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RESEARCH ARTICLE

A Survey of Traditional Medicinal Plants in District Hapur, Uttar Pradesh: Treatment of Gynecological Disorder

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Abstract

Gynecological disorders are recognized as a major worldwide issue impacting the health of women. During the survey of district Hapur, a total of 52 ethnomedicinal plant species were recorded, along with local names, families, habits, and plant parts used. These 52 medicinal plant species that provide crude drugs pertain to 47 genera and 33 families. These plants were found to cure 12 kinds of gynecological disorders. During documentation of plants used to cure gynecological disorders, the most frequently prominent families were Fabaceae (9), Lamiaceae, Moraceae (4), Apiaceae, Apocynaceae, Amaryllidaceae, Brassicaceae, and Zingiberaceae (2). During the survey, it was reported that twenty-five families had one species each. Among the genera, *Ficus* (4 spp.), *Ocimum* (2 spp.), and *Allium* (2 spp.) were the dominant genera. Based on their ethnomedicinal uses, the most significant species were *Curcuma longa*, *Allium cepa, Asparagus racemosus*, and *Vitis vinifera*. This is first-hand information related to ethnomedicinal plant species that are used by the local people to treat gynecological disorders in district Hapur. This research aims to preserve the ancient treasure collected through folklore and herbal healers to treat gynecological problems. Further pharmacological survey of these plants may provide some important drugs for the treatment of common gynecological disorders that may be used as powerful medications.

Keywords: Ethnomedicinal,folklore, gynecological disorders, plant species, traditional.

Introduction

Gynecological disorders are problems of females such as abortion, infertility, menopause, leucorrhoea, gonorrhea, delivery problems, menstrual trouble, uterine prolapse, cervical cancer, breast cancer, endometrial cancer, PCOS, etc. Gynecological disorders are regarded as an important global problem for women's health as they often include conditions in the female reproductive system. Menstrual disorders are prevalent among women. Due to their hesitation and lack of knowledge, many women decide not to consult with physicians. So, women rely primarily on the usage of indigenous herbs to treat various ailments in rural areas (Das *et al*. 2015). In modern times, non-steroidal anti-inflammatory medications, an operation, and allopathic treatment are often used to treat gynecological diseases. Even though these treatments are very effective, there are also a lot of common potential side effects. These include nausea and vomiting from surgery or anesthesia, breast enlargement, post-hysterectomy sexual dysfunction, skin rashes or digestive issues from drug use, or more serious kidney, liver, and heart impairment from drug use, especially when used for a long time (Lawal *et al*. 2013, Panda *et al*. 2018). Furthermore, several medicines during pregnancy have a risk of harming the embryo. Due to socioeconomic factors, many women are compelled to seek abortions. Women have the option to induce abortions themselves in nations where abortion is illegal or if the healthcare system is unable to adequately care for the population. Abortion is defined as "causing miscarriage," which is a punishable offense under the Indian Penal Code (1860).

The WHO states that "women's health care is crucial." Women who reside in hamlets are very impoverished, both financially and educationally (WHO). In general, rural pregnant women would rather have their babies delivered by a trained village midwife than by a gynecologist. They are unable to visit the medical facilities and multispecialty clinics due to financial constraints and distance. In many

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underdeveloped nations, primary maternity care is given by traditional birth attendants, or dais. From ancient times in India, traditional birth attendants, or dais, have provided prenatal and postpartum treatment, support, and guidance. Traditional birth attendants, or dais, acquired their knowledge and experience through practice and traditions. The major source of healthcare for almost 80% of the world's population is traditional herbal medicine, while many modern pharmaceutical medications are derived from plants for many disorders (Gupta & Solanki 2013). In India, the ancient medical systems of Unani, Ayurveda, Homeopathy, and Siddha rely heavily on wild-harvested plants for over 95% of their plant-based medicines (Satyavati *et al.* 1987). Many medicinal plants have been identified in several Ayurvedic scriptures, viz. Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya, etc. As earlier as we know, different types of medicinal plants and their preparations are used in different gynecological disorders, i.e. Aartavkshaya, Aartavativrridhi, Asrigdara, Phirang, Raktagulma, Somaroga, Upadansha, Yonivyapada, Yonikanda, etc., which are treated with different herbs having different Ayurvedic properties, i.e. Ashok, Amalaki, Banyan tree (Vat), Sesamum (Til), Triphala, etc. and Tandulodaka is used as a main Anupana for the treatment of Asrigdara. Honey, Milk, and Ushnodaka (lukewarm water) are also used in the treatment of different gynecological disorders (Gautam *et al.* 2017).

