for ethnomedicine. The folk wisdom of these communities, if scientifically examined, could offer significant benefits to humanity. The current study aimed to document the traditional knowledge of tribal herbal medicine practitioners of Kumbhalgarh Wildlife Sanctuary, Rajasthan and quantitative analysis to uncover potential insights for future research. Quantitative indices such as use value (UV), informant consensus factor (ICF), informant agreement ratio (IAR), relative frequency citation (RFC), and fidelity level (FL) were used to enumerate the benefit, importance and exposure of ethnomedicinal plants.

Index Terms- Ethnomedicine, Use value, ICF, Kumbhalgarh Wildlife Sanctuary.

I. Introduction

Indigenous peoples have deep knowledge of their local flora and fauna, which significantly effects their cultural identity and environmental relationships. In India, traditional folklore healthcare systems have a deep history, predominantly within rural and tribal communities, dating back to ancient times, including the pre-Vedic eras related with the Mohenjodaro and Harappan civilizations. This historical familiarity with medicinal plants, essential oils, and natural insecticides underscores the long-standing practice of ethnomedicine, which is the traditional healthcare approach of indigenous populations (Katewa, 2009).

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Indian civilization has been a pioneer in utilizing various plants as indigenous drugs, and ethnomedicine serves as the foundation for other traditional systems like Ayurvedic, Unani, as well as modern allopathic system of medicine. Herbal medicine is recognized not just as a substitute for conventional treatment but as a legitimate therapeutic approach (Broom et al., 2009). It's estimated that about 80% people of the developing countries relies partially or fully on herbal remedies for primary healthcare, with higher plants serving as a crucial source of conventional medical therapies (Meena and Yadav, 2006). As per the WHO, 80 to 90% of the global population primarily depends on local herbal practitioners. The WHO has formally acknowledged traditional medicine in its 29th and 30th assemblies (1976–1977), advocating for the integration of conventional practitioner into public healthcare programs (Trivedi and Nehra, 2004).

In India, major classical medical systems such as Ayurveda, Siddha, and Unani utilize approximately 1,200 plant species for treating health issues. In contrast, tribal communities use over 7,500 species of plants for healing purposes (Katewa. 2009). India holds a prominent position among the worl's biodiversity hot spots and also home to around 45,000 plant species, of which 15,000 to 20,000 have medicinal applications (Guru et al., 2022).

The Aravalli hills, inhabited by various tribes and ethnic groups like the Bhil, Meena, Garasia, Kathodi, Saharia, Bhagora, and Damor (Katewa, 2009) but Kumbhalgarh Wildlife Sanctuary is dominated by Bhil, Grasia, Damor and Meena. Many residents live in remote areas with narrow access to modern amenities, relying heavily on natural or forest resources to fulfil their day-to-day needs. These tribal communities possess extensive knowledge of herbal plants, developed through generations of experience. Ethnomedicinal therapy is crucial for their primary healthcare and offers significant potential for discovering new herbal drugs with minimum side effects.

II. Materıals and Methods

1. Study Area

Kumbhalgarh Wildlife Sanctuary, located in southern-central Rajasthan, covers 610.528 square kilometers area and encircles the historic Kumbhalgarh fortress. This sanctuary is situated within the ancient hill ranges of Aravalli, the sanctuary spans latitudes 25º - 25º 40' N and longitudes 73º 02' - 73º 30' E, extending across parts of the Rajsamand, Udaipur, and Pali districts (Fig.1). Its elevation varies from 502 to 1,300 meters above sea level. The sanctuary serves as an ecotone between the forests of Aravalli hills and the Thar Desert to the west, effectively preventing the desert from expanding eastward. This semi-arid region showcases a unique blend of flora from the dried western and the southeastern humid zone, highlighting the resilience of moisture and shade-loving species in its challenging conditions.

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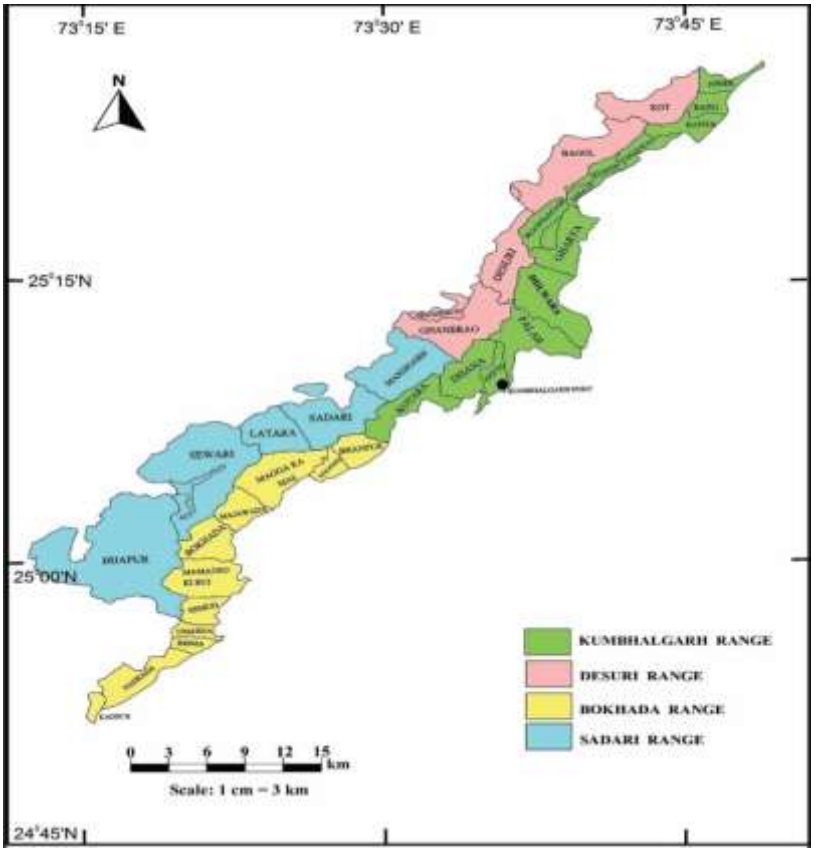

