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ETHNOMEDICINAL PLANT DIVERSITY AND THEIR USAGE AMONG RURAL COMMUNITIES INNANTA FOREST REGION, KOTA DISTRICT, RAJASTHAN

Anita Malav, Pragya Dadhich and Poonam Jaiswal *

Department of Botany, Janki Devi Bajaj Government Girls College, University of Kota, Kota - 324001, Rajasthan, India.

Keywords:

Nanta, Ethnomedicinal diversity, Ethnic community, Anthropogenic activities

Correspondence to Author:
Poonam Jaiswal

Associate Professor,
Department of Botany,
Janki Devi Bajaj Government Girls College, Kota - 324001, Rajasthan, India.
E-mail: poonamjaiskota@gmail.com

ABSTRACT: Kota district is situated in the south-eastern region of Rajasthan and is well known for its floral biodiversity. The present study has been done in the Nanta forest area located in the Sakatpura forest range in forest division Kota. This area is still unexplored in terms of ethnomedicinal plant diversity, which provides a new area for research in human wellbeing and biodiversity conservation. The Present study reveals ethnomedicinal diversity, their identification, and medicinal uses based on the knowledge gathered from rural folk, natives, and local traditional medicine practitioners (vaids). The data collected was validated with secondary sources. Due to high anthropogenic activities, there is a risk of losing the present diversity of ethnomedicinal plants in the study area. It is requisite to preserve the diversity of this region. Based on participatory observation and talk with local inhabitants, 60 species belonging to 26 families were identified, which were used as ethnomedicinal resources by local inhabitants. Stomach-related diseases, skin diseases, rheumatism, and asthma are the most diseases for which therapeutic values of the plants were reported in the study area.

INTRODUCTION: India is a biodiverse country where more than 43% of the total flowering plants are reportedly of medicinal importance[1]. Plants have been a source of medicine to humans for ages and traditional plant-derived medicines have still being used worldwide. The use of plants for medicinal purposes has been documented long back in ancient Indian literature by Tulsidas, Samvat, Charak, Drdhbala, *etc*. which provided many important drugs of the modern day[2]. The traditional medicinal knowledge of ethnic communities is still unrecorded and their practices are transmitted orally over hundreds of years [3].

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But the lack of documentation of traditional knowledge of tribal people and ethnic groups about medicinal plants has culminated in losing this treasure of ethnomedicinal knowledge. Ethno-botanical aspect holds much more hidden treasure, as almost 80% of the human population in developing countries is dependent on plant resources for healthcare [4] or plant-based traditional medicines for their primary healthcare needs [5].

Most of the Ethno-medicinal plant resources are used for ages to treat Fever, Jaundice, Chronic diarrhoea, Dysentery, Bone fracture, Asthma and Eye disorder. Although modern medicinal facilities have increased in recent years, ethnomedicinal uses are still preferred for curing selected diseases with lesser side effects [6]. In a country like India, it is estimated that 70%of inhabitants still rely on herbs, whereas 2500 species of plants from about 1000 genera are used by traditional healers[7]. In the present era, Ethnobotany has become an important

field of research and development not only in resource management and conservation of biodiversity but also socioeconomic development of the region. Ethno-medicinal findings are beneficial for the advancement of modern medicine [8]. Now a day's, exploration and analysis of ethnomedicinal plants from many parts of India are drawing good recognition as ethnobotany includes the core area of research in plant science [9]. Standardization of the exploitation and knowledge about the mode of utilization is important for conserving ethnomedicinal wealth. The enumeration of ethnomedicinal plants, the evaluation of their resource potential, and knowledge about their usage by the people are prerequisites to standardizing their systematic exploitation.

Human activities such as globalization and urbanization cause a serious threat to traditional medicine potency. In the recent past, there has been a rise in the demand for herbal medicines and plant-based drugs worldwide, resulting in heavy exploitation of medicinal plants from the wild. The excessive utilization of plant resources, destructive mode of collection and high anthropogenic pressure such as grazing by livestock are the major threats that have destroyed natural populations of plant resources. Habitat degradation and excessive extraction of medicinal plants to meet the demands are the main factors responsible for making them vulnerable to local extinction in the wild. Due to overgrazing, wood cutting, and clearing of forests for farming; the medicinal plant diversity is under threat in the present study area and many species are getting extinct. It is, therefore an urgent need for the protection and conservation of medicinal plant diversity at the study site and the traditional knowledge of local inhabitants. Many researchers [10, 11, 12] have explored the ethno-medicinal wealth of different parts of Rajasthan. However, information on the ethnomedicinal uses of plants has not been documented from the Kota district. Keeping this in view, the present study was carried out in the Nanta forest area. The study aims to identify the ethnomedicinal diversity of flora in the Nanta forest region and review available ethnobotanical knowledge about medicinal plants.

