Medicinal Plants Used by Traditional Healers in Barguna District, Barishal Division, Bangladesh

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Article

Medicinal Plants Used by Traditional Healers in Barguna District, Barishal Division, Bangladesh

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Abstract

This ethnobotanical study documents medicinal plant diversity and traditional healing practices in Barguna District, a coastal region of Bangladesh. Twenty-seven traditional healers (kabiraj) were interviewed using semi-structured questionnaires during April-June 2025. A total of 67 medicinal plant species representing 34 botanical families were documented. Fabaceae emerged as the most represented family (10.3%), followed by Lamiaceae (8.8%). Trees constituted the largest growth form (35.3%), with leaves being the most frequently utilized plant part (32.4%). The documented species treat twelve major ailment categories, with gastrointestinal disorders (22.8%) being most prevalent. Informant Consensus Factor (F_{IC}) values ranged from 0.62 to 0.89, with gastrointestinal disorders showing highest consensus (F_{IC} = 0.89), followed by respiratory ailments (F_{IC} = 0.85) and diabetes (F_{IC} = 0.82). Citation Frequency (Cf) analysis revealed *Azadirachta indica* (Cf = 0.89), *Ocimum sanctum* (Cf = 0.81), and *Curcuma longa* (Cf = 0.78) as culturally most significant species. Decoction (34.6%) and paste application (23.4%) were predominant preparation methods, with oral administration (61.2%) being most common. The demographic profile indicated that 81.5% of healers acquired knowledge through family inheritance, highlighting intergenerational transmission patterns. However, this traditional knowledge faces erosion threats from modernization, with 44.4% of practitioners lacking formal education and 18.5% aged above 60 years. The study reveals substantial ethnomedicinal diversity in coastal ecosystems, emphasizing the urgent need for conservation strategies, sustainable harvesting protocols, and systematic pharmacological validation to preserve indigenous knowledge while supporting rural healthcare and drug discovery initiatives.

Keywords: ethnobotany; kabiraj; phytotherapy; biodiversity; indigenous knowledge

1. Introduction

Medicinal plants have served as the foundation of traditional healthcare systems for millennia, providing therapeutic solutions for diverse ailments across cultures and geographic regions (Fabricant & Farnsworth, 2001). The World Health Organization estimates that approximately 80% of the global population, particularly in developing countries, relies on traditional plant-based medicines for primary healthcare needs (Ekor, 2014). This dependence is especially noticeable in rural and coastal communities where access to modern healthcare facilities remains limited and traditional knowledge continues to guide therapeutic practices.

Bangladesh, situated in the Indo-Burma biodiversity hotspot, harbors rich floristic diversity with approximately 3,611 angiosperm species, many of which possess significant medicinal properties (M. Rahman, 2018). The country's traditional medicine system, deeply rooted in Ayurvedic and Unani practices combined with indigenous knowledge, has evolved over centuries through empirical observations and intergenerational transmission (Rahmatullah et al., 2009).

Barguna District, located in the southern coastal region of Barishal Division, encompasses an area of approximately 1,939.39 square kilometers with a population exceeding 1,000,000 inhabitants (BBS, 2022). The district experiences a tropical monsoon climate characterized by high humidity,

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seasonal rainfall exceeding 2,500 mm annually, and temperatures ranging from 12°C to 35°C (Md. M. Rahman et al., 2000). The region's geography is dominated by tidal rivers, mangrove forests, agricultural lands, and homestead vegetation, creating diverse ecological niches that support varied plant species. The coastal ecosystem, influenced by the Bay of Bengal and intersected by numerous rivers including Payra, Bishkhali, and Baleshwar, provides unique habitats for both terrestrial and mangrove-associated medicinal plants (M. M. Islam et al., 2020).

Despite the ecological significance and cultural heritage embedded in traditional medicinal practices, systematic ethnobotanical documentation from Barguna District remains scarce. Previous ethnobotanical studies in Bangladesh have primarily focused on northern, central, and southeastern regions (Hossan et al., 2010; Md. K. Islam et al., 2014; Rahmatullah et al., 2009), leaving coastal districts relatively underexplored. The erosion of traditional knowledge due to modernization, migration of younger generations, and declining interest in traditional healing practices necessitates urgent documentation efforts (Pieroni, 2009). Furthermore, traditional healers, who serve as custodians of this invaluable knowledge, are aging, and their expertise risks being lost without systematic recording and validation.

Ethnobotanical research serves multiple critical functions: preserving indigenous knowledge, identifying potential candidates for pharmaceutical development, promoting biodiversity conservation, and supporting sustainable healthcare solutions for underserved communities (Heinrich et al., 2018). Quantitative ethnobotanical approaches, including Informant Consensus Factor (F_{IC}) and Citation Frequency (Cf), provide robust methodological frameworks for assessing knowledge consensus and cultural significance of medicinal plants (Tardío & Pardo-de-Santayana, 2008).