Fig. 1: An administrative map of KWS (Kumbhalgarh Wildlife Sanctuary)

Kumbhalgarh Wildlife Sanctuary comprises 34 forest blocks administered across four forest ranges. Notably, it marks the westernmost limit for teak distribution. While most of the forest blocks exhibit moderate floral diversity, areas such as Aaret, Semud, Dhana, Ghanerao, Bagol, and Mahadev Ki Bugh are particularly rich in floral diversity. The sanctuary having entire of 610.528 Sq. km. in which 600.18 Sq. km area is reserved forest and remaining 10.35 Sq. km is protected forest. The sanctuary is distributed in three districts namely Rajsamand, Pali and Udaipur.

2. Data Collection

Ethnobotanical data were collected in 11 villages of Kumbhalgarh Wildlife Sanctuary from August 21 to December 2023. It took 153 field days to collect the ethnomedicinal data. During the first visit to every village, the purpose and type of the work were explained to each informant in their local language, to get prior informant consent. After getting consent from informants, formal interviews were conducted. Semi-structured and unstructured interviews are conducted to acquire ethnomedicinal information of local plants. During the study, 158 informants were interviewed of which 103 were males and 55 were females. Among 153 informants, 49 informants were termed as key informants. Those informants were traditional healers and skilled

in traditional healing. The remaining 109 informants lacked specialized knowledge. They were either herbal medicine users or information carriers. The age of the youngest and oldest informant is 26 and 87 years, respectively. Among the 158 informants, 52 of them were between 60 and 89 years of age. Each informant also gave their verbal consent and participated voluntarily in the interview. The demographic information of the informants like age, educational status, gender, and ethnomedicinal information like the local name of plants, plant parts used as ethnomedicine, mode of preparation, and the amount and number of doses were also recorded through a semi-structured questionnaire.

3. Identification and Herborization

Specimens of ethnomedicinal plants were collected from the study area in collaboration with informants. Field specimens of ethnomedicinal plants were preferably collected during the flowering and fruiting stage. The collected plant parts are used to prepare herbarium specimens and for identification purposes. Identification of the medicinal plants was done with the help of Flora of Rajasthan by Shetty and Singh (1987-1993), Flora of Indian Desert by Bhandari (1978), World Online Flora and verified by Dr. Ravi Prasad, Scientist E, Botanical Survey of India, Hourah, Kolkata. The voucher specimens were deposited to the departmental herbarium of S.R.K. Government P.G. College, Rajsamand (Rajasthan), for future purpuses.

4. Quantitative Ethnobotany

Use Reports (UR)

The data acquired from the field interviews were converted into a basic structure. UR can be described as informant (I) mentions the use of a species (S) for the healing or treatment of an illness category (U). In the current study, authors have followed the following method to convert the data into use report. If species ‘X’ was recommended for the healing or treatment of illness category ‘P’, it was considered as one UR. If species ‘X’ was recommended for the healing or treatment of illness categories ‘P’ and ‘Q’, then it was considered as two reports. If a mixture of species ‘X’ and ‘Y’ was used for the healing or treatment of illness category ‘P’, it was considered as two use reports (i.e. species ‘X’ for the treatment of ‘P’ and species ‘Y’ for the treatment of ‘P’). If a mixture of species ‘X’ and ‘Y’ was used for the healing or treatment of illness categories ‘P’ and ‘Q’, it was considered as four (2 x 2) use reports. By the above-mentioned process, all the information was converted into use reports (UR). Then, the use reports were converted into claims. The ‘claim’ is similar to that of use reports, but it does not contain the factor ‘informant (I)’. If a species ‘X’ was mentioned for the treatment of an illness category ‘P’ by two informants, it was considered as two UR, but as one claim.

Use Value (UV): The Use Value (UV) is an estimation of the relative importance of any ethnomedicinal plant. İt was calculated using the formula given below.

$$UV = \frac{\sum Ui}{N}$$

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Where Ui = the number of UR (Use Reports) or citations mentioned by an informant for a specific plant species, and N = total number of participants who were termed as informants. Low value of UV shows less citation, whereas high value of UV shows a substantial volume of citations from the informants (Phillips and Gentry, 1993).

Informant Consensus Factor (ICF): This is one of the widely used indices in quantitative ethnobotanical studies. This index, originally proposed by Trotter and Logan (1986), was used to assess the consistency of the healer's knowledge in treating a specific illness category. This factor can be given as

$$ICF = \frac{(N_{ur} - N_t)}{N_{ur} - 1}$$

where, N_{ur} = the number of UR (use reports) for a particular illness category, and N_t = the number of plant species used for a particular illness category by all informants. The range of ICF is between zero to one, high ICF value shows the high rate of informant consensus. ICF value reflects the cultural consistency in the selection of ethnome dicinal plants for the treatment of a particular illness category, without providing any details about the significance of individual plant species used (Heinrich et al., 1998).

Relative Frequency Citation (RFC): The relative frequency citation (RFC) is a method used to estimate the importance of a plant species and the level of agreement among informants on its use. İt can be calculated using the following formula:

$$RFC = \frac{FC}{N}$$

Where, FC= the number of informants who quoted plant species, and N = total number of informants. The value of RFC ranges between 0 to 1. The values that near to 1 shows that nearly all of the informants are agreed on use of a particular ethnomedicinal plant for a particular illness category while low values suggest less agreement on the usage of specific medicinal plant species among informants (Tardio & Pardo-de-Santayana 2008).