Due to their safety, effectiveness, and affordability, herbal medications are gaining popularity among people in both urban and rural regions in emerging nations such as China and India. Approximately 8,000 plant species are recognized for their ethnomedicinal value (Joshi 1995), and the development of innovative plant-based therapeutic products has been aided by traditional knowledge-based formulations or indigenous traditional medicine (Katewa 2009). Very little quantitative research has been conducted on the use of traditional medicines for gynecological care, although many ethnomedicinal studies have been conducted on herbal plants. Thankfully, there is still a strong history of treating female health issues using herbal remedies. These conventional treatments, however, lack extensive documentation. There is a lack of traditional knowledge about traditional medicines due to several factors, including the rise of nuclear families, where grandmothers are missing, migration to cities, and easy access to synthetic pharmaceuticals. For women of all ages, gynecological problems constitute a major contributor to morbidity and medical expenses. Those who are having genitourinary instrumentation or catheterization, as well as young women who are sexually active and elderly, are the most in danger. Over 40% of women get a urinary tract infection at some point in their lives (Adeniyi *et al.* 2006, Tripathi *et al.* 2011, Mishra *et al.* 2013).

Because sexual disorders are socially stigmatized, the majority of women in rural areas seek treatment from traditional medical healers. Through documentation, the current research aims to preserve the priceless legacy of the local people and traditional healers on the use of herbal treatments against gynecological disorders and disseminate it to the rest of the globe. We gathered traditional knowledge about medicinal plants used to cure gynecological problems in this survey.

Materials And Methods

Investigation Area

The present survey was carried out in the district of Hapur of Uttar Pradesh State, India (Figure 1). The district is located at

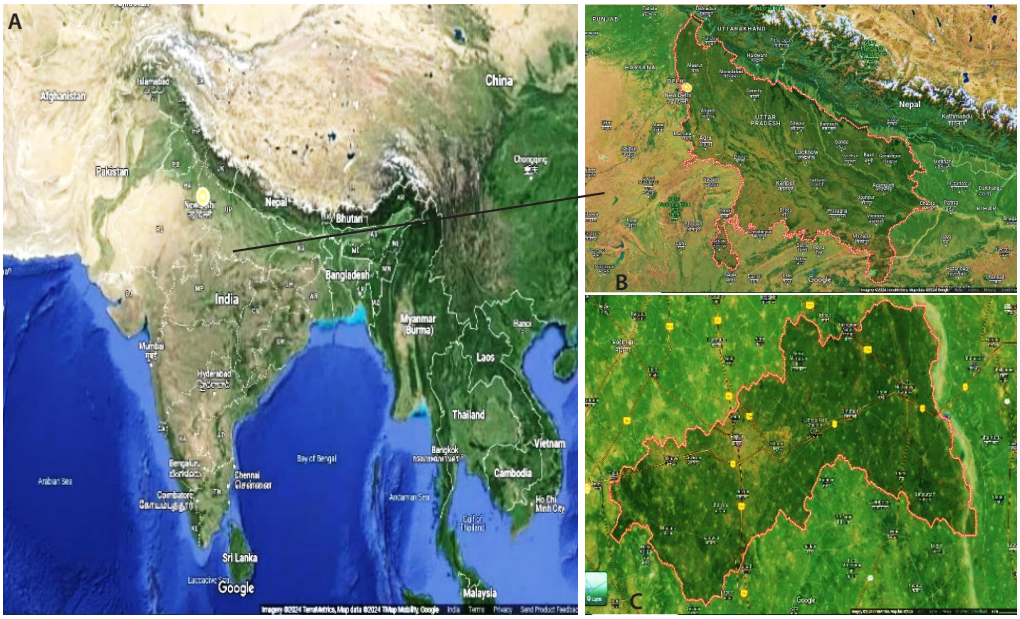

Figure 1: Map of the survey area A: India B: Uttar Pradesh C: Hapur district

Table 1: Enumeration of ethnomedicinal plant species used by local people for gynecological disorders in district Hapur, Uttar Pradesh

