Project On

A Survey on Ethnopharmacological Wild Medicinal Plant in Rangpur District, Bangladesh.

Submitted To

The Department of Pharmacy,

Faculty of Health & Life Sciences,

Daffodil International University

In the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

Submitted By

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Batch: 24th

Department of Pharmacy

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Daffodil International University

October 2024

APPROVAL

This project, A Survey on Ethnopharmacological Wild Medicinal Plant in Rangpur District, Bangladesh, submitted to the Department of Pharmacy, Faculty of Health & Life Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Pharmacy and approved as to its style and contents.

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ABSTRACT

This study presents a comprehensive survey of ethnopharmacological wild medicinal plants in the Rangpur District of Bangladesh, focusing on their traditional uses, local practices, and therapeutic potential. The research involved interviews with local healers and community members to document their knowledge and experience with various medicinal plants. A total of 15 wild species were identified, including Piper longum, Punicum granatum, Plumbago zeylanica, and Terminalia bellirica. The findings reveal that these plants are commonly used for treating a range of ailments, including digestive disorders, respiratory issues, and skin diseases. Additionally, the study highlights the significance of preserving traditional knowledge and promoting sustainable practices in the use of medicinal plants. The results contribute valuable insights into the ethnopharmacological practices of the region and underscore the need for further scientific validation of these traditional remedies.

Keywords: Ethnopharmacology, Medicinal plants, Traditional medicine, Rangpur District, Bangladesh, Herbal remedies, Sustainable practices, Community knowledge.

Certificate

This is certified that the results of the investigation that are embodied in this thesis works are original and have not been submitted before in substance for any degree or diploma of the university. The entire present work submitted as a thesis work for the partial fulfilment of the degree of Bachelor of pharmacy.

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DECLARATION

I, at this moment, announce that I am carrying out this project study under the supervision of **"Md. Mizanur Rahman**, Assistant Professor, Department of Pharmacy, Faculty of Health & Life Sciences, Daffodil International University, Impartial Compliance with the Bachelor of Pharmacy Degree Requirement (B. Pharm). This project, I declare, is my original work. I also state that neither this project nor any part thereof has been submitted for the Bachelor's award or any degree elsewhere.

Submitted By:

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Chapter One: Introduction

1.1. Plant

Photosynthetic eukaryotic organisms constitute the entire kingdom Plantae. Previously believed to encompass fungi and certain types of algae, this group was referred to as plants. However, contemporary classifications have eliminated these organisms, as well as all prokaryotes (including bacteria and archaea). Viridiplantae, or "green plants," is closely related to the group Glaucophyta, which includes land plants, and includes chlorophyte phytoplankton and the clade Embryophyta. This category includes a diverse array of organisms, including mosses, hornworts, liverworts, ferns, and florals. The majority of plants are multicellular, and their cells contain chloroplasts that enable photosynthesis, the primary energy source for green plants, through compounds such as chlorophylls a and b. Although certain parasitic or mycotrophic plants are unable to photosynthesize as a result of a deficiency in chlorophyll, they are still capable of producing flowers, fruits, and spores. Plants frequently have alternating generations and reproduce through both sexual and asexual methods. An estimated 260,000–290,000 plant species are capable of reproducing without seeds, out of a total of over 320,000 [1]. Furthermore, green plants are a critical source of sustenance worldwide and generate nearly all the oxygen necessary for the Earth's ecosystems. For centuries, humans have cultivated a variety of plants, such as cereal grains, fruit trees, and vegetable gardens, in order to provide for their needs. For centuries, plants have been employed to manufacture a variety of essential products, including nourishment, fiber, paper, medications, and even psychoactive substances [2]. The scientific discipline of botany is dedicated to the investigation and study of vegetation. Throughout history, all living organisms that produced oxygen or necessitated sustenance were classified as either plants or animals. Aristotle, a Greek philosopher (384-322 BC), is frequently credited with the initial recognition of the similarities between plants and animals. He observed that animals are frequently mobile in order to gather sustenance, whereas plants remain stationary. The modern scientific classification system was founded by Carl Linnaeus (1707-1778), who classified life into the kingdoms Vegetabilia (later known as Metaphyta or Plantae) and Animalia (Metazoa). After it became apparent that the plant kingdom contained a variety of species that were not closely related to one another, fungi and specific algae were reclassified into separate kingdoms. This process occurred over time. Nevertheless, a significant number of individuals still loosely refer to these organisms as "plants." A "plant" is typically defined as a multicellular organism that possesses primary chloroplasts and cellulose-rich cell walls, which facilitate photosynthesis [3-4].

1.2. Medicinal plants

Medicinal botanicals were frequently employed in the traditional healthcare systems of ancient civilizations. Plants generate an extensive array of compounds that fulfill numerous functions, including protection against insects, herbivores, fungi, and diseases. Currently, we are aware of the existence of a multitude of phytochemicals, and a significant number of these compounds have been confirmed or strongly suggested to have biological effects. Nevertheless, the therapeutic potential of utilizing an entire plant as a medicinal agent is still a topic of debate due to the fact that each plant contains a multifaceted combination of phytochemicals. Despite the widespread belief that numerous plants possess medicinal properties, only a small number have been subjected to the rigorous scientific testing necessary to confirm their efficacy and safety, let alone to gain a comprehensive understanding of their phytochemical composition and pharmacological activities [5]. Hundreds of medicinal botanicals, including opium, are documented in Sumerian clay tablets, which date from approximately 3000 B.C. to 300 A.D. The Ebers Papyrus, a text that is particularly noteworthy for its discussion of medicinal practices and therapeutic botanicals, is one of the well-preserved ancient Egyptian archives [6]. In addition to their economic value, medicinal plants have a diverse array of applications. They contain therapeutically active compounds (Stary) that can be employed to treat a variety of maladies. Numerous plant extracts have been investigated, developed, and suggested as potential medicinal agents. Intensive research is currently being conducted on medicinal plants due to their distinctive properties, including their potential to provide phytochemicals with therapeutic benefits that could aid in the development of novel drugs. Numerous studies have suggested that phytochemicals, or plant-derived compounds, may contribute to the prevention of cancer and provide health benefits [7]. Okinawans, who possess one of the highest rates of centenarians, have demonstrated the advantages of a plant-based diet. In the same vein, the DASH (Dietary Approaches to Stop Hypertension) diet and the modern Mediterranean diet both prioritize meals that are abundant in phytochemicals, which promote health and longevity [8-9]. The natural presence of beneficial phytochemicals in common fruits and vegetables has sparked a growing interest in the use of medicinal plants as natural alternatives to synthetic and traditional pharmaceuticals in cosmetics. Antioxidant properties are exhibited by plant extracts and essential oils, which are recognized for their high concentrations of phenolic and flavonoid compounds. These properties may provide protection against age-related disorders that are associated with oxidative stress. Research on medicinal plants is essential and should be

prioritized in conjunction with conventional drug research, as a result of the abundance of beneficial phytochemicals in these plants and the increasing popularity of natural products in pharmaceuticals and cosmetics.

