

Research Article

Medicinal Plant Diversity in the Campus of Bhopal Memorial Hospital and Research Centre: A Green Repository for Health and Healing

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Abstract

The campus of Bhopal Memorial Hospital and Research Centre (BMHRC) is located at latitude 23 ° 17'0" and longitude 23 ° 17'0" to serve as an ecological treasure in an urban healthcare setting. The hospital's campus is spread across 85.61 acres, with well-maintained green spaces, including herbal gardens and natural vegetation. This study documents the diversity of medicinal plants within the campus, emphasizing their ecological, therapeutic, and cultural significance by conducting a field survey of campus and list of medicinal plants prepared. A total of 202 medicinal plant species were identified, belonging to 75 families, with predominant representation from Euphorbiaceae (14 species), Fabaceae (11 species), Moraceae (9 species) and Solanaceae (7 species). With 202 documented medicinal plant species, BMHRC fosters a therapeutic landscape that not only benefits patients but also enhances staff well-being and job satisfaction. Research indicates that well-designed hospital gardens contribute to higher patient and family satisfaction, reduced stress levels, and improved healthcare experiences, making them an invaluable asset in patient-centered care. These plants are widely used in traditional and modern medicine to treat various ailments, including respiratory, dermatological, and gastrointestinal conditions. Due to their different chemical constituents and compositions including antioxidants and trace elements, these plants offer a variety of beneficial effects against different diseases through radical scavenging and antioxidant mechanisms. Several aromatic plants offer inherent medicinal pharmacological properties and variedly being utilized for flavouring, repellent and herbal beverages. As many as 13 medicinal plants studies against chronic kidney diseases in humans and 24 medicinal plants were reported in animal studies. However in many articles the caution has been issued to consider the toxic effects of certain herbal medicines. Therefore, conservation practices and the potential for integration into healthcare and research are of significance to mankind. This study underscores the importance of medicinal plant biodiversity in enhancing public health and promoting sustainable practices in healthcare institutions.

Keywords

Biodiversity, Conservation, Healthcare, Medicinal Plants

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Received: 01 April 2025; **Accepted:** 21 April 2025; **Published:** 22 May 2025



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1. Introduction

Biodiversity is indispensable to the daily lives and livelihoods of tribal communities and others, meeting their fundamental needs. Since the dawn of human existence, the plant kingdom has been deeply intertwined with human life [1, 2]. India, celebrated for its rich biodiversity, is one of the world's most diverse nations, where medicinal plants have held profound traditional significance for centuries, particularly in Ayurveda, Siddha, Unani, and homeopathy [3]. These plants play a crucial role in enhancing physical, mental, and spiritual well-being across cultures, serving diverse purposes [4]. They include species with specific organs that produce clinically validated therapeutic compounds, used directly or as precursors for drug development, as well as plants whose benefits, though not scientifically proven, are traditionally valued as medicine, tonics, food, or cultural symbols [1, 5]. Aromatic plants are often used as natural medicines because of their remedial and inherent pharmacological properties and the focused review on a subset of medicinally important aromatic plants with radioprotective activity has been conducted [6]. Recently, the research outcomes were summarized and reviewed for the use of herbal medicine in the treatment of chronic kidney diseases (CKD) and hurdles in the way for further research [7].

Similarly, since its establishment following the devastating 1984 Bhopal gas tragedy—caused by the accidental leakage of MIC gas—Bhopal Memorial Hospital and Research Centre (BMHRC) has consistently focused on addressing climate change and its impact on public health [8, 9]. The severe atmospheric pollution that plagued Bhopal and its surroundings

after the disaster, along with persistent groundwater contamination from toxic chemical waste, continues to affect the community [10]. Over the past decade, BMHRC has not only provided medical treatment and rehabilitation to a large patient base, primarily gas victims and their dependents, but has also worked to create a sustainable, energy-efficient, and pollution-free environment within its Super Specialty Hospital. This green setting promotes psychological healing and aids in recovering from the trauma of the disaster. BMHRC's approach serves as a model for climate change mitigation, with initiatives such as reducing greenhouse gas (GHG) emissions and combating global warming, minimizing air pollution, including Respirable Suspended Particulate Matter (RSPM)—critical for patients and residents as exposure to dust pollution can lead to asthma and COPD—and addressing water scarcity through innovative rainwater harvesting and recycling systems [11]. The hospital infrastructure, handed over by Hospital Services Consultancy Corporation Limited (HSCC) to BMHRC in 2000, spans 85.16 acres, with a 24-acre built-up area housing the super specialty facility and staff quarters. Medicinal plants are a cornerstone of traditional medicine and an invaluable resource for modern drug discovery [2, 5]. Urban healthcare facilities, like BMHRC, have the potential to preserve and utilize these resources to complement conventional treatments, reduce dependency on synthetic drugs, and foster ecological balance. This study aims to document the medicinal plant diversity in the BMHRC campus, analyze their therapeutic applications, and evaluate the existing conservation practices to propose strategies for their sustainable management.