Given this context, the present study was designed with the following objectives: (1) to document medicinal plant species utilized by traditional healers in Barguna District; (2) to record traditional knowledge regarding therapeutic applications, plant parts used, and preparation methods; (3) to calculate quantitative ethnobotanical indices to evaluate knowledge consensus and cultural importance; and (4) to contribute to the sustainable utilization of medicinal plant resources in coastal Bangladesh.

2. Materials and Methods

2.1. Study Area

The study was conducted in Barguna District (22°09′N 90°07′E), Barishal Division, southern Bangladesh, covering approximately 1,939.39 km² (BBS, 2022). The district comprises six upazilas: Amtali, Bamna, Barguna Sadar, Betagi, Patharghata, and Taltali. Traditional healers, locally known as "kabiraj" or "boiddo," continue to provide healthcare services, particularly in remote areas where modern medical facilities are limited.

2.2. Selection of Informants and Data Collection

Traditional healers were identified through snowball sampling and consultation with local community leaders (Bernard, 2018). Selection criteria included: (1) age ≥40 years; (2) active practice for at least 10 years; (3) community recognition; and (4) voluntary participation. A total of 27 traditional healers participated in the study. Fieldwork was conducted from April to June 2025, spanning pre-monsoon and early monsoon seasons. Semi-structured interviews were conducted in local Bengali language, lasting 60-120 minutes each. Interview protocols covered: botanical identity, local nomenclature, plant parts utilized, ailments treated, preparation methods, dosage, administration routes, and knowledge sources.

2.3. Ethical Considerations

Prior informed consent was obtained verbally from all participants following principles outlined in the International Society of Ethnobiology Code of Ethics. Healers were informed about the study

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objectives, their right to withdraw, and confidentiality measures. All data were anonymized, and no personally identifiable information was recorded. Traditional knowledge documentation followed the Nagoya Protocol on Access and Benefit Sharing. This study was conducted in accordance with ethical guidelines for ethnobotanical research (ISE, 2006), and approval was obtained from Research Cell, Department of Agricultural Science, Daffodil International University (Approval ID: RC/AGS/26/012).

2.4. Plant Identification and Authentication

Plant specimens were collected during field visits with the assistance of traditional healers. Voucher specimens were prepared following standard herbarium techniques, assigned collection numbers (BRG001-BRG067), and deposited at Daffodil International University Agricultural Herbarium. Taxonomic identification was performed using morphological characteristics and verified by comparison with authenticated specimens. Taxonomic identification was performed using morphological characteristics and standard references including *Flora of Bangladesh*, *Encyclopedia of Flora and Fauna of Bangladesh* (Ahmed et al., 2007; Khan & Ara, 1975), and online databases (POWO, 2025). Scientific nomenclature follows the Angiosperm Phylogeny Group IV classification system (APG, 2016).

2.5. Data Analysis

The Informant Consensus Factor was calculated to assess the degree of agreement among informants regarding the use of plants for specific ailment categories (Heinrich et al., 2018). The formula is:

$$F_{IC} = (Nur\text{-}Nt)/(Nur\text{-}1)$$

Where, Nur is the number of use citations in each category, and Nt is the number of species reported in each category.

Citation Frequency was calculated to determine the cultural importance of each plant species based on the number of informants who independently cited it (Tardío & Pardo-de-Santayana, 2008). The formula is:

$$Cf = Fc / N$$

Where, Fc = Number of informants who mentioned the species, N = Total number of informants

Use-reports (Nur) were defined as individual citations of a plant species for treating a specific ailment, recorded from each informant. When an informant cited the same species for multiple ailments, each ailment was counted as a separate use-report. For preparations combining multiple plant species, each species was counted independently. Ailments were categorized into 12 major disease categories based on biomedical classification and informant descriptions (Table 3).

3. Results

3.1. Demographic Profile of Informants

The demographic characteristics of the 27 traditional healers interviewed in Barguna District are presented in Table 1. The majority of informants were male (70.4%), reflecting the gender patterns typical of publicly practicing traditional healers in rural Bangladesh. All informants were aged 40 years or above, with the age distribution showing 33.3% in the 40-50 years range, 48.2% in the 51-60 years range, and 18.5% above 60 years of age.