Fidelity Level (FL): The Fidelity level (FL) is a percentage that represents popularity of a medicinal plant among informants for a specific illness category. The fidelity level can be calculated using the formula given below:

$$FL(\%) = \frac{N_P}{N \times 100}$$

Where, N_P = proportion of informants who quoted an ethnomedicinal plant for a specific illness category, and N = number of informants who suggest the plant for another use or purpose (Alexiades 1996). The high value of FL shows the high

number of citations and popularity of medicinal plants among the informants. On the other hand, the Low value of FL shows less citation and popularity.

III. Results

The study involved 158 informants, whose demographic details—including age, gender, educational standard, profession, and healing experiences—are summarized in Table 1. A significant majority of the participants were male (65.19%), while females constituted 34.81%. The age distribution of informants was as follows: 20–30 years (10.13%), 31–40 years (15.82%), 41–50 years (18.35%), 51–60 years (22.78%), and over 60 years (32.91%).

In terms of plant families, Acanthaceae and Fabaceae were the most represented (Table 2.), each with 6 species (8.33%), followed by Asteraceae with 5 species (6.94%) and Euphorbiaceae with 3 species (4.16%). The therapeutic plants studied included various growth forms: herbs (34 species, 47.89%), trees (21 species, 29.58%), shrubs (12 species, 16.90%), and climbers (4 species, 5.63%) (Fig. 2).

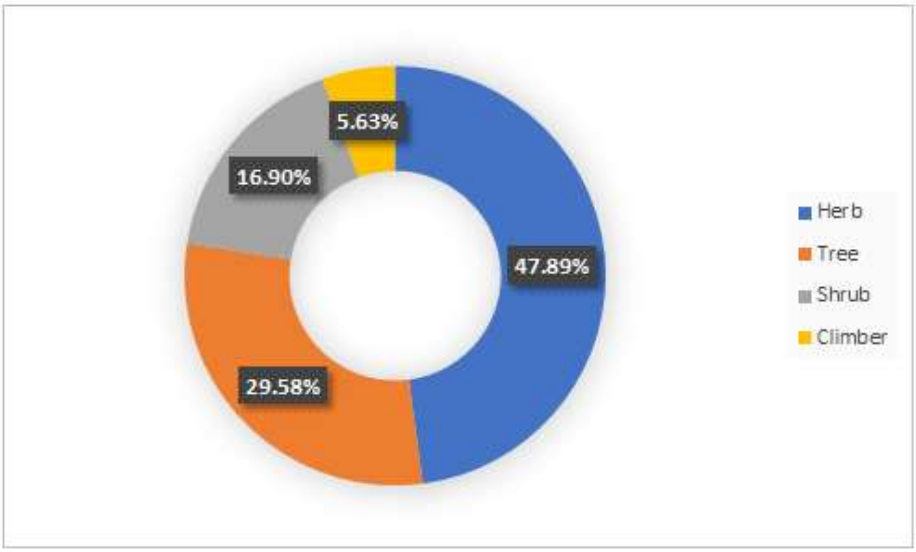

Fig. 2: Growth forms of ethnomedicinal plants

Different parts of the plants were utilized in traditional medicine, including stem, bark, root, leaves, flowers, fruits, seeds, rhizomes, tubers, and whole plants. The most commonly used parts were leaves from 37 species (52.11%), roots from 22 species (30.99%), and fruits from 13 species (18.31%) (Fig.3).

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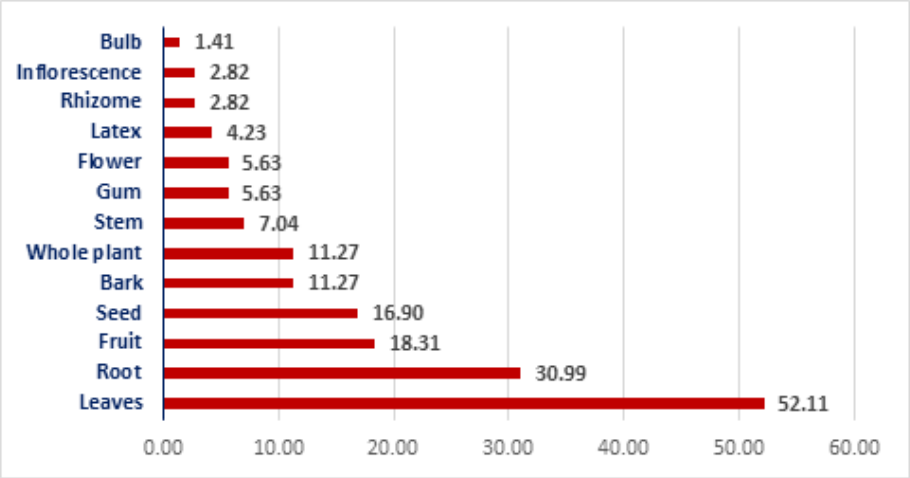

Fig. 3: Plant part used for ethnomedicinal preparation.

Local practitioners employed various preparation techniques, predominantly decoction (34 species, 47.89%), paste (22 species, 30.99%), and juice, powder (15 species, 21.33%) (Fig.4). Most traditional medicines (84%) were diluted in water, while 16% were prepared without additional ingredients. Administration methods included oral uptake, topical application, fumigation, and inhalation, with oral administration being the most common.