2. Materials and Methods

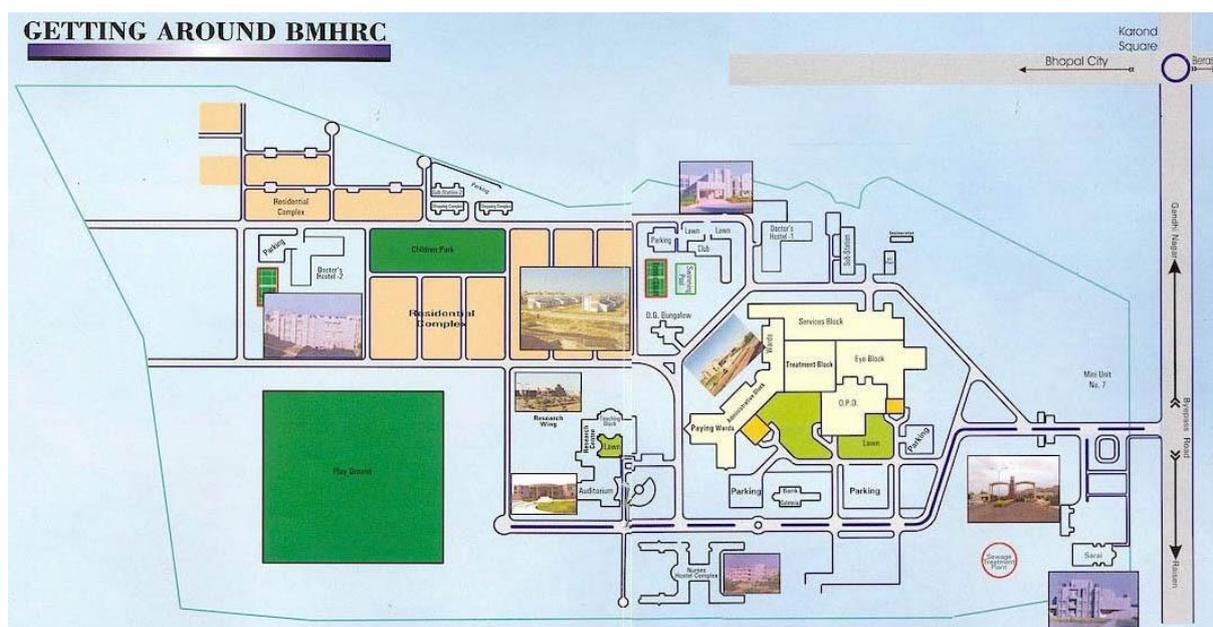


Figure 1. Location map BMHRC Campus [14].

BMHRC is located at latitude 23 ° 17'0" and longitude 23 ° 17'0". Bhopal has a moderate climate with temperature ranging from 10 °C to 40 °C. It receives an annual rainfall of 1260 mm. The climate risk profile of Bhopal city, as outlined in the analysis below, focusses on observed changes and future projections of temperature and rainfall. The hospital's campus is spread across 85.61 acres, with well-maintained green spaces, including herbal gardens and natural vegetation (Figure 1). The data was collected by field surveys conducted in the month of May 2024. The species of plants were identified and list of plants were prepared according to their scientific name, therapeutic applications, families, and parts used for the treatment. The digital photographs were used to identify the species of the plants with the help of the flora/Encyclopaedia and further confirmation was made with the expert of the field [12, 13].

3. Results and Discussion

The detailed investigation of medicinal plants in the present study and their medicinal uses is represented in Table 1. A total of 202 medicinal plant species were observed belonging to the 75 different families. Euphorbiaceae, Fabaceae, Moraceae and Solanaceae families were found to represent the highest number of species. The number of species within these families were Euphorbiaceae (14 species, 6.93%), Fabaceae (11 species, 5.45%), Moraceae (9 species, 4.46%) and Solanaceae (7 species, 3.47%), followed by families such as Apocynaceae, Araceae, Asteraceae, Bignoniaceae and Malvaceae (6 species each, 2.97%). However, families Acanthaceae, Amaranthaceae, Lamiaceae, Myricaceae and Olaceae comprised 5 species each i.e. 2.47%.

Table 1. Medicinal Vegetation present in BMHRC campus, Bhopal.

Botanical Name	Family Name	Uses	Part used
<i>Adhatoda vasica</i>	Acanthaceae	Skin disease, cough reliever, uretic, worm control	Fruit, Flower, Leaves, Roots
<i>Eranthemum pulchellum</i> Hort.	Acanthaceae	Antioxidants, diabetes, digestive problems	Leaves
<i>Barleria cristata alba</i>	Acanthaceae	Tooth ache, Arthritis	Leaves
<i>Thunbergia erecta</i>	Acanthaceae	Skin problems, improve sexual potency,	Leaves, Fruit
<i>Ruellia tuberosa</i>	Acanthaceae	Emetic, emollient, analgesic, analgesic, anti-hypertensive, anthelmintic, anti-abortive for conditions including anal disease, chyme, gonorrhoea and syphilis	Leaves, Roots, Flower
<i>Achyranthes aspera</i> Linn	Amaranthaceae	Urinary problem, blood purifier, snack bite, goitre	Fruit, Flower, Leaves
<i>Amaranthus viridis</i>	Amaranthaceae	Antibacterial, anti-inflammatory, anti-oxidant	Leaves, Stem, Roots
<i>Amaranthus cruentus</i>	Amaranthaceae	Antibacterial, anti-inflammatory, anti-oxidant	Leaves, Stem, Roots
<i>Amaranthus spinosus</i> L.	Amaranthaceae	Antibacterial, anti-inflammatory, anti-oxidant	Leaves, Stem, Roots
<i>Chenopodium album</i>	Amaranthaceae	Anthelmintic, cardiogenic, laxative, diuretic	Leaves, Roots
<i>Crinum latifolium</i> (Linn)	Amaryllidaceae	Joint Pain	Leaves, Flower
<i>Hymenocallis littoralis</i>	Amaryllidaceae	It has anti-viral and anti-neoplastic properties, making it a traditional medicine for wound healing	Leaves, Flower, Bulb
<i>Buchanania lanzan</i> Roxb.	Anacardiaceae	Impotence, Mumps, Indigestion	Fruit, Bark, Leaves, Flower
<i>Mangifera indica</i>	Anacardiaceae	Asthma, dysentery, gout	Fruit, Bark, Leaves, Flower
<i>Anacardium occidentale</i>	Anacardiaceae	Use of resin for pesticide	Fruit, Bark, Leaves
<i>Buchanania cochinchesis</i>	Anacardiaceae	Impotence, Indigestion, Mumps	Fruit, Bark, Leaves
<i>Annona reticulate</i> L.	Annonaceae	Boost mood, high BP, digestive	Fruit, Seed, Leaves, Flower
<i>Annona squamosa</i>	Annonaceae	Boost mood, high BP, digestive	Fruit, Seeds, Bark, Leaves
<i>Centella asiatica</i>	Apiaceae	A mental tonic to relieve urosis, high blood	Leaves, Roots