Pre-extraction and extraction are the initial phases of medicinal plant research, which are conducted to access bioactive components. maceration and Soxhlet extraction are frequently employed in small-scale laboratories and factories. The efficacy and cost-effectiveness of extraction technologies have been enhanced by recent developments, including supercritical fluid extraction, microwave-assisted extraction, and ultrasound-assisted extraction (SFE). These developments enable a more comprehensive extraction process, with each method presenting its own set of advantages and obstacles. This summary offers recommendations for selecting the most suitable technique in light of recent advancements, emphasizing the principles, advantages, and constraints of frequently employed methodologies [10].

1.3. Plants Used for Medical Purposes

Medicinal plants are the term used by herbalists to describe the wide variety of plants that possess medicinal properties. These plants are recognized for their ability to encourage the development of new therapies. These plants have been acknowledged for their contributions to human nutrition and health and have played a critical role in the expansion of human civilization. Ginger, green tea, and hazelnuts are among the plants that are emphasized for their therapeutic properties. It is important to note that the active compounds in products such as toothpaste and aspirin are believed to have plant origins. However, the specific plant species that contribute to each product vary.

Different Medical Practices

The term "Alternative Medicine" is frequently employed to refer to treatments for ailment that employ botanical remedies. Nevertheless, conventional medications in tablet or capsule form are also frequently derived from plants. Plant extracts are incorporated into the formulation of numerous pharmaceuticals, with several medications being entirely plant-based. For example, the flora yew, foxglove, periwinkle, and opium poppy are the origins of medications such as vincristine, morphine, and taxol, respectively [11].

1.4. Ethnobotany

The term "ethnobotany" denotes the scientific investigation of plants and their applications based on the customs and mythology of a particular culture in relation to its native flora and fauna. The latter half of the nineteenth century saw the emergence of this discipline of study. The objective of ethnobotanists is to record the diverse methods by which plants are employed in human existence, such as for the production of alcohol, cookery, medicine, and textiles. Richard Evans Schultes, who is frequently referred to as the "father of ethnobotany," defined it as the "scientific investigation of plants from various cultures." The focus of ethnobotany has shifted from the bare documentation of plants to the application of this knowledge in contemporary contexts, particularly within the pharmaceutical industry, since Schultes's era. Today, ethnobotany faces two significant challenges: safeguarding intellectual property rights and guaranteeing equitable financial distribution. [12-13].

1.5. Ethnopharmacology

Ethnopharmacology is a discipline that investigates the historical and contemporary connections between various cultures and plant-based medications. It is a valuable source of lead compounds for pharmaceutical development, closely related to ethnobotany, and it concentrates on the use of plants for medicinal purposes [14]. Although conventional medicine has been the primary focus in the past, this approach has also been effectively employed in the investigation of new medications. It encompasses a number of critical research areas, such as the identification of medicinal plants, ethnotaxonomy (the cognitive categorization of plants), the preparation of traditional pharmaceutical forms, and the bio-evaluation of the potential pharmacological effects of these preparations (ethnopharmacology). Furthermore, it evaluates the prospective clinical efficacy and investigates the social and medical repercussions of the use of these compounds, utilizing the discipline of medical anthropology [15-16].

1.6. The importance of ethnobotany in the search for new pharmaceuticals

Pharmaceutical companies that concentrate on leads from traditional medications do so primarily for financial benefit, rather than out of benevolence, underscoring a profit-driven aspect of the industry. The pharmaceutical industry frequently prioritizes its own interests, despite the fact that ethnobotany offers a valuable method of identifying innovative combinations. Ibuprofen, reserpine (for hypertension), and D-tubocurarine (a muscle relaxant used in medical procedures) are modern

medications that were derived from plants that have been used in traditional medicine for a long time. These plants continue to be of service to us today. An estimated 25% of all medications sold in North America contain active constituents that have been approved by healthcare professionals and are derived from botanicals (Farnsworth, 1988). The corporate sector initially recognized approximately three-quarters of these medications as a result of their pervasive use in complementary and alternative medicine (Farnsworth, 1988; Farnsworth, 1990).

Analysts are more likely to uncover additional insights about a specific plant when they are provided with both ethnobotanical data and indigenous knowledge. This is due to the fact that ethnobotanical records and the knowledge of indigenous peoples are founded on personal experience, which frequently yields more precise and detailed information than scientific documentation (Balick, 1990). In the present day, scientists can accomplish their objectives of demonstrating rapid pharmacological activity by employing conventional pharmacopoeia in in vitro and in vivo studies [17].

1.7. Knowledge on medicinal plants and practices

Since ancient times, medicinal plants have been indispensable in the field of healthcare, fulfilling both preventive and curative functions in the well-being of humans. Traditional remedies continue to be employed in specific regions, despite the fact that allopathic medicines are now extensively accessible in Bangladesh and around the world [18]. Even in the 21st century, traditional remedies, which are frequently referred to as ethnic medicine, continue to be essential in numerous countries. For centuries, traditional physicians, who are referred to as Kaviraj, have procured these medicinal plants from nature and have employed them in their clinical procedures. Although these medications are profoundly rooted in indigenous knowledge systems, they frequently encounter obstacles in terms of formal recognition and integration into contemporary healthcare. [19]. These cognitive systems are part of the local community's lifestyles [20].