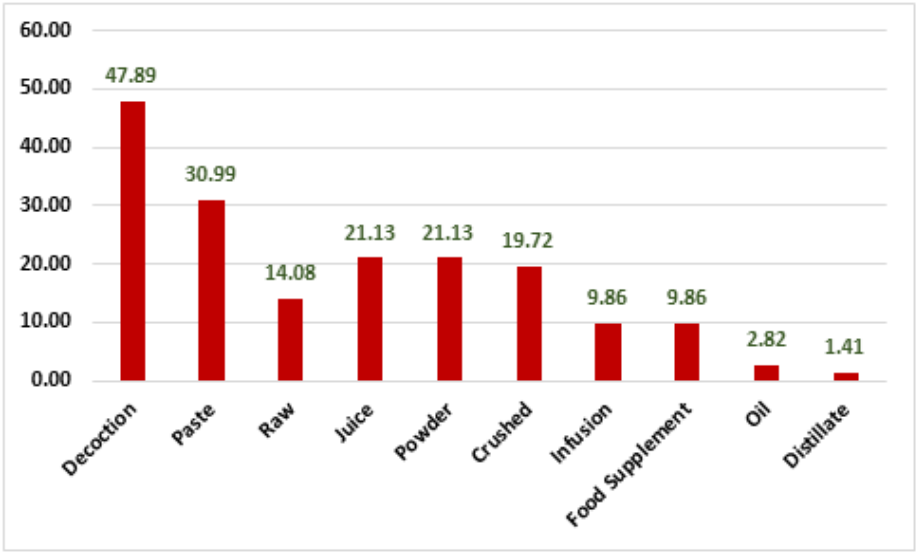

Fig. 4: Mode of preparation and administration.

To evaluate the use value (UV) of the medicinal plants, we used the use report (UR) method, which highlighted the plants most valued by the local community (Table 2). Vitex negundo L. and Asparagus racemosus Willd. had the

highest Use values of 4.31 and 3.84, respectively, indicating their importance in local practices. Other notable plants included Adhatoda zeylanica Medic., Commiphora wightii (Arn.) Bhandari, and Tinospora cordifolia (Willd.) Miers with Use value 3.78, 3.26, 3.26 respectively. Conversely, Wrightia tinctoria (Roxb.) R.Br. had the lowest UV (0.17).

In term of Relative frequency citation Indigofera linnaei Ali., Madhuca longifolia var. latifolia (Roxb.) A.Chev., and Zingiber officinale Rosc. exhibited the highest relative frequency of citation (0.28 each) among the documented species (Table 2).

The study also assessed the cultural significance of medicinal plants used for specific ailments, employing the Informant Consensus Factor (ICF) across 14 disease categories, totaling 54 diseases (Table 3).

Skin diseases and connective tissue disorders (such as rheumatoid arthritis and muscle swelling) received the highest ICF score (0.91), with Vitex negundo L. being the most cited plant for these conditions. In contrast, illness category of injury diseases had the lowest ICF score (0.65).

The frequency of citation (FL) was used to gauge the significance of medicinal plants for specific ailments. Indigofera linnaei Ali. had the highest FL value (91%), frequently prescribed for pneumonia, while Aegle marmelos (L.) Corr. was predominantly mentioned for treating indigestion, with an FL value of 87%. Tribulus teresteris L. had the lowest FL value of 38% in the Genitourinary category among the plants studied.

Table 1: Demographic data of the informants.

Parameter	Category	Number	Frequency (%)
Sex	Male	103	65.19
	Female	55	34.81
Age (in Yrs.)	20-30 Yrs.	16	10.13
	31-40 Yrs.	25	15.82
	41-50 Yrs.	29	18.35
	51-60 Yrs.	36	22.78
	Above 60 Yrs.	52	32.91
Experience (in Yrs.)	Below 5 Yrs.	109	68.99
	5 or above 5 Yrs.	49	31.01
Education Level	Illiterate or Primary School	67	42.41
	High School level	62	39.24
	Graduate and above	29	18.35

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Table 2: Ethnomedicinal plants used by indigenous people in the Kumbhalgarh Wildlife Sanctuary

S.N.	Name of Species	Local Name	Family	Habit	Plant part used	Mode of preparation	Used in Ailment	Use Value	RFC
1	*Abrus precatorius* L.	Chirmu, Rati	Fabaceae	Climber	Leaves and seed	Crushed	Mouth ulcers and Abortion	1.28	0.2
2	*Abutilon indicum* (L.) Sweet.	Dabi, Dablya, Tara Kanchi	Malvaceae	Tree	Root and seed	Powder and decoction	Bronchitis, Urinary broblem, Wounds, Ulcers and Worm infection	1.27	0.2
3	*Acacia catechu* (L.f) Willd.	Khair, Kattha	Fabaceae	Tree	Gum and bark	Food supplement and paste	Stomach pain and Health tonic	1.19	0.07
4	*Acacia nilotica* (L.) Willd. ex Del.	Boriyo	Fabaceae	Tree	Bark and leaves	Paste and raw	Wound, Cuts and Dental care	1.15	0.18
5	*Achyranthes aspera*	Andhijhara	Amaranthaceae	Herb	Leaves and seed	Powder and decoction	Pneumonia, Asthama and Cough	1.14	0.18

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6	*Adhatoda zeylanica* Medic.	Aduso	Acanthaceae	Shrub	Leaves	Decoction, paste and infusion	Cough, Bronchitis, Asthma, Fever, Wounds and Backache	3.78	0.26
7	*Aegle marmelos* (L.) Corr.	Billa	Rutaceae	Tree	Leaves and fruit	Decoction and raw	Constipation, Chronic diarrhea, Dysentery and Stomach pain	2.84	0.27
8	*Annona squamosa* L.	Sitaphal	Annonaceae	Shrub	Leaves and bark	Decoction	Urinary disorder and Diarrhea	0.68	0.07
9	*Argemone maxicana* L.	Pili Kanteli	Papaveraceae	Herb	Latex and Seeds	Paste	Eczema, pyorrhoea and Rheumatoid pain	0.64	0.16
10	*Arnebia hispidissima* (Sieber ex Lehm.) A.DC.	Rambha	Boraginaceae	Herb	Whole plant and root	Decoction	Cancer, Ulcers and Heart tonic	0.62	0.26
11	*Asparagus racemossus* Willd.	Satawari	Liliaceae	Herb	Tuberous root	Juice, decoction and powder	Dysentery, Acidity, Burning feet, Wounds, Leucorrhea and Body ache, Rheumatic pain	3.84	0.15