Botanical Name	Family Name	Uses	Part used
		pressure and anxiety	
<i>Alstonia scholaris</i> (L)	Apocynaceae	Chronic diarrhoea and dysentery, malarial	Bark
<i>Rauvolfia serpentina</i>	Apocynaceae	Ovarian problems, sleepiness	Roots
<i>Tabernaemontana divaricata</i>	Apocynaceae	Eye diseases, Tuberculosis	Milk, Leaves, Flower
<i>Carisa cairindas</i>	Apocynaceae	Disease resistance, digestive system, obesity	Fruit, Leaves
<i>Nerium odoratum</i> L.	Apocynaceae	Diabetes	Leaves
<i>Catharanthus roseus</i> (L)	Apocynaceae	Cough, cold reliever, leukaemia, high blood pressure	Roots, Leaves, Flower, Fruits
<i>Colocasia esculenta</i> (L,)	Araceae	Anaemia, constipation, increase in appetite, heartburn	Leaves, Roots
<i>Spathiphyllum wallisii</i>	Araceae	Antifungal, analgesic	Leaves
<i>Syngonium podophyllum</i>	Araceae	Reduce stress, improve mood	Leaves
<i>Philodendron hederaceum</i>	Araceae	Treatment of inflammation, arthritis, gout	Leaves
<i>Monstera deliciosa</i>	Araceae	Fever, infection control, cough	Leaves
<i>Amorphophallus paeoniifolius</i>	Araceae	Anti-inflammatory, cholesterol lowering, arthritis	Bulb
<i>Polyscias fruticosa</i>	Araliaceae	Anti-inflammatory and antibacterial ointment	Leaves
<i>Livistona rotundifolia</i>	Arecaceae	Digestion, Respiration, Endocrine, Heart	Fruit, Leaves, Flower
<i>Calotropis procera</i>	Asclepiadaneae	Skin disease, fever, kidney	Fruit, Flower, Leaves, Roots
<i>Dracaena trifasciata</i>	Asparagaceae	Mental relief, allergy	Leaves
<i>Chlorophytum comosum</i>	Asparagaceae	Mental relief, allergy	Leaves
<i>Pleomele reflexa</i>	Asparagaceae	Mental relief, anxiety, allergy	Leaves
<i>Asparagus racemosus</i>	Asparagaceae	Blood purifier, pain relief, cardiac disease	Roots
<i>Verbesina encelioides</i>	Asteraceae	Treatment of skin disease and spider bites	Leaves, Flower
<i>Lactuca serrola</i>	Asteraceae	Boost immunity, Increase sex drive, Snake bite	Leaves
<i>Vernonia amygdalina</i>	Asteraceae	Diabetes	Flower, Leaves
<i>Tridax procumbens</i>	Asteraceae	For the treatment of chronic cold, dysentery, dysentery and liver diseases	Leaves, Fruit
<i>Cyanthillium cinereum</i> (Linn.)	Asteraceae	It is a wind-conditioner, a laxative; an astringent, astringent and astringent.	Leaves, Flower, Roots
<i>Eclipta alba</i> (L.)	Asteraceae	Immunity Deficiency, Cough & Rheumatism, Fatty Liver & Jaundice	Leaves, Seed
<i>Verginia ligyuleta</i>	Axifveveceae	Stone, respiratory system	Leaves, Roots
<i>Radermachera xylocarpa</i> (Roxb.) K. Schum	Bignoniaceae	Coronary, thrombosis	Flower, Leaves, Bark
<i>Spathodea campanulata</i> P. Beauv.	Bignoniaceae	Migraine, Epilepsy Control, Urethritis, Analgesia	Bark, Flower, Leaves
<i>Jacaranda mimosifolia</i>	Bignoniaceae	Treatment of wound, gout, and cold	Fruit, Bark, Leaves, Flower
<i>Kigelia pinnata</i>	Bignoniaceae	Kidney stone, Anti-malarial, Anti-amoebic	Fruit, Bark, Flower
<i>Tebebuia argenta</i>	Bignoniaceae	Swelling, Fever, Cough	Fruit, Bark, Leaves, Flower
<i>Begonia obliqua</i>	Bignoniaceae	Treat sun infections and skin diseases	Leaves