S. No.	*Diseases Name*	*Plant part used*	*Botanical Name of Plant*	*Common Name of Plant*	*Family*	*Formulation & application of plant part used*	*Active Phytochemical*
1.	Amenorrhea, Hypomenorrhea & Oligomenorrhea	Root	*Asparagus racemosus* Willd.	Satmul	Asparagaceae	5 gram. root powder with warm water is consumed for 15 days.	Shatavarin 1 (Thakur *et al.* 2021)
		Leaves	*Gymnema sylvestris* R. Br.	Gurmar	Apocynaceae	Decoction of leaves is consumed.	Lupeol, Betaine, Stigmasterol (Vora *et al.* 2023)
		Fruit	*Piper nigrum* L.	Kali mirch	Piperaceae	Powdered fruit is consumed.	Piperine, Catechin, (Takooree *et al.* 2019, Afroze *et al*. 2022)
		Seed	*Sesamum indicum* L.	Til	Pedaliaceae	Seeds are consumed on an empty stomach.	Sesamin, Sesamolin, Sesaminol (Dachtler *et al.* 2003, Yavari *et al.* 2014)
2.	Breast lump (Tumor & Cancer)	Bulb	*Allium cepa* L.	Pyaaz	Amaryllidaceae	Bulb is consumed orally daily.	Quercetin, Allicin (Chakraborty *et al.* 2022)
		Bark	*Bauhinia variegata* L.	Kachnar	Fabaceae	Decoction (10-20 mililiter) of the bark powder (20-30 gram) of Kachnar (*Bauhinia purpurea*) and Gorakhmundi (*Sphaeranthus indicus*) (5-10 gram) is given twice a day.	Kaempferol (Sharma *et al.* 2019)
		Bark	*Ficus religiosa* L.	Pipal	Moraceae	Bark extract is consumed.	Rutin, 3-caffeoylquinic acid, Luteolin 7-O-rutinoside, 6-C-glucosyl-8-C-arabinosylapigenin, Kaempferol-3-O-rutinoside (Murugesu *et al*. 2021)
		Root	*Mimosa pudica* L.	Chui Mui	Fabaceae	Root paste is externally applied to the breast.	L-mimosine (Xu *et al.* 2018)
		Leaves	*Moringa oleifera* Lam.	Shahjan	Moringaceae	Leaves powder with warm water is consumed twice a day.	Rutin, Niaziminin, Kaempferol (Pareek *et al.* 2023, Purwal *et al*. 2010)
		Leaves	*Ocimum sp.*	Tulsi	Lamiaceae	Decoction of leaves is consumed.	Apigenin (Way *et al,* 2004, Chorosho *et al,* 2023)
		Leaves	*Ricinus communis* L.	Arand	Euphorbiaceae	Warmed leaves with castor oil (*Ricinus communis*) are externally applied to the breast.	Coumaric acid, Epigallocatechin, Ricinoleic acid, Ricinine (Majumder *et al*. 2019)
		Seed	*Sesamum indicum* L.	Til	Pedaliaceae	Seeds are chewed on an empty stomach.	β-sitosterol (Downie *et al.* 1999, Shantha *et al*. 2014)
		Seed	*Trigonella foenum-graecum* L.	Methi	Fabaceae	Powder of seeds with cow's milk is given twice a day	Diosgenin (Goyal *et al.* 2016)
		Fruit	*Vitis vinifera* L.	Angur	Vitaceae	Fruit is consumed.	Resveratrol, Catechins, Epicatechin, Gallic acid, p-coumaric (Tsantila *et al*. 2024)

3.	Cervical Cancer	Bulb	*Allium cepa* L.	Pyaaz	Amaryllidaceae	Bulb is consumed orally daily.	Convercetin, Allicin (Wozniak *et al.* 2021)
		Clove	*Allium sativum* L.	Lehsun	Amaryllidaceae	Garlic paste is consumed orally.	Allicin (Wozniak *et al*. 2021)
		Root	*Asparagus racemosus* Willd.	Satmul	Asparagaceae	The root powder is consumed.	Rutin, Kaempferol (Wozniak *et al*. 2021)
		Root	*Beta vulgaris* L.	Chukander	Amaranthaceae	The root is consumed.	Betaines (Wozniak *et al*. 2021)
		Leaves	*Camellia sinensis* L. Ktze.	Chai	Theaceae	Leaves extract is consumed.	Epigallocatechin-3-gallate (Wang *et al.* 2018, Wozniak *et al.* 2021)
		Fruit	*Citrus sp.*	Nimbu, Santra	Rutaceae	Fruit juice is given orally.	Naringin (Ramesh & Alshatwi 2013, Wozniak *et al*. 2021)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder is consumed orally.	Curcumin (Wozniak *et al*. 2021)
		Root	*Daucus carota* L.	Gajar	*Apiaceae*	Root is consumed.	β-carotene, α-carotene, Lutein, Lycopene, Zeaxanthin, Caffeic acid (Wozniak *et al.* 2021)
		Bark	*Ficus religiosa* L.	Pipal	Moraceae	Bark extract is consumed.	Rutin, 3-caffeoylquinic acid, Luteolin 7-O-rutinoside, 6-C-glucosyl-8-C-arabinosylapigenin, Kaempferol-3-O-rutinoside (Murugesu *et al.* 2021)
		Leaves, Fruit	*Ginkgo biloba* L.	Ginkgo	Ginkgoaceae	Decoction of leaves and fruit is given orally.	Ginkgolide B (Xu *et al*. 2020, Wozniak *et al.* 2021)
		Leaves	*Ocimum sp.*	Tulsi	Lamiaceae	Decoction of leaves is given twice a day.	Apigenin (Chorosho *et al*. 2023)
		Fruit	*Vitis vinifera* L.	Angur	Vitaceae	Fruit is given orally.	Rutin, Gallic acid, Caffeic acid, Ferulic acid, Naringin (Wozniak *et al.* 2021)
4.	Dysmenorrhea & Menorrhagia	Bark	*Senegalia catechu* (L.f.) P.J.H. Hurter & Mabb.	Khair	Fabaceae	Extract of bark is consumed orally.	(+)- Catechin, Epigallocatechin, Epigallocatechin gallate, Epicatechin gallate (Afroze *et al.* 2022)
		Bark, Root	*Phyllanthus reticulatus* Poir	Makhi	Phyllanthaceae	Root/Bark decoction is given orally twice a day for dysmenorrhea.	Lupeol, Lupeol acetate, Stigmasterol, Scopoletin (Afroze *et al.* 2022)
		Fruit	*Piper nigrum* L.	Kali mirch	Piperaceae	Powdered fruit is consumed.	Piperine, Catechin, (Afroze *et al.* 2022)
5.	Endometrial cancer	Bulb	*Allium cepa* L.	Pyaaz	Amaryllidaceae	Bulb is consumed orally daily.	Quercetin, Convercetin, Allicin (Wozniak *et al.* 2021)
		Root	*Asparagus racemosus* Willd.	Satmul	Asparagaceae	The root powder is consumed.	Asparanin A (Wozniak *et al*. 2021)
		Whole plant	*Berberis sp.*	Berberry	Berberidaceae	Extract of the whole plant is given twice a day.	Berberin (Wang *et al.* 2018)
		Leaves	*Camellia sinensis* L. Ktze.	Chai	Theaceae	Extract of leaves is consumed.	Epigallocatechin gallate (Wang *et al.* 2018, Wozniak *et al.* 2021)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder is consumed orally.	Curcumin (El *et al.* 2019)