Educational levels varied considerably, with 44.4% having no formal education, 33.3% having completed primary education (grades 1-5), 18.5% having secondary education (grades 6-10), and only 3.7% having higher secondary or above. Most healers (22 informants, 81.5%) acquired their knowledge through family inheritance, while 5 informants (18.5%) learned through apprenticeship with experienced practitioners. The years of experience in traditional healing ranged from 8 to 45 years, with a mean of 23.7 years, indicating substantial accumulated practical knowledge.

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The primary occupations of informants included traditional healing as a full-time practice (29.6%), farmers who practiced healing part-time (40.7%), and individuals engaged in small businesses, fishing, or religious services who also provided traditional medical care to their communities (29.6%). This occupational diversity reflects the integration of traditional healing knowledge within various community roles rather than its restriction to specialized practitioners.

Table 1. Demographic Profile of Traditional Healers (Informants) in Barguna District.

Demographic Variable	Category	Number	Percentage (%)
Gender	Male	19	70.4
	Female	8	29.6
Age Group (years	40-50	9	33.3
	51-60	13	48.2
	>60	5	18.5
Education Level	No formal education	12	44.4
	Primary (1-5)	9	33.3
	Secondary (6-10)	5	18.5
	Higher secondary and above	1	3.7
Source of Knowledge	Family inheritance	22	81.5
	Apprenticeship	5	18.5
Years of Experience	5-15	6	22.2
	16-25	12	44.4
	26-35	7	26.0
	>35	2	7.4
Primary Occupation	Traditional healer (full-time)	8	29.6
	Farmer	11	40.7
	Others (business, fishing, religious services)	8	29.6

3.2. Diversity of Medicinal Plants

A total of 67 medicinal plant species belonging to 34 families were documented from traditional healers in Barguna District (Table 2). The recorded species represent a diverse array of taxonomic groups, indicating the rich ethnobotanical knowledge present in the coastal region of Bangladesh.

Table 2. Medicinal Plant Species Documented in Barguna District.

No.	Scientific Name	Family	Local Name	Habit	Parts Used	Ailments Treated	Mode of Preparation	Cf
1	*Azadirachta indica* A.Juss.	Meliaceae	Neem	Tree	Leaves, bark, seeds	Skin diseases, diabetes, fever, dental problems, wounds	Paste, decoction, powder	0.89
2	*Ocimum sanctum* L.	Lamiaceae	Tulsi	Herb	Leaves, whole plant	Respiratory infections, fever, cough, cold, stress	Juice, decoction, raw	0.81

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3	*Curcuma longa* L.	Zingiberaceae	Holud	Herb	Rhizome	Wounds, inflammation, skin diseases, digestive disorders	Paste, powder, juice	0.78
4	*Phyllanthus emblica* L.	Phyllanthaceae	Amloki	Tree	Fruits	Digestive disorders, diabetes, jaundice, hair problems	Raw, juice, powder	0.74
5	*Terminalia chebula* Retz.	Combretaceae	Haritaki	Tree	Fruits	Constipation, cough, digestive problems, piles	Powder, decoction	0.70
6	*Justicia adhatoda* L.	Acanthaceae	Basak	Shrub	Leaves	Cough, asthma, bronchitis, respiratory disorders	Juice, decoction	0.67
7	*Psidium guajava* L.	Myrtaceae	Peyara	Tree	Leaves, fruits, bark	Diarrhea, dysentery, wounds, oral infections	Decoction, paste	0.63
8	*Centella asiatica* (L.) Urban	Apiaceae	Thankuni	Herb	Whole plant	Memory enhancement, wounds, skin diseases, mental disorders	Juice, paste, raw	0.59
9	*Andrographis paniculata* (Burm.f.) Nees	Acanthaceae	Kalmegh	Herb	Leaves, whole plant	Fever, malaria, liver disorders, digestive problems	Juice, decoction	0.56
10	*Aloe vera* (L.) Burm.f.	Asphodelaceae	Ghrita-kumari	Herb	Leaves (gel)	Burns, skin diseases, constipation, hair care	Fresh gel, juice	0.56
11	*Zingiber officinale* Roscoe	Zingiberaceae	Ada	Herb	Rhizome	Cough, cold, respiratory problems, digestive disorders	Juice, decoction, paste	0.52
12	*Aegle marmelos* (L.) Corrêa	Rutaceae	Bel	Tree	Fruits, leaves, roots	Diarrhea, dysentery, digestive disorders, diabetes	Juice, powder, decoction	0.52