Botanical Name	Family Name	Uses	Part used
<i>Ceiba penandra</i>	Bombaceae	Treatment of Spleen Disorder, Rh Disorder	Fruit, Bark, Leaves, Flower
<i>Bombax ceiba</i>	Bombaceae	Sexual health, asthma, anemia, tuberculosis	Fruit, Bark, Leaves, Flower
<i>Cordia myzta</i>	Boraginaceae	High blood pressure, fever, leukemia	Fruit, Bark, Leaves
<i>Commiphora wightii</i>	Brucraceae	Coronary thrombosis	Tree sap
<i>Tamarindus indica</i> L.	Caesalpiniaceae	Laxative, bacteria control	Fruit, Leaves
<i>Saraca indica</i>	Caesalpiniaceae	Cough, cold, blood purifier	Seed, Flower
<i>Cassia fistula</i>	Caesalpinioidae	Respiratory system, digestive system-laxative	Fruit, Flower, Leaves, Oil
<i>Bauhinia variegata</i> Linn.	Caesalpinioidae	Goitre, immune system	Fruit, Flower, Bark, Roots
<i>Peltophorum pterocarpum</i> (DC.)	Caesalpinioidae	Treats constipation, dysentery, toothache	Bark
<i>Delonix regia</i> Bojer.	Caesalpinioidae	Menstrual, Antibacterial, Microbial	Fruit, Bark, Leaves
<i>Cannabis sativa</i> L.	Cannabaceae	Chronic "pain", multiple sclerosis and mental illness	Leaves, Oil, Seed
<i>Carica papaya</i> Linn	Caricaceae	Reduce inflammation, improve blood pressure, improve blood control, improve skin and hair health, prevent cancer	Fruit, Leaves, Flower
<i>Casuarina equisetifolia</i>	Casuarinaceae	Nervous disorders, acne, stomach ulcers, diabetes	Fruit, Bark, Leaves
<i>Gloriosa superba</i> L.	Chochicaceae	For use abortion, piles, haemorrhoids, and impotence	Bulb, Flower
<i>Terminalia arjuna</i> Roxb	Combretaceae	Heart disease, high blood pressure	Bark
<i>Terminalia chebula</i> Retz.	Combretaceae	Anti-oxidant, digestive, sedative	Bark, Leaves, Fruit
<i>Terminalia bellirica</i>	Combretaceae	Inflammation control, digestive system	Fruit
<i>Terminalia cattappa</i>	Combretaceae	Hepatitis, chronic inflammation (dermatitis), piles, colic, ulcers	Fruit, Bark, Leaves
<i>Juniperus communis</i>	Conferae	Rheumatic arthritis, gout	Bark, Leaves
<i>Argyrea speciosa</i> Linn	Convolvulaceae	Anaemia, inflammation, apelsi, uretic problem	Vine, Flower, Leaves, Fruit
<i>Cuscuta reflexa</i>	Convolvulaceae	Antibacterial, antioxidant, anti-inflammatory, anti-tumour, anti-fungal, anti-inflammatory, anti-hypertensive, analgesic, anti-hair loss and anti-teratogenic	Stem
<i>Costus igneus</i>	Costaceae	Anti-diabetic, antioxidant, anti-cancer, anti-inflammatory, hepatoprotective	Leaves
<i>Kalanchoe pinnata</i>	Crassulaceae	Useful in the treatment of gastric ulcers, respiratory infections, boils, wounds and arthritis	Leaves, Flower
<i>Coccinia grandis</i>	Cucurbitaceae	Helpful for immune system, oxidative, stress, for heart	Fruit, Roots, Leaves
<i>Cyperus rotundus</i> Linn.	Cyperaceae	Acne, Herpes, Psoriasis & Acne	Stem, Flower
<i>Dioscoria alata</i> L.	Dioscoreaceae	Birth Control	Fruits
<i>Elaeocarpus ganitrus</i>	Elaeocarpaceae	Anxiety, depression, heart attack, back pain, migraine	Fruit, Bark
<i>Embllica officinalis</i> Gaertan	Euphorbiaceae	The fruit is used in medicine to treat a range of diseases, immune-boosting efficiency.	Fruit
<i>Drypetes roxbughii</i>	Euphorbiaceae	Sterility	Fruit, Bark, Leaves, Flower