		Leaves	*Ocimum sp.*	Tulsi	Lamiaceae	Decoction of leaves is consumed.	Apigenin (Chorosho *et al.* 2023)
		Seed	*Sida cordifolia* L.	Khareti	Malvaceae	The decoction of seeds is taken.	β-Sitosterole, Stigmasterol (Khurana *et al.* 2016)
6.	Hypogalactia	Root	*Asparagus racemosus* Willd.	Satmul	Asparagaceae	Root powder with milk is consumed.	Shatavarin-1 (Thakur *et al.* 2021)
		Seed	*Foeniculum vulgare* (Fennel)	Sauf	Apiaceae	Seed is given orally.	Anethole, Estragole (Tabares *et al.* 2014)
		Seed	*Moringa oleifera* Lam.	Shahjan	Moringaceae	Seed powder with cow's milk is consumed twice a day.	Arachidic acid, Docosahexaenoic acid (Sari *et al*. 2020)
		Whole plant	*Silybum marianum* (L.) Gaertn.	Doodh Patra	Asteraceae	Extract of the whole plant is consumed.	Silybin B (Dietz *et al.* 2016)
		Seed	*Trigonella foenum-graecum* L.	Methi	Fabaceae	Powder of seeds with cow's milk is given twice a day	Diosgenin, Apigenin, Luteolin (Tabares *et al.* 2014)
7.	Induce abortion	Gum, Bark, Flower	*Butea monosperma* (Lam.) Kuntze	Dhak	Fabaceae	Powder of bark, flower, and gum is given with warm water on an empty stomach.	Butin (Bhargava 1986)
		Root	*Calotropis procera* (Aiton) W. T. Aiton	Aak	Apocynaceae	Powder of root is consumed.	Calotropin (Wadhwani *et al.* 2021)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder with curd is externally applied & consumed orally.	Curcumin (Tossetta *et. al.* 2021)
		Whole plant	*Cynodon dactylon* Pers.	Durva	Poaceae	Juice of whole plant is given twice a day.	Apigenin (Malpani *et al.* 2020)
		Seed	*Trigonella foenum-graecum* L.	Methi	Fabaceae	Powder of seeds with cow's milk is given twice a day	Gitogenin, Trigonelline (Aafi *et al.* 2020)
		Leaves	*Justicia adhatoda* L.	Adusa	Acanthaceae	Decoction of leaves is given.	Vasicine (Gupta *et al*. 1978)
		Root, Bark,	*Moringa oleifera* Lam.	Shahjan	Moringaceae	Root powder with warm water is consumed twice a day.	Morintides, β-sitosterol (Pareek *et al*. 2023, Attah *et al*. 2020)
8.	Infertility in female	Root	*Asparagus racemosus* Willd.	Satmul	Asparagaceae	Root powder with warm water is consumed for 15 days.	Shatavarin 1 (Thakur *et al.* 2021)
		Whole plant	*Ocimum basilicum* L.	Tulsi	Lamiaceae	Decoction of the whole plant is consumed.	Eugenol (Chorosho *et al.* 2023)
		Fruit	*Vitis vinifera* L.	Angur	Vitaceae	Fruit is consumed.	Resveratrol (Chorosho *et al*. 2023)
9.	Leucorrhoea	Seed	*Albizia lebbeck* L. Benth	Siris	Fabaceae	Seed powder with honey kept in an earthen pot in the sun for 15 days. Paste is given twice a day.	D-Catechin, Albizziahexoside A (Behera *et al.* 2021)
		Root	*Justicia adhatoda* L.	Adusa	Acanthaceae	Decoction of root is given.	Vasicine (Hossain *et al*. 2016)
		Gum, Bark, Flower	*Butea monosperma* (Lam.) Kuntze	Dhak	Fabaceae	Powder of bark, flower, and gum (each in equal amount) is given with warm water on an empty stomach.	Butin (Sharma *et al.* 2011)