12	*Bacopa monnieri* (L.) Wettst	Brahmi	Scrophuleriaceae	Herb	Whole plant	Decoction	Fever and Neurological problem	1.13	0.13
13	*Barleria priontis* L.	Danteli, Kala bans	Acanthaceae	Shrub	Root and leaves	Decoction	Cough and Tooth ache	1.12	0.18
14	*Boerhaavia diffusa* L.	Punernava	Nyctaginaceae	Herb	Leaves and Root	Powder and Crushed	Jaundice, Indigestion, Bleeding after delivery	0.59	0.09
15	*Bonbax ceiba* L.	Hemro	Bombacaceae	Tree	Root and bark	Decoction and food supplement	Impotency, Menstrual regulation	0.58	0.06
16	*Boswellia serrata* Roxb.	Salar	Burseraceae	Tree	Gum	Food suplement	Joint pain, Diabetes and Impotency	2.09	0.25
17	*Butea monosperma* (Lam.) Taub.	Khankhra, Sura	Fabaceae	Tree	Flower and Seed	Food suplement and Juice	Diarrhea, Fever and Rheumatic pain	1.39	0.08

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18	*Calotropis procera* (Aiton) W.T.Aiton	Akra, Madar	Apocynaceae	Shrub	Stem, root and leaves	Raw, paste and infusion	Rhematoid pain, Headache and Scorpion bite	1.09	0.1
19	*Capparis decidua* (Forssk.) Edgew.	Kair	Cpparidaceae	Shrub	Flower, root and stem	Raw and paste	Stomach pain, Scorpion bite and bone fracture	1.02	0.24
20	*Cassia fistula* L.	Amaltas	Fabaceae	Tree	Leaves and fruit	Decoction and juice	Constipation, Fever and Rinworm	0.99	0.23
21	*Cleome viscosa* L.	Bagro Pilihulhul	Cleomaceae	Herb	Leaves and Seed	Powder, paste and crushed	Ulcers, Fungal infection, Kidney pain and Join pain	0.57	0.08
22	*Commelina benghalensis* L.	Bokano	Commelinaceae	Herb	Leaves	Crushed and paste	Rabies and Skin disorder	0.51	0.12
23	*Commiphora wightii* (Arn.) Bhandari	Gugal	Burseraceae	Shrub	Gum	Decoction and infusion	Bronchitis, Rheumatoid pain, Pyorrhea, Paralysis and Nervous disorder	3.26	0.22

24	*Curculigo orchioides* Gaertn.	Kali musali	Hypoxidaceae	Herb	Tuberous root	Juice and Crushed	Asthama, Costipation, Eye white spot	1.91	0.23
25	*Curcuma amada* Roxb.	Aama haldi	Zingiberaceae	Herb	Inflorescence and Rhizome	Paste and cruched	Headache and Stomach pain, Indigestion	1.61	0.25
26	*Dalbergia sissoo* Roxb.	Shisham	Fabaceae	Tree	Bark	Diabetes and blood disorder	Diabetes and Blood disorder	0.48	0.08
27	*Echiops echinatus* Roxb.	Oont kantilo	Asteraceae	Herb	Root	Raw and juice	Whooping cough	0.47	0.07
28	*Elytaria acaulis* (L.f.) Lind	Rukhri, Pathar-phor	Acanthaceae	Herb	Root and leaves	Decoction and food supplement	Ringworm and Child birth	0.42	0.09
29	*Enicostema axillare* (Lam.) Roynal	Nawa	Gentianaceae	Herb	Leaves	Decoction	Fever, Body pain, Diabetes	1.53	0.18

30	*Eucalyptus camaldulensis* Dehnb.	Safeda	Myrtaceae	Tree	Leaves	Crushed and infusion	Cough and Bronchitis	0.39	0.03
31	*Euphorbia hirta* L.	Dudhi	Euphorbiaceae	Herb	Whole plant	Decoction	Cough, Diarrhea, Burn and Joint pain	0.98	0.24
32	*Ficus benghalensis* L.	Badlo	Moraceae	Tree	Latex and bark	Powder	Diabetes and Health tonic	0.38	0.08
33	*Grewia abutilifolia* Vent. ex Juss.	Gangchi	Tiliaceae	Tree	Leaves and stem	Paste and decoction	Diarrhea, Stimulate birth and Fracture	0.92	0.22
34	*Holoptelea integrifolia* (Roxb.) Planch.	Sil, Kanjeri	Ulmaceae	Tree	Leaves and seed	Paste	Carbuncle and Ringworm	0.37	0.04
35	*Hygrophila auriculata* (Schum.) Heine	Kantela	Acanthaceae	Herb	Leaves	Decoction and juice	Cough and Blood purifier	0.35	0.05

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36	*Indigofera linnaei* Ali.	Bakario	Fabaceae	Herb	Seed and Root	Juice and decoction	Pneumonia and Diarrhea	2.89	0.28
37	*Jatropha curcas* L.	Ratanjot	Euphorbiaceae	Shrub	Root and latex	Juice and raw	Bone Fracture and Itching	0.91	0.14
38	*Launaea procumbens* (Roxb.) Rammayya & Rajagopal	Kankargobi	Asteraceae	Herb	Leaves	Raw and crushed	Piles and Skin disorders	0.33	0.08
39	*Lepidagathis trinervis* Wall. ex Nees.	Pathar-phor	Acanthaceae	Herb	Leaves and Root	Decoction and paste	Typhoid, Cut and wounds	0.89	0.21
40	*Leucas aspera* (Willd.) Link	Gotta	Lamiaceae	Herb	Whole plant	Decoction and crushed	Fever, Piles and Headache	0.32	0.15