The pharmaceutical industry indirectly depends on medicinal plants for their products, while approximately 71% of the global population continues to rely on traditional remedies for primary healthcare. Approximately 19% of the top 153 prescription pharmaceuticals are derived from plants, and approximately 26% of the modern pharmacopoeia is founded on traditional medicinal plants [21]. Traditional remedies in Asia generate 44% of global revenue, with over 38,650

medicinal plant species, of which 78 are commercialized. Bangladesh, China, Nepal, Indonesia, Myanmar, Pakistan, and India are the primary Asian countries that are essential for the incorporation and cultivation of medicinal plants [22].

The medicinal plants that are naturally available in Bangladesh are abundant. During the early 1980s, the Ayurvedic and Unani (herbal medicine companies) medicine companies sourced approximately 80% of their plant requirements from domestic forests, while the remaining 20% was met through importation. However, at present, imports account for 80% of the plant requirements, while 20% are satisfied by locally cultivated medicinal plants [23]. According to the Bangladesh Agricultural Research Institute (BARI), there are 711 species of medicinal plants in Bangladesh. Ayurvedic and Unani medicine manufacturers utilize 255 of these plants. In nearly every village of Bangladesh's 87,223 villages, there is at least one traditional physician or Kaviraj (local name) who has been exercising and treating individuals with their experience and expertise in traditional remedies [24]. According to a survey report, approximately 39% of rural residents possess knowledge about medicinal plants, and 13% of rural residents are currently administering medicinal plant treatments to others. Kaviraj's employ straightforward formulations to treat diseases, some of which are capable of treating chronic and everyday illnesses in both infants and the elderly [25].

Diversity of traditional plants: The world is home to a vast and extensive variety of traditional medicinal flora. For centuries, these plants have been employed by a variety of indigenous cultures and traditional medicinal systems to alleviate a broad variety of maladies [26]. The world is home to a vast and extensive variety of traditional medicinal flora. For centuries, these plants have been employed by a variety of indigenous cultures and traditional medicinal systems to alleviate a broad variety of afflictions. The following is a concise summary of the subject matter; however, it is important to acknowledge that this response is not comprehensive and should be considered a launching point for additional research [27].

The geographic distribution of traditional medicinal plants is highly variable, with distinct plants being more prevalent in specific regions of the globe. For instance:

Asia: A extensive tradition of botanical medicine is present in Asian countries, including China and India. Traditional Chinese Medicine (TCM) employs a diverse selection of medicinal plants,

such as ginseng (Panax ginseng), licorice root (Glycyrrhiza glabra), and astragalus (Astragalus membranaceus) [28]. Ayurveda, an ancient medicinal system in India, frequently employs botanicals such as ashwagandha (Withania somnifera), neem (Azadirachta indica), and turmeric (Curcuma longa).

Africa: A wide variety of traditional medicinal plants are found in Africa. For example, the African potato (Hypoxis hemerocallidea) is reputed to possess immune-boosting properties, and the foliage of the cinchona tree (Cinchona officinalis) is employed to treat malaria. The rooibos plant (Aspalathus linearis) and the hoodia cactus (Hoodia gordonii) are two additional plants of note [29].

Americas: The use of medicinal flora by indigenous cultures in the Americas has a lengthy history. For example, the indigenous people of the Andes have traditionally employed the leaves of the coca plant (Erythroxylum coca) to alleviate altitude illness and provide vitality. Salicin, which was the inspiration for the development of aspirin, is present in the bark of the willow tree (Salix spp.). Aloe vera (Aloe barbadensis) and the foliage of the pau d'arco tree (Tabebuia impetiginosa) are additional flora that are employed.

Traditional medicinal plant use in modern medicine: The development of modern medicine has been significantly influenced by traditional medicinal plants, which have been used as sources of bioactive compounds for the production of pharmaceutical medications. For instance, the compound artemisinin, which is derived from the Chinese herb Artemisia annua, has transformed the treatment of malaria and is now a critical component of artemisinin-based combination therapies (ACTs) that are recommended by the World Health Organization (WHO). Opium poppy (Papaver somniferum) and its derivatives, including codeine and morphine, are another example of analgesics that are commonly used in contemporary medicine [30].

Traditional medicinal plants used by Kaviraj's in 21st century: In the 21st century, Kavirajs, traditional physicians in South Asia, continue to rely on medicinal botanicals in their practice. These healers utilize a variety of plant-based remedies to address a variety of maladies, as they have inherited knowledge that has been handed down through generations. Nevertheless, it is crucial to exercise caution and recognize the traditional knowledge that these physicians possess,

as there is a scarcity of recent scientific research that specifically examines the practices of Kavirajes [31].

Chapter Two: Purpose of The Study

2.1. Purpose of the study

- ☑ Document traditional knowledge of medicinal plants in Rangpur.
- ☑ Identify key wild medicinal plant species and their uses.
- ☑ Analyze local usage patterns and treatment methods.
- ☑ Promote conservation and sustainable use of medicinal plants.
- ☑ Provide data for potential pharmacological research.
- ☑ Highlight the role of traditional medicine in rural healthcare.
- ☑ Support cultural heritage and traditional practices.

Chapter Three: Literature Review

3.1. José Manuel Neves a b, Carla Matos a, Carla Moutinho a b, Glória Queiroz d, Lígia Rebelo Gomes "Ethnopharmacological notes about ancient uses of medicinal plants in Trás-os-Montes (northern of Portugal)" Journal of Ethnopharmacology Volume 124, Issue 2, 15 July 2009, Pages 270-283.

The tradition of medicinal plant use in Trás-os-Montes, a region in northern Portugal renowned for its rich cultural and ethnobotanical heritage, is the subject of this research by José Manuel Neves et al., which was published in the Journal of Ethnopharmacology (2009). The researchers documented the knowledge of medicinal plants and their applications in the treatment of a variety of ailments through interviews with local residents. 133 plant species from 53 families were identified in the study, which revealed that a significant number of them are utilized in folk medicine to treat prevalent health issues, including digestive disorders, respiratory afflictions, and skin conditions. The community's dependence on natural remedies that are both accessible and effective is reflected in the preparation methods used, which include infusions, decoctions, and topical applications.

The results emphasize the cultural importance of these plants in local healthcare practices, as well as the necessity of preserving traditional knowledge. Furthermore, the investigation underscores the potential of these plants for pharmacological research, positing that certain ones may present promising opportunities for the development of new drugs. By documenting and preserving valuable knowledge about medicinal plants in Trás-os-Montes and promoting conservation efforts within the region, this work contributes to the broader field of ethnopharmacology.