		Leaves, Bark	*Ficus benghalensis* L.	Bargad	Moraceae	Leaves and bark powder with honey are given for 15 days.	Rutin, Friedelin, Leucoanthocyanin (Behera *et al.* 2021)
		Fruit, Leaves	*Ficus religiosa* L.	Pipal	Moraceae	The powder of fruit and tender leaves in equal amounts with jaggery is given twice a day for Uterine diseases.	Coumarin (Behera *et al.* 2021)
		Fruit	*Ficus racemose* L.	Gular	Moraceae	Fresh fruit is given daily.	Stigmasterol, Lupeol, Lupeol acetate, Taraxasterol ester, Hentriacontane (Behera *et al.* 2021)
		Bark	*Ficus virens* L.	Pilkhan	Moraceae	Bark extract is consumed.	Stigmasterol, Lupeol, Scutellarein (Behera *et al*. 2021)
10.	Ovarian Cancer	Bulb	*Allium cepa* L.	Pyaaz	Amaryllidaceae	Bulb is consumed orally daily.	Quercetin, Allicin (Wozniak *et al.* 2021)
		Leaves	*Brassica oleracea*	Gobhi	Brassicaceae	The cooked vegetable is consumed orally.	Isothiocyanates Indoles (Zhang *et al.* 2006)
		Leaves	*Camellia sinensis* L. Ktze.	Chai	Theaceae	Extract of leaves is consumed.	Epigallocatechin gallate (Wang *et al.* 2018, Wozniak *et al.* 2021)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder is consumed orally.	Curcumin (Wozniak *et al*. 2021)
		Root	*Daucus carota* L.	Gajar	Apiaceae	Root is consumed.	β-carotene, α-carotene, Lycopene, Zeaxanthin (Wozniak *et al*. 2021)
		Leaves, Fruit	*Ginkgo biloba* L.	Ginkgo	Ginkgoaceae	Decoction of leaves and fruit is given orally.	Quercetin, Ginkgolide A & B (Ye *et al*. 2007, Wozniak *et al*. 2021)
		Leaves	*Ocimum sp.*	Tulsi	Lamiaceae	Extract of leaves is consumed.	Apigenin (Suh *et al*. 2015, Chorosho *et al.* 2023)
		Fruit	*Vitis vinifera* L.	Angur	Vitaceae	Fruit is consumed.	Resveratrol (Wozniak *et al.* 2021)
11.	PCOS (polycystic ovary syndrome)	Leaves	*Aloe vera* (L.) Burm. f.	Gvarpatha	Asphodellaceae	Leaves juice is given on an empty stomach.	Aloe-emodin, Barbaloin (Lakshmi *et al.* 2023)
		Whole plant	*Berberis sp.*	Burberry	Berberidaceae	Extract of the whole plant is given twice a day.	Berberin (Li *et al*. 2015, Mishra *et al*. 2022)
		Fruit	*Cocos nucifera* L.	Nariyal	Arecaceae	Coconut water is consumed orally.	Skimmiwallin, Isoskimmiwallin (Bhandary *et al*. 1995, Lakshmi *et al*. 2023)
		Stigma	*Crocus sativa* L.	Kesar	Iridaceae	Saffron water is given twice a day.	Crocin (Yasmin *et al.* 2019)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder is consumed orally.	Curcumin (Lakshmi *et al.* 2023)
		Bark	*Ficus religiosa* L.	Pipal	Moraceae	Bark extract is consumed daily.	β-sitosterol – D – glycoside (Behera *et al.* 2021)
		Seed	*Foeniculum vulgare* Mill.	Sauf	Apiaceae	Seed is consumed.	Anethole, Ascorbic acid, α-tocopherol, β-tocopherol, γ-tocopherol, δ-tocopherol (Lakshmi *et al.* 2023)
		Whole plant	*Fumaria parviflora* Lam.	Pittapapada	Papaveraceae	Decoction of the whole plant is consumed daily in the morning.	Protopine (Mubeen *et al.* 2022)