Study Area: Nanta forest area is situated in the Kota district; Rajasthan is under the Sakatpura forest range. Its coordinates are 25.197496° N latitude and 75.7931599° E longitude. The famous Abheda Mahal and Karni Mata Temple are situated here. Tribal people like Bhil, Meena, and Gurjar are residing here for centuries. Rebari (cattle rearing tribe) and Gadia-lunar (nomadic tribes with ironsmith occupation) are the tribes that do not make a permanent settlement in the area but reside there for a few months during cattle migration and rainy season. These tribes have been using plants as medicine for years not only for humans but also for cattle.

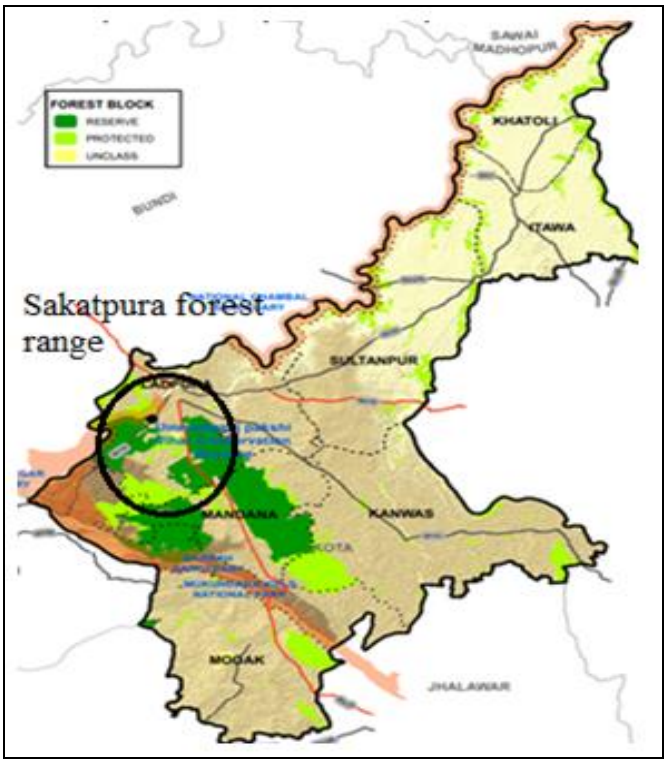

FIG. 1: MAP OF KOTA SHOWING THE STUDY AREA

Objectives: The current study's prime objective is to document ethnobotanical diversity in the area and to gather information regarding multifaceted usage by the indigenous people.

Knowledge of the wild plant diversity of any area is crucial as it aids in their conservation, and it becomes even handier when the area is vulnerable to aforesaid threats. The sustainable management and utilization of plants are some issues seeking an instantaneous focus for conserving the local biodiversity. The national and global biodiversity enumeration can be strengthened by the grass-root approach of preparing a local inventory. As various local remedies are neither well documented nor known to the younger generation; the documented

information on ethnobotanical uses of local flora can assist in preserving traditional knowledge of the area.

MATERIAL AND METHOD: To understand and documentation of the ethnomedicinal status of the study area, a detailed analysis of the utilization of indigenous medicinal plants; field surveys were conducted from March 2020 to March 2022. Additional stays in the area, forest surveys with local resource persons, and market surveys were also arranged. Identification and listing of the ethnomedicinal flora of the study area have been done. Plant specimens collected during the survey were identified with the help of flora of the "Botanical Survey of India" and "Flora of Rajasthan"[10].

The information on the ethnomedicinal uses of the indigenous plants has been collected by interviewing local people, experienced rural elders, traditional herbal medicine practitioners, local herbal drug sellers, and forest officials; then the collected information is verified by consulting literature. A total of 250 local inhabitants (148 men and 102 women) from different age groups (25 years and above) were interviewed in the local language 'Hadoti'. Information concerning local names of the plant, plant parts with medicinal properties, recipes, and mode of administration was collected. The information collected about the medicinal utility of the plants was compared with the earlier published literature on ethnobotanical surveys [13, 10, 14]. The collected data was then tabulated **(Table 1)** with details like the family of the plant, its local name, family, habit, plant part used, use, and validation of the data was also done with secondary sources.