3.2.Amel Boudjelal, Cherifa Henchiri, Madani Sari, Djamel Sarri, Noui Hendel, Abderrahim Benkhaled, "Herbalists and wild medicinal plants in M'Sila (North Algeria): An ethnopharmacology survey" Journal of Ethnopharmacology, Volume 148, Issue 2, 9 July 2013, Pages 395-402.

Amel Boudjelal and associates conducted a study in 2013 that was published in the Journal of Ethnopharmacology. The study examined the traditional use of natural medicinal plants by herbalists in M'Sila, a region in northern Algeria. The researchers identified 62 native plant species that are used to treat a variety of afflictions, including digestive issues, respiratory problems, and

skin conditions, through surveys with local herbalists. The study delineates the preparation and application methods, including infusions, decoctions, and poultices, that are indicative of the herbalists' comprehensive understanding of the local flora and its therapeutic properties.

The central position of these plants in the community's healthcare, particularly in areas with limited access to contemporary medical facilities, is underscored by the research. It also underscores the necessity of documenting and preserving this traditional knowledge, as modernization poses a threat to its survival.

3.3.M. Martinez, P. Poirrier, R. Chamy, D. Prüfer, C. Schulze,Gronover, L. Jorquera, G. R uiz, "*Taraxacum officinale* and related species—An ethnopharmacological review and its potential as a commercial medicinal plant" Journal of Ethnopharmacology, Volume 169, 1 July 2015, Pages 244-262.

The medicinal properties and commercial potential of Taraxacum officinale (common dandelion) and related species are the subject of M. Martinez and associates' 2015 ethnopharmacological review, which was published in the Journal of Ethnopharmacology. Traditional uses, phytochemical compositions, and pharmacological properties are summarized in this review, which emphasizes the plant's extensive potential in traditional medicine for the treatment of inflammatory conditions, liver complaints, and digestive disorders. The review also addresses the diverse bioactive compounds present in Taraxacum officinale, such as flavonoids, terpenes, and phenolic acids, which have demonstrated potential in laboratory studies for their antioxidant, anti-inflammatory, and anticancer functions.

The authors underscore the dandelion's potential as a commercially viable medicinal plant by emphasizing its resilience, extensive availability, and ease of cultivation. The review advocates for additional clinical research to verify conventional claims and to gain a more comprehensive understanding of the therapeutic advantages of dandelion compounds. Ultimately, the investigation promotes Taraxacum officinale as a potential candidate for the development of standardized commercial medicinal products, in addition to its value as a traditional medicine resource.

Chapter Four: Methodology

4. Methodology

4.1. Study Area

The survey is conducted in the Nilphamari District of Rangpur Division. Badiyar Mor is the name of the village. Although it is not yet widely recognized, this region is abundant in natural medicinal plants. Kavirajs from various communities in Nilphamari travel to Badiyar Mor to gather medicinal flora. The work of two Kavirajs, which encompasses 40 medicinal plants for a variety of maladies, is the subject of the survey. The Kavirajs' interviews were conducted using a semi-structured questionnaire to obtain accurate information. There are two Kavirajs who are currently practicing medicine; however, only two of them were available for the interview. Some of them were hesitant to disclose their remedies. However, two of them were exceedingly accommodating in providing their names and remedies. Even the plant sample was collected with great cooperation.

Name: Bokul Chandro Shil

Age: 49 Years

Name: Kabiraj Giyash Uddin

Age: 74 Years

One of the two Kavirajs who was exceedingly cooperative in the collection of the samples was Bokul Chandro Shil. The field interview was attended by numerous elderly men and women who contributed to the accuracy of the obtained information. The majority of them are over the age of 72. Their expertise in medicinal plants was extensive, and despite their lack of recognition as Kaviraj, they employed these plants to treat their children, family members, and, in some instances, neighbors.