41	*Madhuca longifolia* var. *latifolia* (Roxb.) A.Chev.	Mahua, Mohri	Sapotaceae	Tree	Flower, Leaves and Seed	Powder, crushed, Distillate and Oil	Bronchitis, Eczema, Constipation, Wounds and Burns	1.76	0.28
42	*Maytenus emarginatus* (Willd.) Ding Hou	Kankero	Celastraceae	Shrub	Leaves and fruit	Paste and raw	Wound, Ulcer, and Piles	0.31	0.07
43	*Momordica dioica* Roxb. ex willd.	Kinkora	Cucurbitaceae	Climber	Fruit	Food supplement	Diabetes and Menstrual disorder	0.83	0.13
44	*Mukia maderaspatana* (L.) M.Roem	Phori-kachri	Cucurbitaceae	Climber	Root and fruit	Paste	Dysentery and Piles	0.29	0.06
45	*Nyctanthes arbortristis* L.	Har-Singar	Oleaceae	Tree	Root and leaves	Powder and Juice	Leucorrhea, Cough and cold	1.63	0.26

46	*Pedalium murex* L.	Bada-gokhru	Pedaliaceae	Herb	Fruit	Powder	Diarrhea, Dysentery and Dropsy	0.28	0.07
47	*Peristrophe paniculata* (Forsk.) Brum.	Bhamwara, Kaker	Acanthaceae	Herb	Leaves and root	Decoction and paste	Fever and Worm infection	0.27	0.13
48	*Phoenix sylvestris* (L.) Roxb.	Khajoor	Arecaceae	Tree	Root and leaves	Decoction and juice	Cough, Tooth ache and wounds	0.82	0.13
49	*Plantago ovata* Forsk.	Isaphagol	Plantaginaceae	Herb	Seed	Raw	Constipation and Gonorrhea	0.26	0.12
50	*Pllumbago zeylanica* L.	Chitrak	Plumbaginaceae	Herb	Leaves and root	Decoction and paste	Rheumatoid pain and Itching	0.25	0.06
51	*Rhus mysurensis* G.Don	Dansara	Anacardiaceae	Shrub	Fruit	Raw	Indigestion, Dysentery and Increase lactation	0.79	0.09

52	*Ricinus communis* L.	Arandi	Euphorbiaceae	Herb	Leaves	Crushed and paste	Inflammation and Headache	0.77	0.18
53	*Salvia aegyptiaca* L.	Boti, Hingot	Lamiaceae	Herb	Leaves	Crushed and infusion	Asthama, Sting and Bite	0.24	0.06
54	*Solanum virginianum* L.	Jangli Baingan	Solanaceae	Herb	Root, flower and fruit	Decoction, crushed and infusion	Hernia, Diarrhea, Asthama and Tooth ache	0.23	0.11
55	*Sonchus asper* (L.) Hill	Kalijibi	Asteraceae	Herb	Leaves	Decoction and paste	Cuts, Wounds and Ulcers	0.22	0.11
56	*Sterculia urens* Roxb.	Kadaya	Sterculiaceae	Tree	Gum and root	Food suplement and decoction	Asthama, Bronchitis, After delivery Tonic	1.43	0.22
57	*Striga gesneriodes* (Willd.) Vatke	Gwaria mehndi	Scrophulariaceae	Herb	Whole plant	Crushed	Wounds and Mosquito reppeltent	0.76	0.12

58	*Tecomella undulata*	Rohida	Bignoniaceae	Tree	Leaves and bark	Decoction and powder	Stress, Abortion and Blood purification	0.21	0.09
59	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Arjun	Combretaceae	Tree	Bark and fruit	Decoction and juice	Asthama, Hypertension, Cardiac tonic	2.45	0.13
60	*Terminalia bellirica* (Gaertn.) Roxb.	Bahera	Combretaceae	Tree	Fruit and seed	Powder	Sexual debility and Health tonic	1.32	0.16
61	*Tinospora cordifolia* (Willd.) Miers	Giloy, Neem giloy	Menispermiaceae	Climber	Stem	Decoction and juice	Fever, Jauncice, Skin disorder and Leucorrhea	3.26	0.26
62	*Tribulus terrestris* L.	Gokharu, Kanti	Zygophyllaceae	Herb	Whole plant	Powder and Juice	Cough, Asthma, Kidney stone and Wounds	1.29	0.08

63	*Tridex procumbens* L.	Tokario	Asteraceae	Herb	Leaves	Juice and decoction	Urinary problem, First aid for injury, Loss of consciousness	2.62	0.18
64	*Typha angustala* Bory & Chaub.	Era	Typhaceae	Herb	Inflorescence and leaves	Decoction and crushed	Wounds and Indigestion	0.19	0.09
65	*Urginea indica* (Roxb.) Kunth.	Mar Kando	Liliaceae	Herb	Leaves and bulb	Paste and powder	Rheumatoid swelling, Cardiac tonic and Cracked skin healing	0.74	0.17
66	*Vitex nergundo* L.	Nirgundi	Verbenaceae	Shrub	Leaves and fruit	Decoction and juice	Body pain, Headache, Urinary problems, Lever disorder, Stomach pain and Rheumatiod pain	4.31	0.25
67	*Withania somnifera* (L.) Dunal	Aswagandha	Solanaceae	Shrub	Leaves and root	Powder	Stress, Cold and Hyper tension	1.88	0.22

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68	*Wrightia tinctoria* (Roxb.) R.Br.	Dudhi, Karu	Apocynaceae	Tree	Leaves	Paste	Eczema and Pyorhoea	0.17	0.08
69	*Xanthium strumarium* L.	Adhasisi	Asteraceae	Herb	Fruit and seed	Decoction and infusion	Headache and Urinary problems	1.31	0.15
70	*Zingiber officinale* Rosc.	Adarak, Sonth	Zinziberaceae	Herb	Rhizome	Powder and paste	Abdominal pain, Indigestion, Wounds and boils	1.72	0.28
71	*Ziziphus nummularia* (Burm.f.) Wight & Arn.	Jhari, Bordi	Rhamnaceae	Shrub	Fruit and leaves	Decoction and paste	Heat strock, Cuts and Injury	0.69	0.08