RESULTS AND DISCUSSION: The present investigation found that out of 150 species recorded from the area, 60 species are being used as medicine by local inhabitants and tribes. Native people of this area have been using plants as medicines for centuries. Detailed information including botanical name, family name, habit, plant part used, mode of application and their medicinal uses are represented in **Table 1**.

Out of 27 families, Fabaceae (11 species) is the largest family that contributes to the medicinally valuable plants followed by Asteraceae (9 species), Euphorbiaceae (4species), Poaceae (4 species), Malvaceae (4 species), Amaranthaceae (3species), Apocynaceae (3 species), Convolvulaceae, Acanthaceae, Solanaceae each have 2 plant species of medicinal importance **(Fig. 2).** Out of 60 plants recorded here are 36 herbs, 11 shrubs, 10 trees, and 03 climbers. **(Fig. 3)** represents the plant part used in the preparation of medicine.

It shows that most of the leaves (35%), whole plants (20%), stems (13.33%) and seeds (10%) are being used in the preparation of medicine. The other parts of plants like roots, flowers, bulbs and gum are also being used as medicine in some percentages.

The mode of medical administration involved Oral administration, applying the paste, Chewing, rubbing/massaging and Inhalation. Rare species like *Oxystelma esculentum* (L.f.) R.Br. and *Grewia tenax* (Forssk.) are also recorded from here. The study reveals that most ethnomedicine is used for the treatment of asthma, cough, fever, dysentery, abdominal pain, skin disease and as an immunity booster.

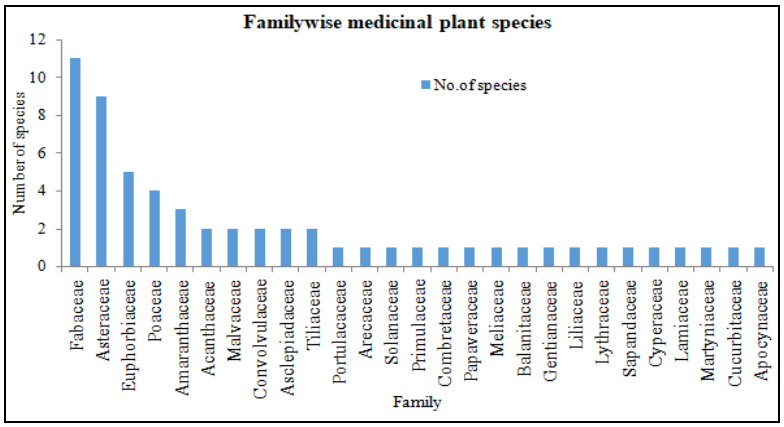

FIG. 2: REPRESENTATION OF FAMILY-WISE MEDICINAL PLANT SPECIES IN THE STUDY AREA.