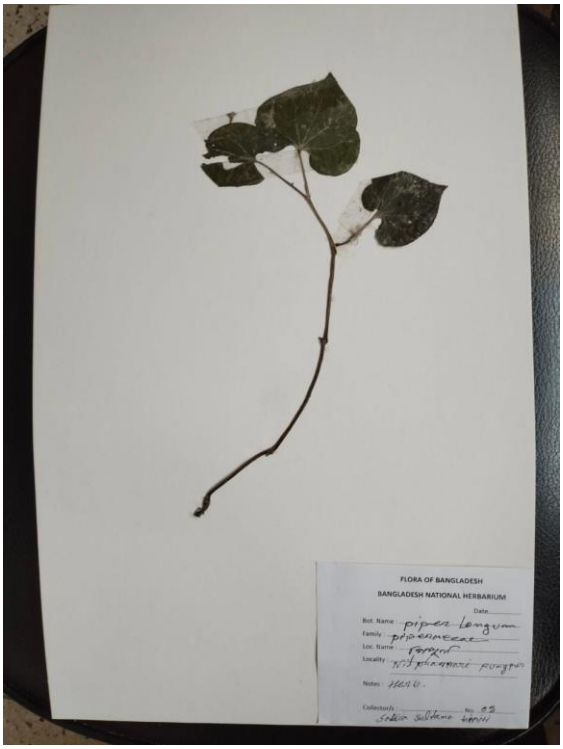
4.2. Data Collection Methods

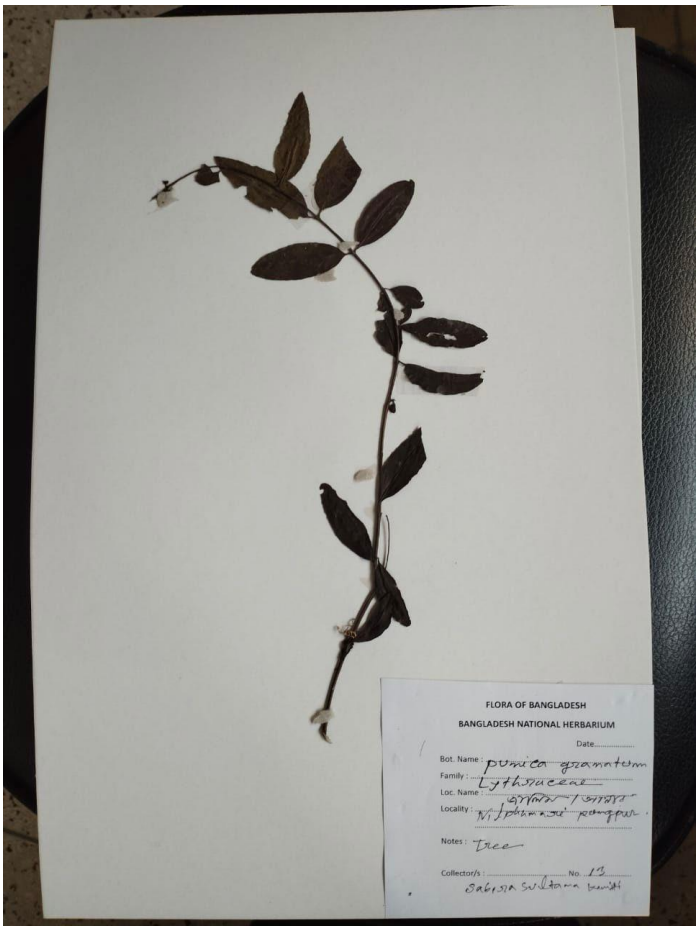
Structured interviews with Kaviraj and field observations were implemented in the investigation. Using a structured questionnaire that concentrated on the identification of plants, their applications, and the methods of preparation, interviews were conducted with local healers, herbalists, and elderly community members. The scientific name, local appellation, elements used, preparation, and dosage of each plant were recorded.

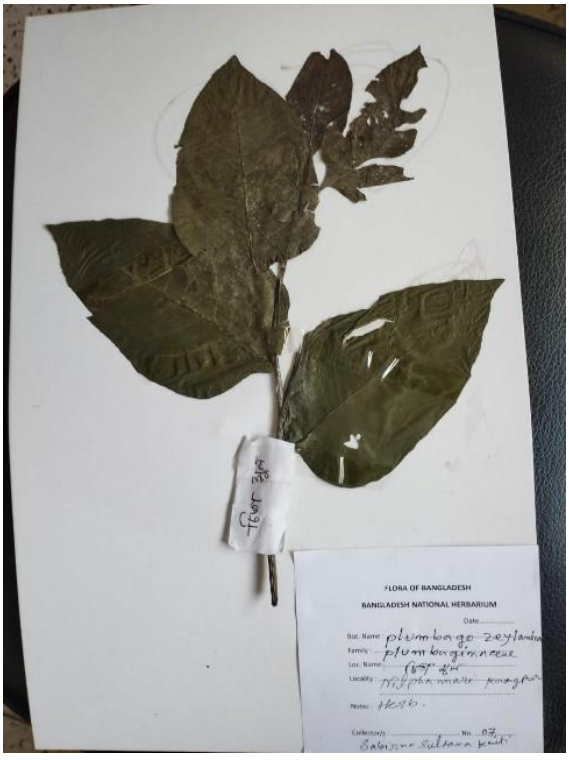
4.3. Data Analysis

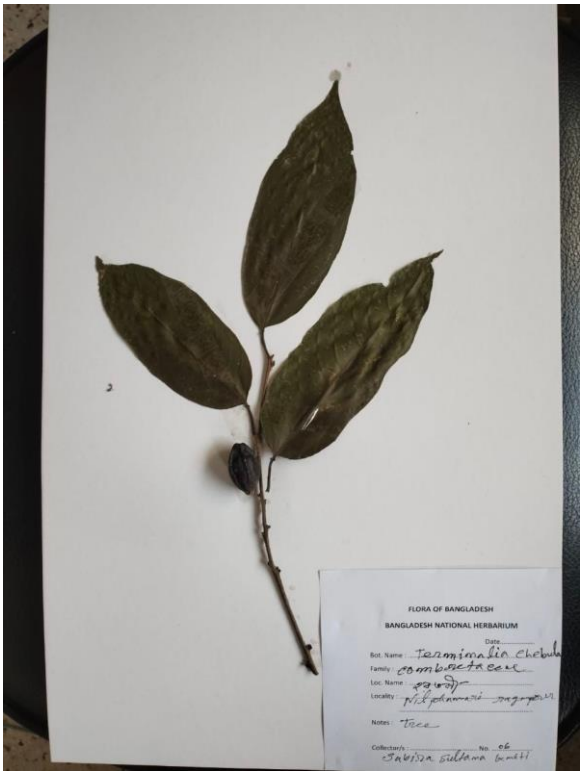
The classification of plants was based on their families, forms of preparation, and applications. In order to evaluate the prevalence of plant use and identify prevalent treatments for maladies, qualitative analysis was implemented. On-site field notes were obtained to document the environment and medicinal plant habitats.