Botanical Name	Family Name	Uses	Part used
<i>Euphorbia microphylla</i>	Euphorbiaceae	Hair problem, blood purifier, urinary releaser	Leaves, Roots, Stem
<i>Jatropha curcas</i>	Euphorbiaceae	Oil, Increase eye sight site, Bio fuel	Oil, Fruit, Stem
<i>Jatropha gossypifolia</i>	Euphorbiaceae	Increase eight site, skin, worm	Oil, Fruit, Stem
<i>Euphorbia royleana</i>	Euphorbiaceae	Scaly spots, eczema, psoriasis	Sap, Stem
<i>Euphorbia leucocephala</i>	Euphorbiaceae	Anti-influenza activity	Leaves
<i>Phyllanthus nivosus</i>	Euphorbiaceae	decrease pain and inflammation	Leaves, Roots
<i>Acalypha indica</i> L.	Euphorbiaceae	Bronchitis, asthma, pneumonia, rheumatism	Roots, Leaves, Stem, Flower, Fruits
<i>Phyllanthus urinaria/niruri</i>	Euphorbiaceae	Digestive, joint disease, blood purifier	Roots, Leaves, Stem, Flower, Fruits
<i>Euphorbia thymifolia</i>	Euphorbiaceae	Bronchitis, Asthma, conjunctivitis, Ring worm	Leaves, Fruits, Roots, Stem, Flower
<i>Codiaeum variegatum</i>	Euphorbiaceae	Gonorrhoea, malaria, hypertension, impotence	Laves, Bark
<i>Euphorbia hirta</i>	Euphorbiaceae	Relaxation of bronchioles, vomiting, urino-genital	Leaves, Fruits, Roots, Stem, Flower
<i>Ricinus communis</i> L.	Euphorbiaceae	Cough, cold, anti-inflammatory, urinary problems	Leaves, Seed
<i>Pongemia pinnata</i>	Fabaceae	Skin disease, anti-oxidant	Flower, Seed, Bark
<i>Dalbergia latifolia</i> Roxb.	Fabaceae	Ovarian problems, sleepiness,	Fruit, Flower, Bark, Leaves
<i>Ougeinia oojenensis</i> (Roxb.)Hochr.	Fabaceae	Anti-hypertensive, -increased activity, obesity	Fruit, Bark, Leaves, Flower
<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Diabetes	Fruit, Bark, Leaves, Flower
<i>Senna alata</i>	Fabaceae	Ringworm, wound, fungal infection	Fruit, Bark, Leaves, Flower
<i>Dalbergia sissoo</i> Roxb. Ex DC	Fabaceae	Itching, pimples, leprosy, nausea	Fruit, Bark, Leaves, Flower
<i>Pithecellobium dulce</i>	Fabaceae	Anemia, Anti-oxidant, Anti-microbial	Fruit, Bark, Leaves
<i>Parkia biglobosa</i>	Fabaceae	Antiparasitic, hepatoprotective and antiplatelet	Leaves, Pod, Bark
<i>Prosopis cineraria</i> (L) Druce.	Fabaceae	Pediatric disorder, arthritis, cat bite, asthma treatment	Fruit, Bark, Leaves
<i>Clitoria ternatea</i>	Fabaceae	Skin, memory problem, sleepness problem	Leaves, Fruits, Roots, Stem, Flower
<i>Trifolium repens</i>	Fabaceae	Respiratory conditions: cystitis, cough, sitting, Gastrointestinal disorders: gastrointestinal and indigestion, dyspnoea, severe oxidative stress, menopausal symptoms	Leaves, Roots, Flower
<i>Cynodon dactylon</i>	Gramineae	Mental problems, stress, miscarriage	Leaves
<i>Ocimum canum</i> L.	Lamiaceae	Bacteria control, Digestive system	Leaves, Roots, Seed
<i>Ocimum americanum</i>	Lamiaceae	Urinary system	Leaves, Roots, Seed
<i>Ocimum basilicum</i>	Lamiaceae	Ring worm control, skin disease	Leaves, Roots, Seed
<i>Salvia rosmarinus, R. officinalis</i>	Lamiaceae	Good for memory, Epilepsy	Flower, Leaves, Oil
<i>Leucas aspera</i> (Willd.)	Lamiaceae	Loss of appetite, bloating, pain, Loss of appetite due to typhoid, fever, and stomach ailments	Leaves, Seed, Roots
<i>Cinnamomum tamla</i>	Lauraceae	Diabetes, Anti-Oxidant, Anti-Inflammation	Bark, Leaves
<i>Acacia arevica</i>	Leguminosae	Blood purifier, cough cold reliever, joint pain	Roots, Fruits, Gum

Botanical Name	Family Name	Uses	Part used
<i>Albizia labback</i>	Leguminosae	Goitre, leprosy, increase sperm count	Bark, Seed, Leaves, Fruit
<i>Beutea monosperma</i>	Leguminosae	Skin, urinary flow, round worm	Seeds, Flower, Leaves, Roots
<i>Pterocarpus santalinus</i>	Leguminosae	Headache, fever, wound healing, anti- diabetic	Oil, Wood
<i>Poinciana puicharima</i>	Leguminosae	To prevent recurrence of malaria, and is used to promote menstrual flow'	Leaves, Flowers, Roots
<i>Mucuna prurita</i> Hook	Leguminosae	Nervous system, Round worm	Seed, Roots
<i>Citrus medica</i>	Lemoniaceae	Worm control, digestive system	Flower, Bark, Roots, Leaves, Oil
<i>Aloe vera</i>	Lilliaceae	Abdomen, liver, kidney disease	Leaves
<i>Legerstromia speciosa</i>	Lythraceae	Diabetes	Flower, Fruit
<i>Legerstromia indica rosea</i>	Lythraceae	Anti-inflammatory, analgesic, anti-inflammatory, antioxidant, anti-inflammatory	Leaves, Fruit, Roots
<i>Lawsonia inermis</i> L.	Lythraceae	Skin problem, headache, burning sensation in feet	Leaves, Stem, Flower
<i>Galphimia gracilis</i>	Malthighiaceae	Relief from "chest pain", calming anxiety as well as relief from diabetes, asthma, malaria, rhinitis, hay fever (alveolar rhinitis), dysentery	Leaves, Pods
<i>Thesposia populnea</i>	Malvaceae	Diarrhoea, cough reliever, diuretic	Flower, Bark, Leaves
<i>Grewia asiatica</i>	Malvaceae	Reduces asthma and swelling	Fruit, Bark, Leaves
<i>Hibiscus rosa-sinensis</i>	Malvaceae	Anti-tumor, anti-fertility, anti-ovulatory, pregnancy, preventive implantation,	Leaves, Flower, Stem
<i>Malvastrum coromandelianum</i>	Malvaceae	Anti-inflammatory, antiseptic, analgesic, anti-bacterial, hypoglycaemic	Leaves, Roots, Flower
<i>Abutilon indicum</i> Linn.	Malvaceae	To increase blood pressure, muscle mass, blood pressure	Leaves, Flower, Roots
<i>Abelmoschus manihot</i>	Malvaceae	Anti Halitosis, stomach problems, to increase appetite	Seed, Fruit
<i>Maranta arundinacea</i>	Marantaceae	Relief from acidity and stomach pain, Improves digestion	Leaves
<i>Azadiracta indica</i>	Meliaceae	Cough, cold digestive system, vomiting	Flower, Fruit, Leaves, Roots, Oil
<i>Melia azadaracta</i>	Meliaceae	Leukoderma, leprosy, scabies, scrofula (Goitre), Piles	Fruit, Bark, Leaves
<i>Chakrasia tabularis</i>	Meliaceae	Anti malarial, anti bacterial, anti fungal	Bark, Leaves
<i>Tinospora cordifolia</i>	Menispermaceae	Fever, digestive system	Vine, Stem, Leaves
<i>Cocculus hirsutus</i>	Menispermaceae	To treat leprosy, skin diseases, indigestion	Roots, Leaves
<i>Callindra haematocephate</i>	Mimosaceae	Anti-inflammatory, anticoagulant, immunomodulatory and anticarcinogenic	Leaves, Pods, Roots
<i>Mimosa pudica</i>	Mimosaceae	Urinary tract infections and increased diuretic activity	Leaves, Flower
<i>Acacia catechu</i> Willd.	Mimosoideae	Diarrhoea, vitiligo	Kattha, Bark
<i>Acacia auriculiformis</i> Acumm.	Monosoideae	Euphoria, oral and dental hygiene, burn injuries	Pods, Bark, Leaves, Seeds