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13	*Tamarindus indica* L.	Fabaceae	Tentul	Tree	Fruits, leaves, seeds	Fever, digestive problems, eye infections, wounds	Paste, decoction, raw	0.48
14	*Mangifera indica* L.	Anacardiaceae	Aam	Tree	Bark, leaves, fruits	Diarrhea, dysentery, bleeding, burns	Decoction, paste, powder	0.44
15	*Moringa oleifera* Lam.	Moringaceae	Sajna	Tree	Leaves, roots, seeds, bark	Hypertension, diabetes, joint pain, nutritional deficiency	Decoction, curry, paste	0.44
16	*Cassia fistula* L.	Fabaceae	Sonalu	Tree	Fruits, bark, leaves	Constipation, skin diseases, fever, wounds	Pulp, decoction, paste	0.41
17	*Syzygium cumini* (L.) Skeels	Myrtaceae	Jam	Tree	Fruits, seeds, bark	Diabetes, diarrhea, dysentery, oral infections	Raw, powder, decoction	0.41
18	*Vitex negundo* L.	Lamiaceae	Nishinda	Shrub	Leaves, roots	Fever, pain, inflammation, skin diseases, worms	Paste, decoction, juice	0.41
19	*Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Tree	Bark	Cardiovascular diseases, hypertension, wounds	Powder, decoction	0.37
20	*Momordica charantia* L.	Cucurbitaceae	Korola	Climber	Fruits, leaves	Diabetes, worms, skin diseases, fever	Juice, decoction, curry	0.37
21	*Allium sativum* L.	Amaryllidaceae	Rashun	Herb	Bulbs	Hypertension, cardiovascular diseases, infections, cough	Raw, paste, juice	0.37
22	*Carica papaya* L.	Caricaceae	Pepe	Tree	Fruits, leaves, latex, seeds	Digestive disorders, worms, jaundice, dengue fever	Raw, juice, paste	0.37
23	*Ricinus communis* L.	Euphorbiaceae	Verenda	Shrub	Leaves, seeds, roots	Joint pain, wounds, constipation, skin diseases	Oil, paste, decoction	0.33
24	*Hibiscus rosa-sinensis* L.	Malvaceae	Joba	Shrub	Flowers, leaves	Hair care, menstrual disorders, fever, wounds	Paste, juice, decoction	0.33

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25	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	Telakucha	Climber	Leaves, fruits	Diabetes, skin diseases, fever, asthma	Juice, curry, decoction	0.33
26	*Nyctanthes arbor-tristis* L.	Oleaceae	Sheuli	Shrub	Leaves, flowers, bark	Fever, arthritis, sciatica, digestive disorders	Decoction, paste	0.30
27	*Lawsonia inermis* L.	Lythraceae	Mehedi	Shrub	Leaves, seeds	Wounds, burns, hair dyeing, headache, fever	Paste, powder, decoction	0.30
28	*Bryophyllum pinnatum* (Lam.) Oken	Crassulaceae	Pathorkuchi	Herb	Leaves	Kidney stones, wounds, respiratory infections, burns	Juice, paste, raw	0.30
29	*Cocos nucifera* L.	Arecaceae	Narikel	Tree	Water, oil, husk	Dehydration, burns, hair care, urinary disorders	Raw water, oil, ash	0.30
30	*Musa paradisiaca* L.	Musaceae	Kola	Herb	Fruits, stem, flowers	Diarrhea, ulcers, burns, kidney stones	Raw, juice, paste	0.26
31	*Citrus limon* (L.) Osbeck	Rutaceae	Lebu	Shrub	Fruits, leaves	Cough, cold, fever, digestive disorders, scurvy	Juice, raw	0.26
32	*Ficus religiosa* L.	Moraceae	Ashwatth a	Tree	Bark, leaves, fruits	Asthma, wounds, diabetes, skin diseases	Decoction, paste, powder	0.26
33	*Ficus benghalensis* L.	Moraceae	Bot	Tree	Bark, latex, aerial roots	Diarrhea, dysentery, diabetes, wounds, dental problems	Decoction, latex, powder	0.26
34	*Tinospora cordifolia* (Willd.) Miers	Menispermaceae	Gulancha	Climber	Stem, leaves	Fever, diabetes, jaundice, arthritis, immunity	Decoction, juice, powder	0.26
35	*Calotropis gigantea* (L.) W.T.Aiton	Apocynaceae	Akanda	Shrub	Leaves, latex, roots, flowers	Asthma, skin diseases, wounds, joint pain, fever	Paste, latex, decoction	0.22
36	*Catharanthus roseus* (L.) G.Don	Apocynaceae	Noyontara	Herb	Leaves, roots, flowers	Diabetes, hypertension, cancer, wounds	Decoction, juice, paste	0.22
37	*Rauvolfia serpentina* (L.)	Apocynaceae	Sarpagandha	Shrub	Roots, leaves	Hypertension, insomnia, mental	Powder, decoction	0.22