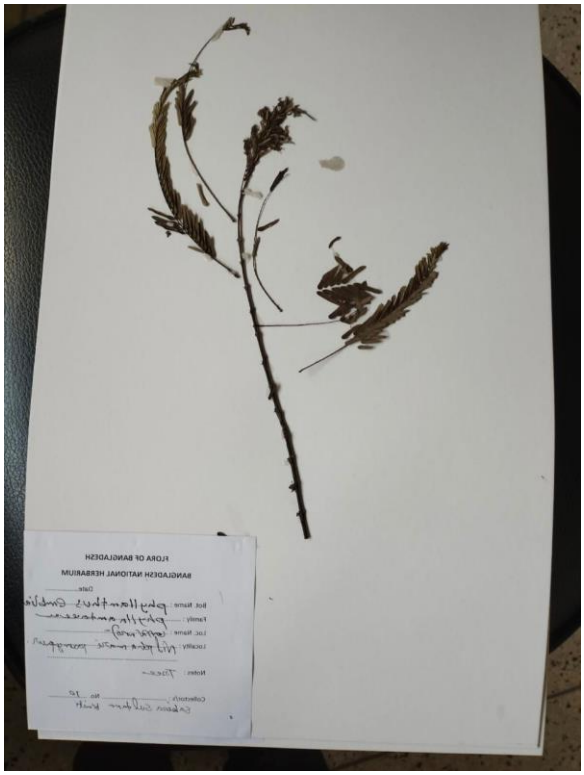
4.4. Herbarium collection

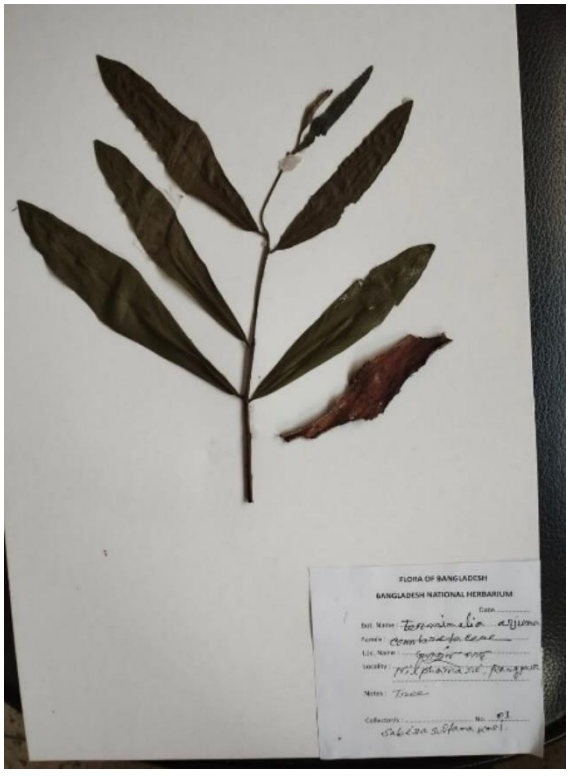


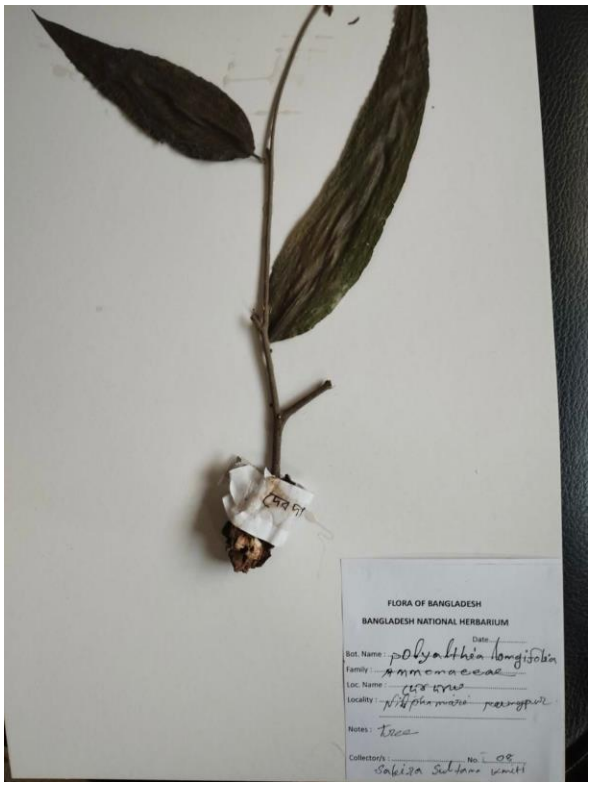


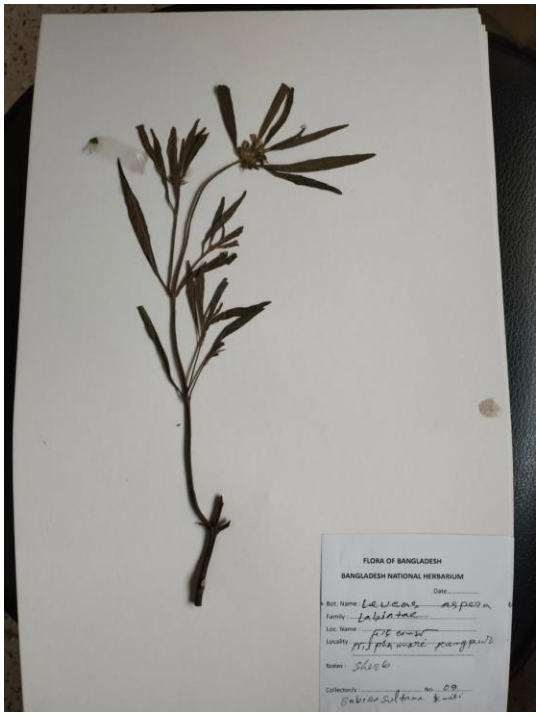












Chapter Five: Result & Discussion

5.1. All medicinal plant list

Scientific Name	Local Name	Family	Habitat	Parts Used	Local Uses
Piper longum	Pipli	Piperaceae	Tropical regions	Fruit, Root	Used for digestive issues, respiratory ailments, and as an analgesic.
Punica granatum	Dadim	Punicaceae	Subtropical regions	Fruit, Bark, Leaves	Treats diarrhea, inflammation, and acts as an antioxidant.
Plumbago zeylanica	Chitrak	Plumbaginaceae	Coastal areas	Root	Used for digestive disorders, skin diseases, and inflammation.
Abroma augusta	Thakurmunda	Malvaceae	Forests, scrublands	Root, Leaves, Bark	Used in menstrual disorders, diabetes, and as a pain reliever.
Terminalia bellirica	Baheda	Combretaceae	Moist deciduous forests	Fruit	Treats respiratory issues, digestive disorders, and acts as a laxative.
Psidium guajava	Guava	Myrtaceae	Tropical regions	Leaves, Fruit	Used for diarrhea, cough, and as an antimicrobial agent.
Leucas aspera	Thumbai	Lamiaceae	Open grasslands	Whole plant	Used in fever, skin infections, and

					respiratory disorders.
Clerodendrum viscosum	Gokulakanta	Lamiaceae	Forest edges	Leaves, Roots	Treats skin diseases, fever, and digestive issues.
Phyllanthus emblica	Amla	Euphorbiaceae	Mixed forests	Fruit	Used for digestive health, skin conditions, and as an antioxidant.
Polyalthia longifolia	Ashoka	Annonaceae	Urban areas, gardens	Leaves, Bark	Used for fever, skin infections, and inflammation.
Ficus racemosa	Dumur	Moraceae	Riverbanks, forests	Bark, Fruit, Leaves	Treats diarrhea, diabetes, and respiratory ailments.
Curcuma zedoaria	Zedoary	Zingiberaceae	Tropical regions	Rhizome	Used for digestive issues, skin disorders, and anti-inflammatory.
Ricinus communis	Erenda	Euphorbiaceae	Disturbed areas	Seeds, Leaves	Used as a laxative, anti-inflammatory, and for skin ailments.
Terminalia chebula	Haritaki	Combretaceae	Deciduous forests	Fruit	Treats digestive issues, respiratory disorders, and acts as a tonic.
Tinospora cordifolia	Guduchi	Menispermaceae	Tropical forests	Stem, Leaves	Used for fever, diabetes, and immunity enhancement.