		Root	*Glycyrrhiza glabra* L.	Mulethi	Fabaceae	Root extract is used twice a day.	Liquiritigenin, Isoliquiritigenin, Liquiritin, Isoliquiritin, Glabridin, Glabrene (Yang *et al*. 2018, Lakshmi *et al*. 2023)
		Leaves	*Gymnema sylvestris* R. Br.	Gurmar	Apocynaceae	Decoction of leaves is consumed.	Lupeol, Betaine, Stigmasterol (Vora *et al.* 2023)
		Seed	Linum usitatissimum L.	Alsi	Linaceae	Extract of seed is consumed twice a day.	Secoisolariciresinol, Secoisolariciresinol diglycoside, Linolenic acid (Lakshmi *et al.* 2023)
		Whole plant	*Mentha spicata* L.	Pudina	Lamiaceae	Juice of the whole plant is consumed daily.	Lutein, Rutin, Rosmarinic acid, Caffeic acid (Lakshmi *et al*. 2023)
		Leaves	*Ocimum sp.*	Tulsi	Lamiaceae	Decoction of leaves is consumed.	Apigenin (Chorosho *et al*. 2023)
		Fruit	*Punica granatum* L.	Anar	Lythraceae	Juice of fruit is consumed daily.	Catechin, Epicatechin, Gallocatechin, Quercetine, Kaempferol (Yadav *et al.* 2020, Lakshmi *et al.* 2023)
		Fruit, Root	*Tribulus terrestris* L.	Chota gokhru	Zygophyllaceae	Powder of fruit and root with warm water is consumed.	Kaempferol, Kaempferol-3-glucoside, Kaempferol-3-rutinoside, Tribuloside, Furostanol, Diosgenin (Lakshmi *et al.* 2023)
		Seed	*Trigonella foenum-graecum* L.	Methi	Fabaceae	Powder of seed with cow's milk is given twice a day.	β-pinene, β-caryophyllene, Camphor, Neryl acetate (Lakshmi *et al*. 2023)
		Whole plant	*Vitex agnus-castus* L.	Nirgundi	Lamiaceae	Juice of whole plant is given twice a day orally.	Apigenin, 3-methylkaempfero, Luteolin, Casticin (Lakshmi *et al.* 2023)
		Rhizome	*Zingiber officinalis* Roscoe	Adrak	Zingiberaceae	Rhizome powder is given twice a day.	Gingerol, Shogaol Zingerone (Atashpour *et al.* 2017, Lakshmi *et al.* 2023)
12.	Uterine fibroids	Bulb	*Allium cepa* L.	Pyaaz	Amaryllidaceae	Bulb is consumed orally daily.	Quercetin (Block 1985, Islam *et al.* 2014)
		Clove	*Allium sativum* L.	Lehsun	Amaryllidaceae	Garlic paste is consumed orally.	Allicin (Block 1985, Islam *et al.* 2014)
		Leaves	*Camellia sinensis* L. Ktze.	Chai	Theaceae	Leaves extract is consumed.	Epigallocatechin gallate, Quercetin (Singh *et al.* 2011, Islam *et al.* 2014)
		Fruit	*Citrus sp.*	Nimbu, Santra	Rutaceae	Fruit juice is given orally.	Quercetin (Hertog *et al*. 1993)
		Rhizome	*Curcuma longa* L.	Haldi	Zingiberaceae	Powder of rhizome is consumed orally.	Curcumin (Wilken *et al.* 2011)
		Root	*Daucus carota* L.	Gajar	Apiaceae	The root is consumed.	Indole-3-carbinol (Aggarwal and Ichikawa 2005)
		Seed	*Glycine max* (L.) Merr.	Soybean	Fabaceae	Seed is consumed.	Isoliquiritigenin, Genistein (Cuendet *et al.* 2010, Islam *et al.* 2014)

	Root	*Glycyrrhiza glabra* L.	Mulethi	Fabaceae	Root extract is used twice a day.	Isoliquiritigenin (Cuendet *et al*. 2010, Islam *et al.* 2014)
	Fruit	*Psidium guajava* L.	Amrud	Myrtaceae	Fruit is consumed.	Lycopene (Holzapfel *et al.* 2013)
	Fruit	*Punica granatum* L.	Anar	Lythraceae	Fruit is consumed.	Ellagic acid (Vattem *et al.* 2005, Islam *et al*. 2014)
	Seed	*Raphanus sativus* L.	Muli	Brassicaceae	The powdered seeds of Muli (*Raphanus sativus*), seeds of carrot (*Daucus carota* subsp. *Sativus*), Vijayasar (*Pterocarpus marsupium*) (100 gram each), and Munnaka (*Vitis vinifera*) (200 gram) dried in shade and made into a paste. This paste (10 gram amount) with jaggery is given twice a day.	Indole-3-carbinol (Aggarwal and Ichikawa 2005)
	Fruit	*Solanum lycopersicum* L.	Tamatar	Solanaceae	Fruit is consumed.	Quercetin (Hertog *et al.* 1993)
	Seed	*Vicia faba* L.	Bakla	Fabaceae	Cooked beans/seeds are consumed.	Genistein (Islam *et al.* 2014)
	Fruit	*Vitis vinifera* L.	Angoor	Vitaceae	Fruit is consumed.	Resveratrol, Ellagic acid (Labinskyy *et al.* 2006, Islam *et al.* 2014)