TABLE 1: ETHNO-MEDICINAL DIVERSITY IN THE NANTA FOREST AREA, DISTRICT KOTA, RAJASTHAN

S. no.	Name of species	Local Name	Family	Habit	Plant part used/ administration	Medicinal uses	Validation
1	*Abelmoschus moschatus* Medicus	Jangli-bhindi	Malvaceae	Shrub	Root and root bark (crushed root)	syphilis; crushed root applied externally on wounds	15
2	*Abutilon indicum* (L.)	Kanghi	Malvaceae	Shrub	Paste of Leaves and seeds (Applying paste)	Syphilis, anti-dysenteric, and urinary complaints	14,16
3	*Acacia catechu* (Lf.) Willd.	Khair	Fabaceae	Tree	Heartwood Kattha (Orally)	Childbirth, Asthma, pneumonia,check bleeding	14, 17
4	*Acacia senegal* (L.) Willd.	Kumtio	Fabaceae	Tree	Gum (Gum Powder paste)	Sores and burn	10
5	*Acacia nilotica*(L.)Willd.	Babul	Fabaceae	Tree	Gum (Orally)	Diarrhoea, dysentery	10, 18
6	*Acacia leucophloea* (Roxb.) Willd.	Roonjhro	Fabaceae	Tree	Powder of Stem bark	Diarrhoea	14
7	*Achyranthes aspera* L.	Andhijhara, Appamarg	Amaranthaceae	Herb	Decoction of plant	Stomach pain, Kidney stone	13
8	*Ageratum conyzoids* L.	Bhakumbar	Asteraceae	Herb	Paste of Leaves (Applying paste)	Used on cuts to check bleeding	10
9	*Albizia lebbeck* (L.) Benth.	Siras	Fabaceae	Tree	Paste of Stem Bark	To cure Ulcer, skin diseases	10,19
10	*Ammannia baccifera* L.	Agni buti,	Lythraceae	Herb	Paste of Leaves (Applying paste)	Skin diseases, Abdominal pain, anti-inflammatory, and anti-arthritic	20
11	*Anagallis arvensis* L.	Neel	Primulaceae	Herb	Applying Paste of Leaves	Skin diseases	21
12	*Anogeissus latifolia* (Roxb.ex DC.)	Dhao,Dhokda	Combretaceae	Tree	Stem barkGum (Chewing of bark)	Chew the Bark against Cough To repair damaged tissue	14, 22
13	*Argemone mexicana* L.	Satyanashi	Papaveraceae	Herb	Dry and crushed Flowers (Orally	Whooping cough	10, 23
14	*Azadiracta indica* A. Juss.	Neem	Meliaceae	Tree	Young leaves, Mature fruits (Chewing of leaves)	Purify blood, Oil is used as a contraceptive	14
15	*Balanites aegytiaca* (L.) Delile	Hingotia	Balanitaceae	Shrub	Powder of mature fruits (Orally)	Skin Diseases, As contraceptive	10, 24
16	*Blastania garcinii* (Burm f.)	Bhaglingi	Cucurbitaceae	Climber	Paste of leaves (Applying paste)	Boils and swellings	10
17	*Blumea lacera* (Burm.f.)	Kakronda	Asteraceae	Herb	Decoction of Leaves (Orally)	Bronchitis, Febrifuge	25
18	*Brachiara ramose* (L.)	Makraghas	Poaceae	Herb	Ash of the plant (Applying paste)	Ointment on burns	10
19	*Butea monosperma* (Lam.) Taub.	Dhak	Fabaceae	Tree	Gum, Bark extract(Orally)	Weakness, dysentery, Leucorrhoea	14
20	*Calotropis procera* (Ait.) Ait. f.ssp.	Aak	Apocynaceae	Shrub	Powder of flowers (Orally) Paste of Roots	Cough, Asthma Pimples, boils, Scorpion sting	10
21	*Cardiospermum halicacabum* L.	Kanphota	Sapandaceae	Climber	Paste of plant (Applying paste)	Rheumatism and stiffness of limbs	2
22	*Cassia tora* L.	Pawadia	Fabaceae	Herb	Paste of Leaves (Applying paste)	Joint pain skin diseases; eczema and ringworm	25