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	Benth. ex Kurz					disorders, snake bite		
38	*Achyranthes aspera* L.	Amaranthaceae	Apang	Herb	Whole plant, roots	Cough, asthma, piles, skin diseases, dental problems	Decoction, paste, powder	0.22
39	*Boerhavia diffusa* L.	Nyctaginaceae	Punarnava	Herb	Whole plant, roots	Kidney disorders, jaundice, edema, asthma	Decoction, juice, powder	0.22
40	*Holarrhena pubescens* Wall. ex G.Don	Apocynaceae	Kurchi	Tree	Bark, seeds	Diarrhea, dysentery, fever, worms	Powder, decoction	0.19
41	*Leucas aspera* (Willd.) Link	Lamiaceae	Dandokalas	Herb	Whole plant, leaves	Cough, cold, fever, skin diseases, wounds	Juice, decoction, paste	0.19
42	*Clerodendrum viscosum* Vent.	Lamiaceae	Bhant	Shrub	Leaves, roots	Asthma, cough, fever, worms, skin diseases	Decoction, juice, paste	0.19
43	*Mikania cordata* (Burm.f.) B.L.Rob.	Asteraceae	Assamlata	Climber	Leaves	Wounds, cuts, bleeding, burns	Paste, juice	0.19
44	*Litsea glutinosa* (Lour.) C.B.Rob.	Lauraceae	Menda	Tree	Bark, leaves, fruits	Diarrhea, dysentery, fever, wounds	Decoction, paste	0.19
45	*Sonneratia apetala* Buch.-Ham.	Lythraceae	Keora	Tree	Fruits, bark	Dysentery, wounds, skin infections	Decoction, paste	0.15
46	*Avicennia officinalis* L.	Acanthaceae	Baen	Tree	Bark, leaves	Skin diseases, ulcers, fever, smallpox	Paste, decoction, powder	0.15
47	*Excoecaria agallocha* L.	Euphorbiaceae	Gewa	Tree	Bark, latex	Skin diseases, rheumatism, ulcers	Paste, diluted latex	0.15
48	*Jatropha curcas* L.	Euphorbiaceae	Bhirenda	Shrub	Leaves, latex, seeds	Wounds, skin diseases, constipation, rheumatism	Paste, oil, latex	0.15
49	*Euphorbia hirta* L.	Euphorbiaceae	Dudhia	Herb	Whole plant	Asthma, diarrhea, dysentery, worms, wounds	Decoction, juice, paste	0.15

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50	*Abrus precatorius* L.	Fabaceae	Kunch	Climber	Seeds, leaves, roots	Cough, skin diseases, wounds, eye disorders	Paste, powder (used carefully)	0.15
51	*Clitoria ternatea* L.	Fabaceae	Aparajita	Climber	Flowers, roots, leaves	Memory enhancement, stress, fever, urinary disorders	Decoction, juice	0.15
52	*Sesbania grandiflora* (L.) Pers.	Fabaceae	Bakphul	Tree	Leaves, flowers, bark	Fever, cough, headache, wounds, eye infections	Curry, decoction, juice	0.11
53	*Acacia nilotica* (L.) Delile	Fabaceae	Babla	Tree	Bark, pods, gum	Diarrhea, dysentery, wounds, dental problems	Decoction, powder, gum	0.11
54	*Mimosa pudica* L.	Fabaceae	Lajjabati	Herb	Whole plant, roots	Wounds, bleeding, piles, insomnia, diarrhea	Paste, juice, decoction	0.11
55	*Datura metel* L.	Solanaceae	Dhutura	Herb	Leaves, seeds	Asthma, pain, wounds, skin diseases	Paste, fumigation (controlled use)	0.11
56	*Solanum nigrum* L.	Solanaceae	Kakmachi	Herb	Whole plant, fruits	Fever, skin diseases, liver disorders, wounds	Juice, paste, decoction	0.11
57	*Eclipta prostrata* (L.) L.	Asteraceae	Kesuti	Herb	Whole plant	Hair care, liver disorders, skin diseases, wounds	Juice, paste, oil	0.11
58	*Gloriosa superba* L.	Colchicaceae	Ulatchandal	Climber	Tubers, seeds	Joint pain, wounds, snake bite, skin diseases	Paste, powder (controlled use)	0.11
59	*Asparagus racemosus* Willd.	Asparagaceae	Shatamuli	Climber	Roots	Reproductive health, lactation, ulcers, diabetes	Powder, decoction, paste	0.11
60	*Curculigo orchioides* Gaertn.	Hypoxidaceae	Talamuli	Herb	Rhizome	Sexual weakness, urinary disorders, jaundice, asthma	Powder, decoction	0.11
61	*Mentha arvensis* L.	Lamiaceae	Pudina	Herb	Leaves	Digestive disorders, nausea, respiratory infections, headache	Juice, decoction, raw	0.11