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Table 3: ICF and FL value for Ailment categories

S.N.	Ailment Category	Number of plants used	Use reports	ICF	FL (%)	Most cited taxa
1	Infectious diseases	12	112	0.90	55	*Abutilon indicum* (L.) Sweet.
2	Neoplasm	2	7	0.83	46	*Arnebia hispidissima* (Sieber ex Lehm.) A.DC.
3	Blood diseases	9	46	0.82	70	*Asperagus racemossus* Willd.
4	Metabolic diseases	6	31	0.83	40	*Boswellia serrata* Roxb.
5	Nervous system disorder	12	87	0.87	57	*Commiphora wightii* (Arn.) Bhandari
6	Visual and ear diseases	5	21	0.80	72	*Curculigo orchioides* Gaertn.
7	Cardiovascular diseases	11	49	0.79	63	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.
8	Respiratory diseases	22	119	0.82	91	*Indigofera linnaei* Ali.
9	Digestive diseases	67	443	0.85	87	*Aegle marmelos* (L.) Corr.
10	Skin diseases	13	109	0.89	63	*Tinospora cordifolia* (Willd.) Miers
11	Genitourinary diseases	21	101	0.80	38	*Tribulus terrestris* L.
12	Connective diseases	16	166	0.91	77	*Vitex nergundo* L.
13	General Symtoms	49	314	0.85	76	*Adhatoda zeylanica* Medic.
14	Injury	28	78	0.65	82	*Tridex procumbens* L.

IV. Discussion

The high proportion of male informants in this study may be attributed to traditional healers' tendency to share their knowledge of native medicinal plants primarily with other men. This trend is consistent with findings from similar studies conducted in various states (Katewa, 2009, Meena and Yadav, 2010, 2011). The most frequently utilized plant families were Acanthaceae and Fabaceae, likely due to the superior adaptability of these species across a wide range of elevations, a pattern observed in previous research (Meena et al., 2013; Malav et al., 2023).

Herbs emerged as the predominant plant species, possibly due to their accessibility and abundance in the local environment. This aligns with findings from ethnobotanical studies in Rajasthan (Upadhyay et al., 2010; Kumar & Khan, 2023) and other regions (Vijayakumar et al., 2015; Raj et al., 2018), which similarly highlighted the prevalence of herbs in traditional medicine. The most commonly used

parts of medicinal plants were leaves, consistent with studies from both the state and across the country (Sukumaran et al., 2021). Leaves are readily available and can be easily sourced during emergencies, especially in tropical countries like India. Their ease of growth and regeneration also makes them a more sustainable option compared to other plant parts.

Indigenous knowledge regarding the dosing of remedies has developed over time through practical experience with traditional medicinal plants. Dosage delivery methods varied based on the severity of the ailment, the patient's health, age, and the healer's experience. Measurements for remedies were often made using household items like tablespoons or tea cups.

Interestingly, the mean number of medicinal plants cited by male and female informants did not show significant differences, indicating that both genders possess comparable levels of knowledge and that family members share the responsibility for primary health care. Previous studies have also found no significant differences in medicinal plant knowledge between male and female informants (Meena, 2014, Karakose, 2022). Key informants, however, exhibited greater expertise compared to general informants, likely due to their extensive experience and careful application of therapeutic plants (Giday et al., 2009).

Among the documented medicinal plants, Vitex negundo L. demonstrated the highest use value (UV) and relative frequency of citation (RFC), highlighting its significance for treating various ailments. The study revealed the highest informant consensus factor (ICF) for the treatment of connective diseases (such as rheumatoid arthritis and muscle swelling) at 0.91, suggesting a strong agreement among informants regarding its medicinal use. This high level of consensus may reflect the prevalence of these conditions in the community.

According to Heinrich et al. (2009) a high ICF value indicates a greater likelihood of species possessing valuable bioactive compounds. Therefore, species with high consensus should be prioritized for conservation, especially in regions where medicinal plants are increasingly threatened. Additionally, Indigofera linnaei Ali. and Aegle marmelos (L.) Corr. exhibited the highest frequency of citation (FL) for treating pneumonia and indigestion, respectively, suggesting these plants possess notable healing potential.

V. Conclusion

Traditional medicine practices among rural populations are deeply influenced by their lived experiences and the cultural knowledge passed down through generations via oral tradition. However, these indigenous medicinal practices are increasingly at risk as modern medicine penetrates remote areas. Folkloric traditions are gradually fading, largely due to the younger generation's diminishing interest and the availability of over-the-counter medications. It is crucial to document the experiences of older community members, whose empirical knowledge of medicinal plant usage in ethnomedicine is invaluable and cherished. This wealth of

traditional knowledge not only contributes to the understanding of local healing practices but also enriches the range of treatments available for various ailments.
The region is home to a significant diversity of medicinal plants. Medicinal plants have numerous applications and hold great potential for the development of new pharmaceuticals. The insights gained from this ethnobotanical study will serve as a foundation for further pharmacological research, particularly focusing on the most frequently cited, valued, and significant therapeutic plants. Additionally, the importance of preserving these medicinal plants will be highlighted, emphasizing their role as secure and effective alternatives that can be integrated into primary healthcare services.

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- **Ethical Statement:** There are no explicit rules or regulations related to conduct the ethnomedicinal research in India. Before providing oral informed consent, the purpose of the study was explained to the participants. Each participant agreed to voluntarily take part in the study. Participants were allowed to quit the interview at any time.
- **Conflict of Interest:** The authors declare that the research was conducted without any commercial or financial support that could be seen as a potential conflict of interest.