23	*Celosia argentea* L.	Shitivar, Surli	Amaranthaceae	Herb	Seeds, Leaves and tender shoot (Orally)	Hepatoprotective For good health	26
24	*Chorchorus capsularis* L.	Chinchuparni	Malvaceae	Herb	Leaves (Orally)	Boost immunity system, Piles, Tumors	27
25	*Cynodon dec tylon* (L.) Pers.	Dub, Dubri	Poaceae	Herb	Leaves (Orally)	Diuretic, Dropsy, Blood pressure, Wound healing	13
26	*Cyperus rotundus* L.	Nagarmotha	Cyperaceae	Herb	Powder of Leaves, and Tubers (Orally)	Diarrhoea, malaria, stomach and bowel disorder	28
27	*Dactyloctenium aegyptium* (L.) Willd.	Makra	Poaceae	Herb	Soak grains (Orally)	Belly aches after childbirth, Kidney pain	13
28	*Datura innoxia* Mill.	Dhatura	Solanaceae	Shrub	Juice of Flower, Petals, Seeds (Orally)	Ear pain, Cough, fever, Asthma	10
29	*Dichrosta chyscinerea* W. & A.	Goya Khair	Fabaceae	Tree	Root (Orally)	Rheumatism, Diuretic	25
30	*Digera muricata* (L.) Mart.	Kunijira	Amaranthaceae	Herb	Powder of flower and seeds(Orally)	Spermatorrhoe, laxative	29
31	*Dichant hiumhuegellii* (Hack.)	Rohis	Poaceae	Herb	Oil extracted from the grass(massaged)	Rheumatism	10
32	*Echinops echinatus* Roxb.	Oont-Katalo	Asteraceae	Herb	Infusion of Plant (Orally)	Cough, Hysteria, dyspepsia,In painful delivery	30
33	*Eclipta alba* (L.) Hassk.	Bhrinraj	Asteraceae	Herb	Leaf Juice Root Paste (Orally)	Dysentery, Jaundice Antiseptic on Ulcers and wounds	31
34	*Enicostema axillare*(Lam.)	Nawan	Gentianaceae	Herb	Juice of Leaves (Orally)	rheumatism, abdominal ulcers, Malaria	32
35	*Euphorbia hirta* L.	Dhudhi	Euphobiaceae	Herb	Decoction of plant (Orally)	Fever, Asthma	33
36	*Evolvulus alsinoides* (L.)	Shankhpushpi	Convolvulaceae	Herb	Smoke of leaves (Inhalation)	Chronic Bronchitis, Asthma	25, 34
37	*Grewia tenax* (Forsk.)	Gangran, Gangir	Malvaceae	Shrub	Decoction of Stem Bark, Root powder (Orally)	jaundice, pulmonary infections, and asthma	35
38	*Indigofera oblongifolia* Forsk.	Khuaro	Fabaceae	Shrub	Stem(Chewing)	Medicated toothbrush	36
39	*Ipomea pes-tigridis* L.	Ghiabat, Vyagrapadi	Convolvulaceae	Twinning Herb	Paste of plant	Sores and carbuncle	37
40	*Jatropha curcus* L.	Ratanjot	Euphorbiaceae	Shrub	Roots, Latex (Orally)	Anti-inflammation, Wound Healing	38
41	*Jatropha gossypifolia* L.	Myla	Euphorbiaceae	Shrub	Seed and Seed Oil Decoction of root(Orally)	Purgative In uterus disease	14
42	*Kirganelia reticulate* (Poir.) Baill.	Kambhoe	Euphorbiaceae	Tall shrub	Leaves (Chewing)	Bleeding gums	39
43	*Lablab purpureus* (L.) Sweet	Sem	Fabaceae	Twinning Herb	Decoction of leaves (Orally)	Bleeding of piles	40
44	*Launaea procumbens* (Roxb.)	Rookhdi	Asteraceae	Herb	Applying the paste of leaves	Rheumatism, boils, and swelling	41
45	*Leucas aspera* (Willd) Link	Goma	Lamiaceae	Herb	Applying the paste of leaves	Skin diseases	42

46	*Martynia annua* L.	Bichhu-butti	Martyniaceae	Herb	Seed oil (Rubbing)	Eczema, against allergy, epilepsy,	43
47	*Oxystelma esculenta* (L.f.) R.Br.	Arkpushpi	Apocynaceae	Climber	Decoction of the Whole plant (Orally)	Rheumatism, inflammation of joints	44
48	*Pergularia daemia* (Forsk.)	Akasan-ki -bel	Apocynceae	Twiningun dershrub	Plant juice (Orally)	Heart burn, Urinary obstruction	45
49	*Peristrophe bicalyculata* (Retz.) Nees	Kakjangha	Acanthaceae	Herb	Decoction of plant (Orally)	Fever	46
50	*Phoenix sylvestris* (L.) Roxb.	Khajoor	Arecaceae	Tree	Roots (Orally)	Against loss of consciousness, vertigo	47
51	*Phyllanthus urinaria* L.	Hazarmani	Phyllanthaceae	Herb	Powder of dry plant (Orally)	Jaundice	48
52	*Physalis minima* L.	Patari	Solanaceae	Herb	Leaf juice (Drop in the ear)	Earache	49
53	*Portulaca oleracea* L.	Lunkha	Portulacaceae	Herb	Whole plant (Orally)	intestinal infections	50
54	*Rhynochosia minima* (L.) DC.	Kulata	Fabaceae	Twining Herb	Decoction of leaves (Orally)	Diarrhoea, respiratory infections	51
55	*Rungia repens* (L.) Nees	Kharmar	Acanthaceae	Herb	Decoction of plant (Orally)	Cough, cold, fever	52
56	*Sphaeranthus indicus* L.	Mundi	Asteraceae	Herb	Dried powder of plant in flowering stage (Orally)	treating jaundice	53
57	*Tridax procumbens* L.	Dandutpala	Asteraceae	Herb	Juice of plant(Orally)	On cuts to check bleeding	54
58	*Urginea indica* (Roxb.) Kunth	Janglikanda	Liliaceae	Herb	Bulbs(Orally)	Bronchial infection, Bulb paste is bandaged on the swelling in rheumatism	55
59	*Vernonia cinerea* (L.) Less.	Sahdevi	Asteraceae	Herb	Juice of flower (Orally)	Eye infection, Conjunctivitis	56
60	*Xanthium strumarium* L.	Adhasisis	Asteraceae	Herb	Juice of plant (Massaged)	Chronic malaria, urinogenital diseases	57