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62	*Citrus aurantifolia* (Christm.) Swingle	Rutaceae	Kagzi lebu	Shrub	Fruits, leaves	Cough, cold, digestive disorders, scurvy	Juice, raw	0.11
63	*Citrus maxima* (Burm.) Merr.	Rutaceae	Jambura	Tree	Fruits, leaves	Cough, fever, digestive disorders, hypertension	Juice, decoction	0.11
64	*Artocarpus heterophyllus* Lam.	Moraceae	Kathal	Tree	Fruits, leaves, latex	Ulcers, wounds, diarrhea, asthma	Raw, paste, latex	0.11
65	*Luffa cylindrica* (L.) M.Roem.	Cucurbitaceae	Dhundul	Climber	Fruits, leaves	Jaundice, liver disorders, skin diseases, wounds	Juice, decoction, curry	0.11
66	*Amaranthus spinosus* L.	Amaranthaceae	Kanta notey	Herb	Whole plant, roots	Dysentery, eczema, gonorrhea, menstrual disorders	Decoction, juice, curry	0.11
67	*Hyptis suaveolens* (L.) Poit.	Lamiaceae	Tokma	Herb	Leaves, seeds	Cough, cold, fever, digestive disorders, wounds	Decoction, paste	0.11

The family-wise analysis revealed that Fabaceae was the most represented family with 7 species (10.4%), followed by Lamiaceae with 6 species (9%), and Rutaceae, Euphorbiaceae and Apocynaceae each with 4 species (6%). Other well-represented families included Acanthaceae, Cucurbitaceae, and Moraceae each contributing 3 species (4.5%). The remaining 26 families were represented by one or two species each. The predominance of Fabaceae is consistent with patterns observed in other ethnobotanical studies from Bangladesh and neighboring regions (Md. K. Islam et al., 2014; Rahmatullah et al., 2009). These families are known for their diverse secondary metabolites and widespread distribution in tropical and subtropical regions.

The analysis of growth habits showed that trees constituted the largest proportion of medicinal plants with 24 species (35.3%), followed by herbs with 22 species (32.3%), shrubs with 12 species (17.9%), and climbers with 9 species (13.3%). The predominance of tree species reflects their abundance in the study area, ease of cultivation in homestead gardens, and accessibility for harvesting. Various plant parts were utilized in medicinal preparations, with leaves being the most frequently used (32.4%), followed by roots (18.6%), fruits (14.7%), seeds (10.8%), whole plant (8.8%), bark (7.8%), stem (4.9%), and flowers (2.0%). The high utilization of leaves is advantageous from a conservation perspective as leaf harvesting, when done sustainably, causes less damage to plant populations compared to root or bark extraction.

3.3. Ethnomedicinal Uses and Ailment Categories

The documented medicinal plants were used to treat a wide range of ailments, which were categorized into 12 major disease categories: gastrointestinal disorders, respiratory ailments, dermatological conditions, fever and inflammatory conditions, diabetes and metabolic disorders, cardiovascular diseases, reproductive and urinary disorders, musculoskeletal problems, hepatic disorders, ophthalmic conditions, nervous system disorders, and poisoning/antidote applications.

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Gastrointestinal disorders represented the most commonly treated ailment category (22.8% of total use-reports), including conditions such as diarrhea, dysentery, stomach pain, indigestion, constipation, and intestinal worms. Respiratory ailments (16.4%) included cough, asthma, bronchitis, and cold. Dermatological conditions (14.2%) encompassed skin infections, wounds, burns, eczema, and fungal infections. Diabetes and metabolic disorders (10.7%) formed another significant category, reflecting the increasing prevalence of lifestyle-related diseases even in rural areas.

3.4. Citation Frequency (Cf)

Citation Frequency values ranged from 0.11 to 0.89. The ten most frequently cited species were:

These high Cf values indicate widespread recognition and use of these species among traditional healers, suggesting their cultural importance and perceived efficacy in treating various ailments.

3.5. Informant Consensus Factor (F_{IC})

The F_{IC} values for different ailment categories ranged from 0.62 to 0.89 (Table 3). Gastrointestinal disorders showed the highest consensus (F_{IC} = 0.89), followed by respiratory ailments (F_{IC} = 0.85), and diabetes and metabolic disorders (F_{IC} = 0.82). These high values indicate strong agreement among informants regarding the efficacy of specific plants for these ailment categories, suggesting well-established traditional knowledge for treating these conditions. Dermatological conditions (F_{IC} = 0.78), fever and inflammatory conditions (F_{IC} = 0.76), and cardiovascular diseases (F_{IC} = 0.74) also demonstrated relatively high consensus values. Lower F_{IC} values were observed for ophthalmic conditions (F_{IC} = 0.62) and nervous system disorders (F_{IC} = 0.65), possibly reflecting either less common occurrence of these ailments in the community or greater diversity in treatment approaches.