References

1. Alexiades MN (1996). Collecting ethnobotanical data: An introduction to basic concepts and techniques. In: MN Alexiades (Ed.): Selected Guidelines for Ethnobotanical Research: A Field Manual. New York: The New York Botanical Garden, pp. 53-94.
2. Bhandari MM (1978). Flora of the Indian desert. Scientific Publisher's, Jodhpur.
3. Broom A, Doron A, Tove P (2009). The inequalities of medical pluralism: hierarchies of health, the politics of tradition and the economies of care in Indian oncology. Social Science and Medicine 69: 698-706.
4. Giday M, Asfaw Z, Woldu Z, Teklehaymanot T (2009). Medicinal plant knowledge of the bench ethnic group of Ethiopia: an ethnobotanical investigation. J. Ethnobiol. Ethnomed. 5(1): 34.
5. Guru A, Dwivedi P, Kaur P, Pandey DK (2022). Exploring the role of elicitors in enhancing medicinal values of plants under in vitro condition. South African Journal of Botany 149: 1029-1043.
6. Heinrich M, Ankli A, Frei B, Weimann C, Sticher O (1998). Medicinal plants in Mexico: healers's consensus and cultural importance. Social Sci. Med. 47: 1859-1871
7. Heinrich M, Edwards S, Moerman DE, Leonti M, 2009. Ethnopharmacological field studies: a critical assessment of their conceptual basis and methods. Journal of Ethnopharmacology 124: 1-17.
8. Karakose M (2022). An ethnobotanical study of medicinal plants in Guce district, north-eastern Turkey. Plant Divers. 44: 577-97.

9. Katewa SS (2009). Indigenous people and forests: Perspectives of an ethnobotanical study from Rajasthan (India). Herbal drugs: Ethnomedicine to modern medicine, 33-56.
10. Kumar N, Khan JB (2023). Ethnobotanical Survey of Traditional Medicinal Plants in Shekhawati Region, Rajasthan, India. Int. Jour. of Multi. Res. 5 (6): 1-17.
11. Malav A, Dadich P, Jaiswal P (2023). Ethnomedicinal plant diversity and their usage among rural communities innanta forest region, Kota district, Rajasthan. Int. Jour. of Pharma. Sci. and Rese. 14(7): 3566-3574.
12. Meena KL (2014). Some traditional ethno-veterinary plants of district Pratapgarh, Rajasthan, India. American Journal of Ethnomedicine 1(6): 393-401.
13. Meena KL, Ahir PC, Dhaka V (2013). Ethnomedicinal survey of medicinal plants for sexual debility and birth control by tribals of Southern Rajasthan, India. The Journal of Ethnobiology and Traditional Medicine 238-244.
14. Meena KL, Yadav BL (2006). Some important medicinal plants of Bhilwara district Rajasthan, India. In Proc Natl Conf Biodiversity Conserv,(MLV Government College, Bhilwara, Rajasthan). Indian J. Trad. Knowl. 84.
15. Meena KL, Yadav BL (2010). Some traditional ethnomedicinal plants of southern Rajasthan. Indian J. Trad. Knowl. 9 (3): 471-474.
16. Meena KL, & Yadav BL (2011). Some ethnomedicinal plants used by the Garasia tribe of district Sirohi, Rajasthan. Indian J. Trad. Knowl. 10 (2): 354-357
17. Phillips O, Gentry AH (1993). The useful plants of Tambopata, Peru: I. Statistical hypotheses tests with a new quantitative technique. Economic Botany 47:15-32.
18. Raj AJ, Biswakarma S, Pala NA, Shukla G, Vineeta Kumar M, Bussmann RW et al. (2018). Indigenous uses of ethnomedicinal plants among forest-dependent communities of Northern Bengal, India. Journal of ethnobiology and ethnomedicine 14: 1-28.
19. Shetty BV, Singh V (Edits.) (1987). Flora of Rajasthan. Vol. I. BSI, Howrah, Kolkata.
20. Shetty BV, Singh V (Edits.) (1991). Flora of Rajasthan. Vol. II. BSI, Howrah, Kolkata.
21. Shetty BV, Singh V (Edits.) (1993). Flora of Rajasthan. Vol. III. BSI, Howrah, Kolkata.
22. Sukumaran S, Sujin RM., Geetha VS, Jeeva S et al. (2021). Ethnobotanical study of medicinal plants used by the Kani tribes of Pechiparai Hills, Western Ghats, India. Acta Ecologica Sinica 41(5): 365-376.
23. Tardio J, Pardo de Santayana M. (2008). Cultural importance indices: a comparative analysis based on the useful wild plants of Southern Cantabria Northern Spain). Econ Bot. 62: 24-39.
24. Trivedi PC, Nehra S (2004). Traditional herbal medicines for health care and management of human diseases. In: Trivedi PC (ed) Herbal Drugs and Biotechnology. Pointer Publishers, Jaipur, India.
25. Trotter, R., Logan, M., 1986. Informant consensus: a new approach for identifying potentially effective medicinal plants. In: Etkin, N.L. (Ed.), Plants in Indigenous Medicine and Diet: Biobehavioural Approaches. Redgrave Publishers, Bedfort Hills, New York, pp. 91–112.

26. Upadhyay, B., Singh, K. P., & Kumar, A. (2011). Ethno-veterinary uses and informants consensus factor of medicinal plants of Sariska region, Rajasthan, India. Journal of Ethnopharmacology 133(1):14-25.
27. Vijayakumar, S., Yabesh, J. M., Prabhu, S., Manikandan, R., & Muralidharan, B. (2015). Quantitative ethnomedicinal study of plants used in the Nelliyampathy hills of Kerala, India. Journal of ethnopharmacology 161: 238-254.