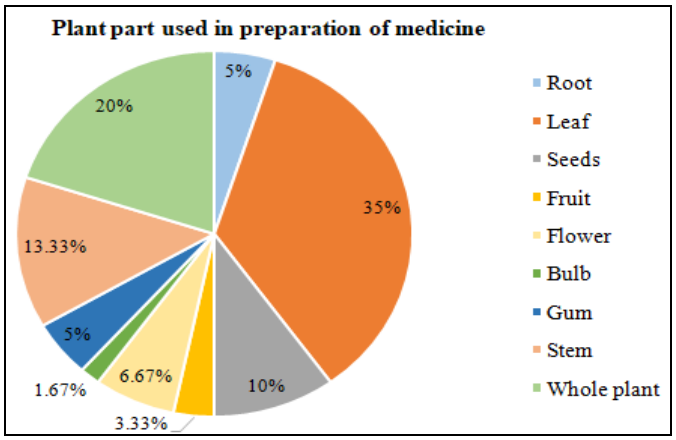

FIG. 3: REPRESENTATION OF PLANT PARTS USED IN THE PREPARATION OF MEDICINE

DISCUSSION: India is included in the twelve largest biodiversity centers in the world and is one of the most fortunate countries in the world, treasured with important medicinal herbs [58]. Scientific assessment of medicinal plants might lead to the discovery of some valuable drugs for controlling various ailments [59]. Tribal like Bhil-Meena, Damor, Saharia, Kathodi, Kokna and some nomadic tribes like Gadia-luhar, Banjara, Bagri, and Bahuria have been notified in Rajasthan and they have their traditions and cultural practices. Their Ethnobotanical knowledge gained through their practices will disappear, which will be an accountable loss to the nation [10]. The Cognizance of India's folk traditional knowledge system is the need for the hours. It is therefore an urgent demand to assess all ethnobotanical information among the various tribal communities before the traditional culture is completely disappeared [14]. In our study it was found that the family Fabaceae recorded the maximum number of plants, this family is not only medicinally important but also has a key role in the

regeneration of degraded vegetation. Family Fabaceae is taxonomically most diverse family and dominant in the study area [60]. Due to symbiosis with nodulating bacteria, leguminous trees can accelerate soil reclamation. Fabaceae is one of the families with a superior capacity to withstand the harsh conditions presented in degraded land and can grow in low-nutrient soil. Traditional knowledge of medicinal herbs with the addition of scientific vision can develop a new approach to sustainable development that is eco-friendly, economically feasible and socially admissible. Necessary steps should be taken to save this region's plant biodiversity to restore ecosystem biodiversity and other environmental functions. After Convention on Biological Diversity 1993 and the Indian Biodiversity Act 2002, the perception has changed, as access and benefit sharing from biological resources and associated traditional knowledge was considered an important agenda.

Therefore, there is an urgent need to document the multifaceted utilization of natural resources in general and ethnobotanical knowledge as well as the usage of several plants in particular. Hence, to preserve traditional knowledge, the management authorities need to prepare a community biodiversity register which should include documentation of local herbs, their usage, and indigenous knowledge lying behind these biological resources. The management authorities also need to encourage and ensure the active participation of local communities in the sustainable harvesting and conservation of natural resources.

CONCLUSION: The present study revealed that the Nanta region of Kota is very rich in ethnomedicinal plant diversity, so it is necessary to conserve them to preserve the traditional knowledge and ethnobotanical wealth of the study area. Due to various anthropogenic activities, this ethnomedicinal diversity is becoming rare and if proper conservation steps are not taken, no sooner do these species go extinct. Conservation of this area is needed to preserve and sustain the medicinal virtue of plants. Cultivation and preservation of these medicinal plants not only protect the biodiversity of this region but also maintain the integrity of the local ecosystem. The study can be useful for medical practitioners, pharmaceuticals, *etc*. It has become requisite to save the biodiversity of this region, and public awareness should be raised for the conservation and sustainable use of plant resources.

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CONFLICTS OF INTEREST: Nil

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