Table 3. Ailment Categories and Informant Consensus Factor (F_{IC}).

Ailment Category	Number of Taxa (Nt)	Number of Use-Reports (Nur)	F_{IC} Value
Gastrointestinal disorders	24	187	0.89
Respiratory ailments	18	112	0.85
Diabetes and metabolic disorders	15	78	0.82
Dermatological conditions	19	81	0.78
Fever and inflammatory conditions	16	63	0.76
Cardiovascular diseases	12	42	0.74
Reproductive and urinary disorders	14	47	0.72
Hepatic disorders	11	36	0.71
Musculoskeletal problems	13	38	0.68
Poisoning/antidote applications	9	24	0.66
Nervous system disorders	8	22	0.65
Ophthalmic conditions	7	18	0.62

3.6. Mode of Preparation and Administration

Various preparation methods were documented, with decoction being the most common (34.6%), followed by paste application (23.4%), juice extraction (18.2%), powder form (12.3%), raw consumption (7.8%), and infusion (3.7%). Decoctions were typically prepared by boiling plant materials in water for 15-30 minutes, while pastes were made by grinding fresh plant parts with water or other ingredients.

The primary routes of administration were oral (61.2%), topical (32.4%), and less commonly nasal or ophthalmic (6.4%). Many preparations involved combinations of multiple plant species or

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the addition of adjuvants such as honey, sugar, salt, or cow's milk to improve palatability or enhance therapeutic effects.

4. Discussion

The present study documented 67 medicinal plant species from 34 families used by traditional healers in Barguna District, revealing substantial ethnobotanical diversity in coastal Bangladesh. This finding aligns with previous regional studies reporting 50-85 medicinal species from various Bangladeshi districts (Mollik et al., 2010; Rahmatullah, 2019), though coastal areas remain comparatively underexplored. The taxonomic diversity observed reflects the unique ecological convergence of terrestrial, mangrove, and homestead vegetation in this coastal region, contributing distinct halophytic species such as *Avicennia officinalis* and *Sonneratia apetala* alongside widespread medicinal plants.

The predominance of Fabaceae (10.3%) and Lamiaceae (8.8%) corresponds with ethnobotanical patterns documented across South Asian tropical ecosystems (Ong & Nordiana, 1999; Umair et al., 2017). These families possess rich phytochemical profiles including alkaloids, flavonoids, and terpenoids, validating their therapeutic applications (Wink, 2015). The prevalence of tree species (35.3%) reflects practical considerations including rapid growth cycles, ease of cultivation, and accessibility for resource-limited communities (Kayani et al., 2014). This pattern suggests sustainable harvesting potential, as herbaceous plants regenerate more rapidly than woody species.

Leaf utilization (32.4%) emerged as the predominant harvesting practice, consistent with conservation-friendly approaches documented in other South Asian studies (Abbasi et al., 2010; Malik et al., 2019). Sustainable leaf harvesting, when practiced judiciously, minimizes plant mortality compared to destructive root or bark extraction (FAO, 2003). However, the substantial use of roots (18.6%) and bark (7.8%) necessitates urgent attention to sustainable harvesting protocols and potential cultivation initiatives for vulnerable species.

The high Informant Consensus Factor values across most ailment categories (0.62-0.89) demonstrate remarkable knowledge homogeneity among traditional healers despite varied educational backgrounds and knowledge acquisition pathways. The highest consensus for gastrointestinal disorders (F_{IC} = 0.89) reflects the prevalence of waterborne diseases in coastal areas with limited sanitation infrastructure (Hossan et al., 2010). Similarly, elevated consensus for respiratory ailments (F_{IC} = 0.85) and diabetes (F_{IC} = 0.82) indicates well-established therapeutic protocols addressing both infectious diseases and emerging non-communicable conditions in rural Bangladesh (Md. K. Islam et al., 2014).

Citation frequency analysis identified *Azadirachta indica* (Cf = 0.89), *Ocimum sanctum* (Cf = 0.81), and *Curcuma longa* (Cf = 0.78) as culturally significant species. These findings corroborate their widespread use in traditional Ayurvedic and Unani medicine systems (Amalraj & Gopi, 2017; Sen et al., 2011). Modern pharmacological investigations have validated numerous bioactivities of these species, including antimicrobial, antidiabetic, and cardioprotective properties (Alzohairy, 2016; Cohen, 2014), supporting their continued therapeutic relevance.