Botanical Name	Family Name	Uses	Part used
<i>Morus alba</i>	Moraceae	Improves bone health and fever	Fruit, Leaves, Bark
<i>Ficus glomerata</i> Roxb.	Moraceae	Digestive system, reproductive system	Bark, Milk, Flower
<i>Ficus laiker</i>	Moraceae	Cough reliever, inflammation control	Bark, Leaves, Milk
<i>Ficus bengalensis</i>	Moraceae	Cough reliever, pain reliever, ulceration	Leaves, Root, Milk, Fruit
<i>Ficus religiosa</i> Linn	Moraceae	Blood pressure, Respiratory system	Fruit, Flower, Leaves, Roots, Bark
<i>Ficus carica</i>	Moraceae	Constipation, Bone hardening	Fruit, Bark, Leaves
<i>Artocarpus heterophyllus</i>	Moraceae	Recirculation, Recirculation, Wound Healing	Fruit, Bark, Leaves
<i>Ficus benamina</i> starlight	Moraceae	Causes rhinoconjunctivitis and allergic asthma	Leaves
<i>Ficus lyrata</i>	Moraceae	Mental relief, allergy	Leaves
<i>Moringa oilifera</i>	Moringaceae	Nervous system, high blood pressure, kidney	Root, Bark, Seed, Flower, Fruit
<i>Syzygium cumini</i>	Myrtaceae	Urinary problem, diabetes, blood circulation	Fruit, Flower Leaves, Roots
<i>Callistemon viminalis</i>	Myrtaceae	Diarrhoea, Dysentery, Gout, Anti Mosquito	Bark, Flower, Leaves
<i>Syzygium aromaticum</i>	Myrtaceae	Antibacterial, Viral, Protozoan, Cholera	Fruit, Leaves
<i>Psidium guava</i> Linn.	Myrtaceae	Intestinal disease, pain, diabetes, wounds	Fruit, Bark, Leaves, Flower
<i>Corymbia citriodora</i>	Myrtaceae	Dysentery, malaria, bacteria	Fruit, Bark, Leaves, Flower
<i>Bougainvillea spectabilis</i>	Nyctaginaceae	Treatment of cough and breathing problems	Leaves, Flower
<i>Boerhavia diffusa</i>	Nyctaginaceae	It improves the digestive system", reduces blood retention and is very useful in the management of heart diseases. It also provides relief in anemia, pneumonia and respiratory distress	Leaves, Roots, Flower
<i>Nictanthus arbourtritis</i>	Oleaceae	Joint pain, malaria, alopecia (baldness), piles	Leaves, Roots Bark
<i>Jasminum grandiflorum</i> Linn	Oleaceae	Liver disease (hepatitis), pain due to liver damage (cirrhosis) and stomach pain due to severe diarrhoea (diarrhoea)	Leaves, Flower
<i>Jasminum auriculatum</i>	Oleaceae	Heart diseases, blood disorders, poisoning, skin diseases, stomatitis, gum inflammation, eye disorders and ear, nose, throat problems	Leaves, Flower
<i>Jasminum sambac</i>	Oleaceae	Mental relief, Anxiety, Allergy, Antibacterial, Oxidative	Leaves, Fruit
<i>Jasminum pubescens</i>	Oleaceae	It is useful in diseases like cough, bile, poison, digestion, heart diseases, Rheumatic disorders, Blood disorders etc.	Leaves, Roots, Flower
<i>Erithrina indica</i> Larn.	Papilionaceae	Antibacterial, Anti-Obesity, Anti-HIV1, Anti-fungal	Fruit, Bark, Leaves, Flower
<i>Passiflora edulis</i>	Passifloraceae	A soothing herb for anxiety, insomnia, seizures and hysteria	Leaves, Fruit
<i>Phyllanthus urinaria</i>	Phyllanthaceae	Human myeloid leukemia, antitussus	Leaves, Fruit, Stem, Roots
<i>Thuja orientalis/Phytyclaus orientalis</i>	Pinaceae	Bronchitis, bacteremia, skin infections, and colds, wounds	Leaves, Fruit, Roots
<i>Dendrocallamus strictus</i>	Poaceae	Treatment of high blood pressure, atherosclerosis, CTVS disease	Bark, Leaves