28.72° N, 77.78° E. Hapur district is a part of Meerut division. It covers an area of about 660 sq. km. in the north-west part of Uttar Pradesh. It falls within the National Capital Region. The district is bounded on the north by Meerut district, on the south by Bulandshahar district, on the east by Amroha district, and on the west by Ghaziabad district. The district consists of three tehsils: Hapur, Garhmukteshwar, and Dhaulana. Hapur is a part of the Indus-Gangetic Plain and the river Ganga forms the eastern boundary of Garhmukteshwar where people come for pilgrimage. Hapur district is the poorest in forest resources as the total area is reported to be 846 hectares which is 0.74% of the total geographical area (114276 hectares) of the district.

Data Collection, Identification & Documentation

The survey was carried out in different regions of the district from 2021 to 2023. Meanwhile, a questionnaire was used for an ethnomedicinal survey on the use of native medicinal plants for curing several kinds of gynecological disorders (Jain, 1989 Martin, 2010). Ethno-gynecological information was gathered through interviews and questionnaires with 12 herbal informants such as women, midwives, dais, and vaidyas of the Hapur district. The local language was used to gather ethnomedicinal information. The ethnic-gynecological data was recorded along with the vernacular name, the botanical name of the plant, family name, plant part(s) used, and the mode of preparing the ethnomedicine to cure women's gynecological disorders (Table 1).

Standard methods of collection, drying, mounting, preservation, and maintenance of plant specimens were followed according to Jain and Rao 1977. The identification and nomenclature of the listed plants were based on the online website "Plants of the World Online (POWO)" (https://powo.science.kew.org) taxonomic database. All the preserved herbarium specimens were deposited at the Herbarium of Raghunath Girls' Post Graduate College, Meerut (Uttar Pradesh).

Results And Discussions

Diversity of ethnomedicinal plant species

An ethnomedicinal survey related to gynecological disorders was conducted in district Hapur of Uttar Pradesh and 52 plant species belonging to 47 genera were reported. Among the 52 plant species, 51 plants were angiosperm and one plant species was gymnosperm. Among the angiosperm plants, 13% were monocot and 87% were dicot. Most cited families of medicinal plants documented were Fabaceae (17%), Lamiaceae, and Moraceae (8%), Apiaceae, Apocynaceae, Amaryllidaceae, Brassicaceae, and Zingiberaceae (4% each); twenty-five families had 2% each shown in Figure 2. Among 47 genera reported, *Ficus* (4 spp.), *Ocimum* (2 spp.), *Allium* (2 spp.) were dominant. Among 52 ethnomedicinal plant species, 26 (50%) plant species belong to herbs, followed by 13 (25%) trees, shrubs 10 (19%), climber 2 (4%), and grasses 1 (2%) shown in Figure 3. Among the