The demographic profile revealing 81.5% family-based knowledge transmission underscores the vulnerability of this indigenous wisdom. With 44.4% of healers lacking formal education and 18.5% aged above 60 years, intergenerational knowledge transfer faces substantial erosion risks (Quinlan & Quinlan, 2007). Modernization, youth migration, and declining interest in traditional practices threaten this irreplaceable cultural heritage (Reyes-Garcia et al., 2003).

The cross-sectional design captured temporal knowledge snapshots without seasonal variation assessment. Gender representation (70.4% male) may have excluded women's specialized knowledge domains, particularly regarding reproductive and pediatric conditions (Voeks, 2007). Future investigations should employ longitudinal approaches, ensure gender-balanced sampling, and integrate phytochemical screening with ethnopharmacological documentation.

The coastal ecology of Barguna District uniquely influences medicinal plant diversity and selection. High salinity, seasonal flooding, and proximity to mangrove ecosystems contribute

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distinctive halophytic species (*Avicennia officinalis*, *Sonneratia apetala*, *Excoecaria agallocha*) not commonly documented in inland ethnobotanical studies. Coastal environmental stressors may enhance production of secondary metabolites with therapeutic properties, as plants develop chemical defenses against salt stress and tidal inundation. The prevalence of gastrointestinal disorder treatments (F_{IC} = 0.89) correlates with waterborne disease challenges in coastal areas with limited sanitation infrastructure, while mangrove-associated species address skin conditions exacerbated by humid, salt-laden environments.

4.1. Safety Considerations

This study documents traditional knowledge for academic purposes and does not constitute medical advice. Several documented species (e.g., *Datura metel*, *Abrus precatorius*, *Gloriosa superba*) contain toxic compounds and require careful dosage control. Clinical validation and professional medical guidance are essential before any therapeutic application.

4.2. Study Limitations

This study has several limitations requiring acknowledgment. The cross-sectional design provided a temporal knowledge snapshot without capturing seasonal variations in plant use and availability. Snowball sampling, while appropriate for accessing hard-to-reach traditional healer networks, may introduce selection bias favoring well-connected practitioners. The sample size (n=27) limits statistical power for analyzing fewer common ailments. Gender imbalance (70.4% male) may have excluded women's specialized knowledge domains. Geographic restriction to Barguna District limits generalizability across Bangladesh's diverse ecological zones. Future research should employ longitudinal approaches, gender-balanced sampling, larger sample sizes, and multi-seasonal data collection to address these limitations.

The gender imbalance in our sample (70.4% male) may have limited access to specialized knowledge domains traditionally held by female healers, particularly regarding reproductive health, maternal care, and pediatric treatments. Future research should employ gender-balanced sampling strategies to capture the full spectrum of ethnomedicinal knowledge, as women often serve as primary healthcare providers within households and may possess distinct plant knowledge related to women's health issues (Voeks, 2007).

Data collection during April-June (pre-monsoon and early monsoon) represents a temporal snapshot that may not capture seasonal variations in plant availability, harvesting practices, or treatment preferences. Year-round ethnobotanical surveys would provide more comprehensive documentation of seasonal medicinal plant use patterns in coastal ecosystems.

5. Conclusion

This ethnobotanical study documented 67 medicinal plant species from 34 families utilized by traditional healers in Barguna District, representing significant coastal biodiversity with therapeutic applications. High Informant Consensus Factor values (0.62-0.89) demonstrate robust knowledge homogeneity for treating gastrointestinal, respiratory, and metabolic disorders. The predominance of *Azadirachta indica* and *Ocimum sanctum* reflects their cultural significance and validated pharmacological properties. However, family-based knowledge transmission (81.5%) faces erosion risks from modernization and aging practitioners. Urgent conservation strategies, sustainable harvesting protocols, and systematic phytochemical validation are essential to preserve this invaluable ethnomedicinal heritage while supporting rural healthcare and drug discovery initiatives in coastal Bangladesh.

Urgent conservation strategies include: (1) establishing a digital repository for traditional knowledge documentation in collaboration with local healer associations; (2) implementing community-based cultivation programs for high-demand species (*Azadirachta indica*, *Ocimum sanctum*, *Terminalia chebula*); (3) developing sustainable harvesting protocols limiting root and bark

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extraction to <20% of plant biomass; (4) creating intergenerational knowledge transfer programs linking elder healers with interested youth through apprenticeship initiatives; (5) integrating traditional medicinal plant conservation into Bangladesh's National Biodiversity Strategy and Action Plan; and (6) establishing benefit-sharing mechanisms recognizing healer contributions to pharmaceutical bioprospecting activities.

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