Terminalia arjuna	Arjuna	Combretaceae	Riverbanks, forests	Bark	Used for heart health, blood pressure regulation, and as an astringent.

Table 01: List of medicinal Plant.

5.2. Collected Medicinal Plant Photograph

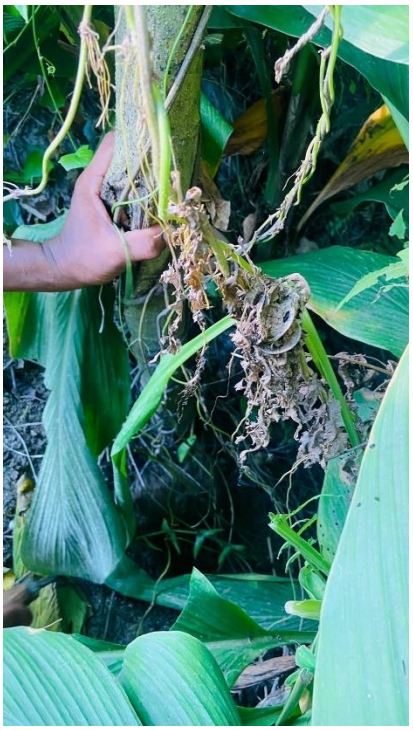
Termimalia Chebula

Terminalia Bellirica

Piper longum

Terminalia arjuna

Phyllanthus emblica



Ficus racemosa

Piper longum

Psidium guajava

5.3. Plant species used for the preparation of the recipes of the medicines

Medicinal Plant	Characterization on the Basis of Structure	Number of Plants	Percentage (%)
Punica granatum	Woody shrub with fleshy fruit	1	6.67
Plumbago zeylanica	Herbaceous plant with long, slender roots	1	6.67
Abroma augusta	Shrub with large, broad leaves and fibrous roots	1	6.67
Terminalia bellirica	Deciduous tree with a thick trunk and small fruits	1	6.67
Psidium guajava	Small tree with edible fruit and thick bark	1	6.67
Leucas aspera	Herbaceous plant with square stems	1	6.67
Clerodendrum viscosum	Shrubby plant with soft, sticky leaves	1	6.67
Phyllanthus emblica	Small tree with dense foliage and small fruits	1	6.67
Polyalthia longifolia	Tall tree with slender, drooping branches	1	6.67
Ficus racemosa	Large tree with aerial roots and fleshy fruits	1	6.67
Curcuma zedoaria	Herbaceous plant with underground rhizomes	1	6.67
Ricinus communis	Herbaceous plant with large, palmate leaves	1	6.67
Terminalia chebula	Deciduous tree with hard, woody fruit	1	6.67
Tinospora cordifolia	Climbing shrub with thin, wiry stems	1	6.67
Terminalia arjuna	Large tree with thick, rough bark and fruit	1	6.67

Table 02: Plant species used for the preparation of the recipes of the medicines.

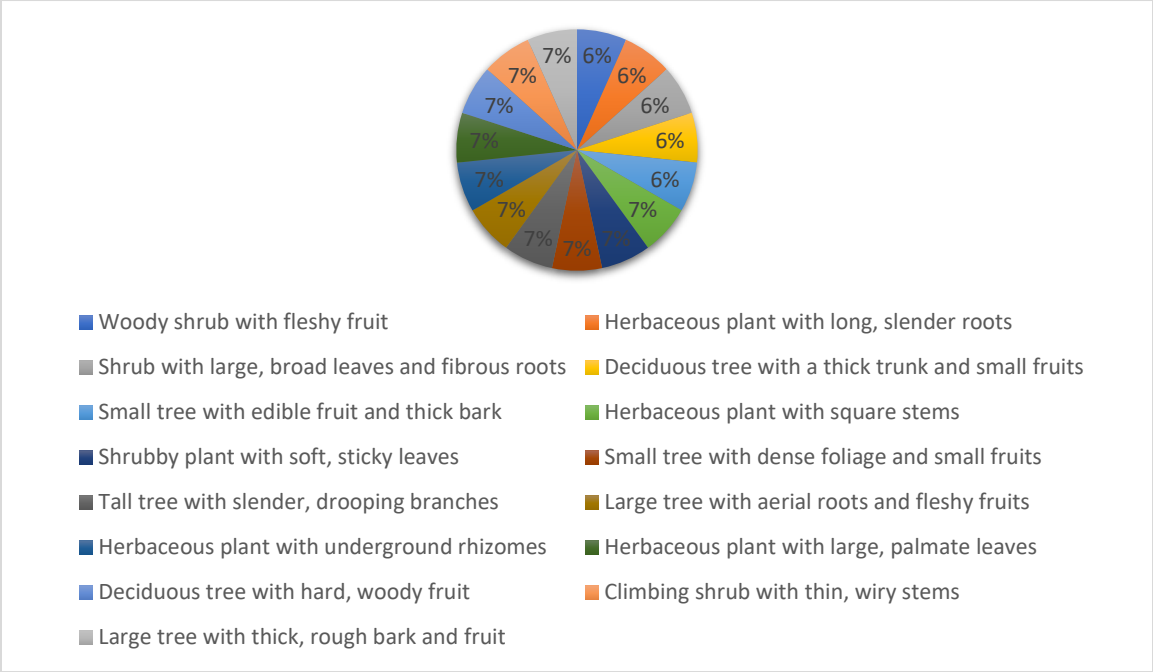


Fig: Percentage of Plant Parts

5.4. Treating disease

Medicinal Plant	Number of Diseases Treated	Diseases Treated
Punica granatum	4	Diarrhea, Inflammation, Antioxidant, Heart health
Plumbago zeylanica	3	Digestive disorders, Skin diseases, Inflammation
Abroma augusta	3	Menstrual disorders, Diabetes, Pain relief
Terminalia bellirica	4	Respiratory issues, Digestive disorders, Laxative, Antioxidant
Psidium guajava	4	Diarrhea, Cough, Antimicrobial, Skin health
Leucas aspera	3	Fever, Skin infections, Respiratory disorders
Clerodendrum viscosum	3	Skin diseases, Fever, Digestive issues
Phyllanthus emblica	4	Digestive health, Skin conditions, Antioxidant, Immunity
Polyalthia longifolia	2	Fever, Anti-inflammatory
Ficus racemosa	3	Diarrhea, Diabetes, Respiratory ailments

Curcuma zedoaria	3	Digestive issues, Skin disorders, Anti-inflammatory
Ricinus communis	3	Laxative, Anti-inflammatory, Skin ailments
Terminalia chebula	3	Digestive issues, Respiratory disorders, Tonic
Tinospora cordifolia	3	Fever, Diabetes, Immunity enhancement
Terminalia arjuna	3	Heart health, Blood pressure regulation, Astringent

Table 03: List of number of treating diseases.