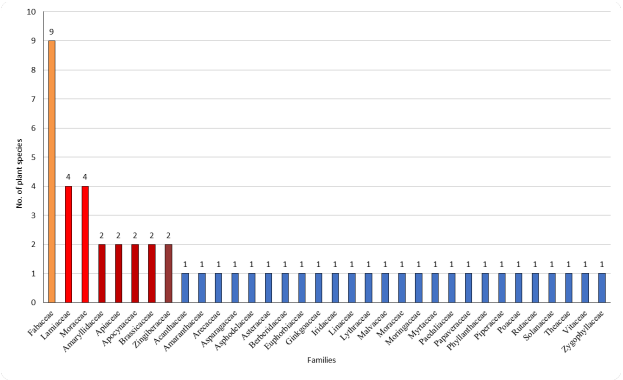

Figure 2: Ethnomedicinal plant families in district Hapur, India

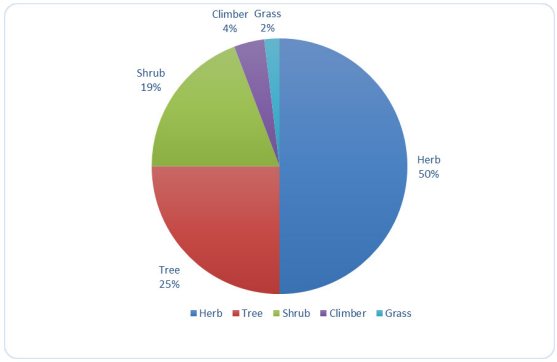

Figure 3: Habit-wise diversity of Ethnomedicinal plants in district Hapur, India

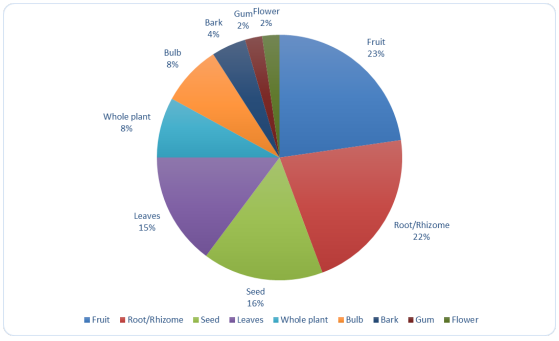

Figure 4: Plant parts used for ethnomedicinal purposes in district Hapur, India

taxa documented, the plant part used were fruit 20 (23%), followed by root/rhizome 19 (22%), seed 14 (16%), leaves 13 (15%), whole plant 7 (8%), bulb 7 (8%), bark 4 (4%), flower 2 (2%) and gum 2 (2%) (Figure 4). The most commonly used preparation of plant parts was in powder form (31%), followed by raw (27%), decoction (16%), extract (14%), juice (7%), and paste (5%) (Figure 5). The 52 ethnomedicinal plant species used to cure 12 kinds of gynaecological diseases, among which polycystic ovary syndrome 18 (19%), uterine fibroids 14 (15%), cervical cancer 11 (11%), breast tumor & cancer, and endometrial cancer 9 each (9% each), ovarian cancer 8 (8%), leucorrhoea, and induce abortion 7 each (7%

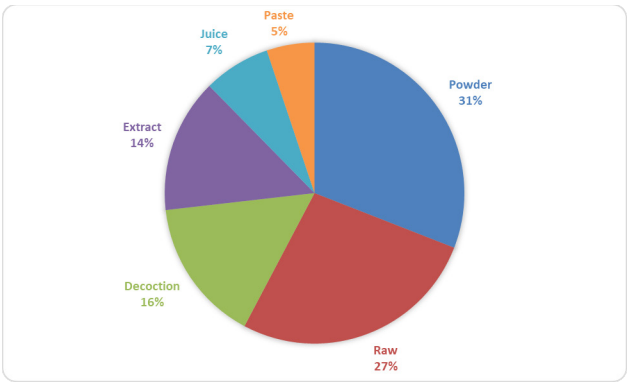

Figure 5: Mode of preparation of ethnomedicinal plants in district Hapur, India

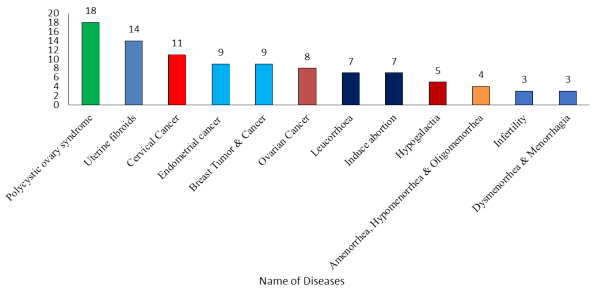

Figure 6: Number of plant species used in the treatment of gynecological diseases in district Hapur, India

each), hypogalactia 5 (5%), amenorrhea, hypomenorrhea & oligomenorrhea 4 (4%), dysmenorrhea & menorrhagia and infertility 3 each (3% each) (Figure 6). The ethnomedicinal plants enumerated diseases wise in alphabetical order with botanical name of plants, local names, plant parts used, family name, formulation and application of plant part used and active phytochemicals as shown in Table 1. For the current survey, a total of 24 informants, aged between 35 and 75, were interviewed (14 females and 10 men).

Conclusion

The survey focused on the health and treatment of rural women. The present survey reveals that rural women rely on traditional medicine for the treatment of gynecological diseases because of their hesitation in consulting the doctor for such diseases. Herbs are always considered a primary source of medicine for the rural population because of the expensive and difficult accessibility to modern medicine. The utilization and prevalence of traditional medicine have been on the rise in recent years, with a growing emphasis on identifying effective and safe remedies. The research conducted on documenting gynecological practices among the local people in the district Hapur not only sheds light on the past but also provides valuable insights into indigenous

knowledge. Further clinical and pharmacological studies are necessary to explore the untapped potentials of the recorded plant species. Given the current state of knowledge on the chemical components of these plants, it is hoped that future research will identify the specific bioactive components that may be used to treat gynecological disorders. The current investigation indicates that further research is necessary to fully understand the extremely intriguing outcomes of gynecological problems. People from rural or tribal areas have a good understanding of the environment and the resources around them. To preserve this very effective traditional therapeutic technique, more research into this indigenous knowledge is vitally needed, as is its scientific confirmation, acceptance in the medical system, and popularization.

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