Botanical Name	Family Name	Uses	Part used
<i>Cymbopogon flexuosus</i>	Poaceae	Cough, cold reliever, high blood pressure	Leaves
<i>Saccharum spontaneum</i>	Poaceae	Used to treat urinary problems, constipation and piles	Stem, Flower
<i>Polypodiopsida</i>	Polypodiaceae	Mental relief, allergy	Leaves
<i>Portulaca oleracea</i>	Portulacaceae	Laxative, cardiac tonic, carminative, muscle relaxant and anti-inflammatory and useful in the treatment of dysentery	Leaves, Fruits, Roots, Stem, Flower
<i>Grevellia robusta</i>	Proteaceae	Earache, Bronchitis, Flu and Toothache.	Bark, Leaves, Flower
<i>Punica granatum</i> Linn.	Punicaceae	Acidity, blood disease, anaemia,	Juice, Fruit, Bark, Roots, Leaves
<i>Chenopodium album</i>	Rhamnaceae	Skin rejuvenation, weight loss, digestion	Fruit, Bark, Leaves, Flower
<i>Haldina cordifolia</i> (Roxb.) Ridsd.	Rubiaceae	Swelling, Blood and Skin Disease	Fruit, Bark, Leaves, Flower
<i>Neolamarckia cadamba</i>	Rubiaceae	Pain, Swelling	Fruit, Bark, Leaves, Flower
<i>Limonia acidissimal</i>	Rutaceae	Liver and cardiac tonic, gum disease	Fruit, Bark, Leaves
<i>Murraya exotica</i>	Rutaceae	Asthma, wound healing	Leaves, Flower
<i>Murraya koenigii</i>	Rutaceae	Morning sickness, diabetes, vomiting	Leaves, Bark, Fruit
<i>Santalum album</i> linn.	Santalaceae	Anxiety, skin disease, fever	Wood, Oil
<i>Schleichera oleosa</i>	Sapindaceae	Ulcer, Injury, Anti- microbial	Fruit, Bark, Leaves, Flower
<i>Litchi chinensis</i> Sonn.	Sapindaceae	Hernia, Obesity, Stomach Upset, Neurogenic Pain	Fruit, Bark, Leaves
<i>Manilkara achras</i> Fosberg.	Sapindaceae	Immunity, Antiviral, Dysentery, Fever, lung cancer	Fruit, Bark, Leaves
<i>Eagle marmelus</i>	Sapotaceae	Digestive control, urine control, respiratory	Roots, Leaves, Bark, Flower
<i>Madhuca indica</i> Gmel.	Sapotaceae	Ulcers, scalds, bronchitis, laxative	Bark, Leaves, Fruit, Seeds
<i>Mimusops elengi</i>	Sapotaceae	Cough reliever, headache, dental pain reliever	Fruit, Flower, Leaves, Roots
<i>Manilkara hexandra</i>	Sapotaceae	Improves function of jaundice, goiter, immunity	Fruit, Bark, Leaves
<i>Leucophyllum frutescens</i>	Scrophulariaceae	Mild sedative, taken as a bedtime drink, irritating, menstrual cramp stimulant	Leaves, Flower
<i>Bacopa monnieri</i>	Scrophulariaceae	To reduce urosis, high blood pressure and anxiety	Leaves, Roots
<i>Ailanthus excels</i>	Simrubaceae	Skin diseases, poisons, wounds, wounds	Bark, Leaves
<i>Solanum nigrum</i> Linn.	Solanaceae	Digestive system, fever control	Flower, Fruits, Leaves, Roots, Stem
<i>Withania somnifera</i> Dunal	Solanaceae	Sexual and general weakness, diuretic	Stem, Roots, Leaves, Fruit
<i>Datura stramonium</i> L.	Solanaceae	Bronchitis, asthma antispasmodic	Roots, Leaves, Stem, Flower, Fruits
<i>Cestrum nocturnum</i>	Solanaceae	To reduce high blood pressure and anxiety, take mental tonic	Leaves, Roots, Flower
<i>Cestrum diurnum</i>	Solanaceae	Source of Vitamin D3	Leaves, Roots, Flower, Fruit
<i>Nicotiana tabacum</i> Linn.	Solanaceae	Nervous system, digestive system, respiratory system	Leaves
<i>Solanum virginianum</i>	Solanaceae	cold and cough, half-headache/migraine, and	Leaves, Fruit, Flower, Roots

Botanical Name	Family Name	Uses	Part used
		headache", worms	
<i>Helicteres isora</i>	Sterculiaceae	Gastrointestinal disorders, diabetes, cancer and infections	Leaves, Fruit
<i>Holoptelea integrifolia</i>	Ulamaceae	Swelling, piles, constipation, vomiting	Fruit, Bark, Leaves
<i>Vitex nigandu</i>	Verbenaceae	Digestive system, urinary flow, kidney problem	Leaves, Roots, Seeds
<i>Duranta repens</i>	Verbenaceae	Anti-microbial, Anti-oxidant	Leaves, Flower
<i>Cissus quadrangularis</i>	Vitaceae	Increases calcium absorption and also enhances the effect of other vitamins which help in food metabolism	Stem
<i>Curcuma aromatica</i>	Zingiberaceae	Antiseptic, anti inflammatory, arthritis	Roots/Bulb
<i>Curcuma longa</i>	Zingiberaceae	Arthritis, conjunctivitis, skin cancer, smallpox	Bulb

The present study highlights the dominance of four major plant families—Euphorbiaceae, Fabaceae, Moraceae and Solanaceae in the medicinal flora of hospital. Each of these families contains species with significant medicinal applications. *Emblica officinalis* Gaertan (Amla) from Euphorbiaceae is widely used for cough, cold, hair fall, and acidity, with its fruit and bark being the primary medicinal components [15]. *Pongamia pinnata* (Karanj) from Fabaceae is beneficial for skin diseases and antioxidant properties, while *Morus alba* (Shahtoot) from Moraceae is traditionally used for bone health and fever [16, 17]. *Solanum nigrum* Linn. (Makoy) from Solanaceae has applications in digestive health and fever control. *Achyranthes aspera* Linn. (Apamarg) from Amaranthaceae is employed for urinary problems, blood purification, and goitre treatment [18, 19]. Preclinical studies have shown that the extracts and bioactive constituents of *Amaranthus* spp. confer several biological activities, including antioxidant, immunomodulatory, hepatoprotective, gastro-protective, cardioprotective, hypolipidemic, anticancerous, antidiabetic, and antimicrobial, which has ignited the interest of researchers in this modest vegetable all over the world [20]. A comprehensive overview of the ergogenic potential of *Amaranthus* and further research promises insights into developing *Amaranthus*-based dietary supplements for enhancing sports performance [21].