5.5. Combination of medicinal plants and their mode of action

1. **Punica granatum (Pomegranate)**

Component	Mode of Action
Punicalagins and Ellagitannins	Antioxidant properties, anti-inflammatory effects, support cardiovascular health, and anti-cancer properties.
Combination Effects	Can be combined with other antioxidants to enhance overall protective effects against oxidative stress.

Table 04: Punica granatum (Pomegranate).

2. **Plumbago zeylanica (Leadwort)**

Component	Mode of Action
Plumbagin	Antimicrobial, anti-inflammatory, and cytotoxic properties.
Combination Effects	Works well with other antimicrobial herbs to combat infections or inflammation more effectively.

Table 05: Plumbago zeylanica (Leadwort).

3. **Abroma augusta (Devil's cotton)**

Component	Mode of Action
Alkaloids	Hormonal balancing effects and potential antidiabetic properties.
Combination Effects	May be combined with other hormonal balancing herbs to enhance efficacy in treating menstrual disorders.

Table 06: Abroma augusta (Devil's cotton).

4. **Terminalia bellirica (Baheda)**

Component	Mode of Action
Tannins and Gallic Acid	Antioxidant, anti-inflammatory, and digestive health properties.
Combination Effects	Pairs well with digestive herbs to enhance gastrointestinal health and protect against oxidative damage.

Table 07: Terminalia bellirica (Baheda).

5. **Psidium guajava (Guava)**

Component	Mode of Action
Flavonoids and Tannins	Antimicrobial properties, aids in digestion, and reduces inflammation.
Combination Effects	Effective when combined with other antimicrobial plants to treat gastrointestinal issues.

Table 08: Psidium guajava (Guava)

6. **Leucas aspera (Thumba)**

Component	Mode of Action
Essential Oils	Antimicrobial, antipyretic, and anti-inflammatory effects.
Combination Effects	Works synergistically with other antipyretic herbs for treating fever.

Table 09: Leucas aspera (Thumba)

7. **Clerodendrum viscosum (Sticky clerodendron)**

Component	Mode of Action
Flavonoids	Anti-inflammatory and analgesic properties.
Combination Effects	Enhances anti-inflammatory effects when combined with other anti-inflammatory herbs.

Table 10: Clerodendrum viscosum (Sticky clerodendron)

8. **Phyllanthus emblica (Amla)**

Component	Mode of Action
Vitamin C and Polyphenols	Strong antioxidant, supports liver health, and enhances immune function.
Combination Effects	Pairs effectively with other immune-boosting herbs to increase overall health benefits.

Table 11: Phyllanthus emblica (Amla)

9. **Polyalthia longifolia (Ashoka tree)**

Component	Mode of Action
Essential Oils	Antimicrobial and anti-inflammatory properties.
Combination Effects	Works well with other antimicrobial plants to enhance the treatment of infections.

Table 12: Polyalthia longifolia (Ashoka tree)

10. **Ficus racemosa (Cluster fig)**

Component	Mode of Action
Tannins and Flavonoids	Antidiabetic and digestive health properties.
Combination Effects	Can be combined with other antidiabetic herbs for enhanced glucose control.

Table 13: Ficus racemosa (Cluster fig)

11. Curcuma zedoaria (Zedoary)

Component	Mode of Action
Curcumin	Anti-inflammatory, antioxidant, and potential anti-cancer properties.
Combination Effects	Effective with other anti-inflammatory herbs to reduce chronic inflammation.

Table 14: Curcuma zedoaria (Zedoary).

12. Ricinus communis (Castor bean)

Component	Mode of Action
Ricinoleic Acid	Laxative properties and anti-inflammatory effects.
Combination Effects	Often used with other laxatives to enhance digestive health.

Table 15: Ricinus communis (Castor bean).

13. Terminalia chebula (Haritaki)

Component	Mode of Action
Tannins and Gallic Acid	Tonic properties for digestive health and antioxidant effects.
Combination Effects	Pairs well with other digestive tonics to enhance gastrointestinal function.

Table 16: Terminalia chebula (Haritaki).

14. Tinospora cordifolia (Giloy)

Component	Mode of Action
Alkaloids and Glycosides	Immune-boosting, anti-inflammatory, and antidiabetic properties.
Combination Effects	Effective when combined with other immune-enhancing herbs for overall wellness.

Table 17: Tinospora cordifolia (Giloy).

15. Terminalia arjuna (Arjuna)

Component	Mode of Action
Arjunolic Acid	Cardioprotective properties and antioxidant effects.
Combination Effects	Works synergistically with other heart-healthy herbs to promote cardiovascular health.

Table 18: Terminalia arjuna (Arjuna).

Chapter Six: Conclusion

6. Conclusion

The crucial role of wild medicinal plants in the traditional healthcare practices of Rangpur District. It reveals a rich repository of ethnobotanical knowledge held by local communities, particularly traditional healers, known as Kaviraj's, who rely on these plants to treat a broad spectrum of ailments. The diversity of plants documented reflects an intricate knowledge system that has been passed down through generations, showcasing the importance of preserving this cultural heritage in the face of modernization and biodiversity loss. Additionally, the survey provides foundational data that could encourage further pharmacological research into the therapeutic properties of these plants, which might yield innovative natural treatments. By promoting the sustainable use and conservation of these resources, this study not only aids in preserving biodiversity but also highlights the potential of medicinal plants in contributing to primary healthcare in rural areas.

Chapter Seven: Reference

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