Apart from these dominant families, several rare and valuable medicinal plant species were also documented in the BMHRC premises, contributing significantly to traditional medicine. *Radermachera xylocarpa* (Bignoniaceae), locally known as Garud this species is traditionally used for treating coronary diseases and thrombosis, with flowers, leaves, and bark being utilized [22]. *Dalbergia latifolia* (Fabaceae) – Known as Shisham, this species is valued for its role in ovarian disorders and sleep regulation, with its fruits, flowers, bark, and leaves used in traditional healing. *Ougeinia oojeinensis* (Fabaceae) – referred to as Tinsa, it possesses anti-hypertensive

and obesity-controlling properties, with medicinal applications derived from its fruit, bark, leaves, and flowers. *Pterocarpus marsupium* (Fabaceae) – Commonly known as Vijaysar, it is widely used for diabetes management, with fruits, bark, leaves, and flowers utilized for medicinal purposes [23]. *Haldina cordifolia* (Rubiaceae) – also called Haldu, it is used for treating swelling, blood disorders, and skin diseases, with various plant parts (fruit, bark, leaves, flowers) incorporated into traditional formulations [24, 25]. *Schleichera oleosa* (Sapindaceae) – known as Kusum, this plant has applications in ulcer treatment, wound healing, and antimicrobial therapy, with fruit, bark, leaves, and flowers used medicinally [26, 27]. *Terminalia chebula* (Combretaceae) – Popularly called Harad, it is a well-documented antioxidant, digestive aid, and sedative, with bark, leaves, and fruit used in herbal preparations [28-30]. *Buchanania lanzan* (Anacardiaceae) – known as Chironji, this species is beneficial in treating impotence, mumps, and indigestion, with fruits, bark, leaves, and flowers widely used in traditional remedies [31, 32].

The increased incidences of adverse effects of synthetic drugs paved way to employ the natural herbal medicines in recent time, many aromatic plants extracts and plant products have used as scavengers of free radical and as antioxidants [6], and further suggested to encourage to focus studies on more screening of aromatic compounds for their bioactivities. Also handful studies are also available for the use of medicinal plants in the treatment of CKD and it was suggested to focus more on molecular studies to identify the active compounds responsible for biological activity [7]. However, it is well known fact about the variety of plant based medicine that different plant extract shows different activity because of their variations in chemical compositions and chemical constituents such as phenolic compounds, nitrogen compounds, vitamins, terpenoids, and certain other endogenous metabolites might result in the complex radical scavenging and antioxidant mechanisms [33].

The presence of these medicinal species at BMHRC enhances the center's role in ethnobotanical conservation and herbal medicine research. Many of these species have been traditionally used but remain underexplored in modern pharmacology, necessitating further phytochemical and clinical investigations. Additionally, the conservation of these rare species is crucial to ensuring their sustainable use for future medicinal applications.

Overall, this study reinforces the ethnopharmacological importance of BMHRC's medicinal flora, demonstrating the need for continued research, conservation, and integration of traditional knowledge with scientific advancements to harness their full therapeutic potential.

4. Conclusions

Beyond its medicinal flora, BMHRC serves as a model for integrating plant conservation into healthcare settings, demonstrating the symbiotic relationship between biodiversity, eco-health, and therapeutic practices. Its campus functions as a green zone for healing and reconciliation, where year-round arboriculture and plant propagation efforts maintain and enhance the environment. Studies suggest that simply viewing natural landscapes can reduce stress within minutes, while extended exposure to hospital gardens improves clinical outcomes, reducing pain medication intake and shortening hospital stays.

With 202 documented medicinal plant species, BMHRC fosters a therapeutic landscape that not only benefits patients but also enhances staff well-being and job satisfaction. Research indicates that well-designed hospital gardens contribute to higher patient and family satisfaction, reduced stress levels, and improved healthcare experiences, making them an invaluable asset in patient-centered care.

Furthermore, as healthcare institutions strive to improve quality and cost efficiency, the role of green spaces in enhancing medical outcomes and economic sustainability is gaining increasing recognition. BMHRC's commitment to integrating nature into its healing environment exemplifies a forward-thinking approach to patient care, public health, and biodiversity conservation. This model underscores the need for continued research, conservation, and interdisciplinary collaboration to optimize the therapeutic potential of medicinal plants and healing landscapes in healthcare settings.

Abbreviations

BMHRC	Bhopal Memorial Hospital and Research Centre
CKD	Chronic Kidney Disease
GHG	Green House Gas
RSPM	Respirable Suspended Particulate Matter
HSCC	Hospital Services Consultancy Corporation Limited
COPD	Chronic Obstructive Pulmonary Disease

BP Blood Pressure

Acknowledgments

The authors would like to thank the Engineering and Horticulture Department (Mr. Devendra Singh and Mr. PS Kirar), BMHRC, Bhopal for helping in listing the species of plants in campus.

Author Contributions

Manisha Shrivastava: Conceptualization, Resources, Writing – review & editing

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Ravindra Samarth: Conceptualization, Data curation, Formal Analysis, Supervision, Writing – review & editing

Conflicts of Interest

The authors declare no conflicts of interest.

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