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Research Paper

Ethnomedicinal Study of Medicinal Plants Used by the Indigenous Bago People of Sudipen, La Union, Philippines

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ABSTRACT

Context: Indigenous knowledge of medicinal plants is rapidly declining among ethnic groups in the Philippines, which requires urgent documentation. ***Objectives:*** This study aimed to document and quantitatively analyze the medicinal plants used by the Bago indigenous people of Sudipen, La Union. ***Methods:*** A mixed qualitative-quantitative ethnomedicinal survey was conducted among 18 key informants with a mean age of 74.2 years; 10 females, 8 males, selected purposively with the assistance of Indigenous Peoples Mandatory Representatives (IPMR) per barangay. Data were collected through semi-structured interviews and focus group discussions with the different IPMRs. Quantitative indices including Informant Consensus Factor (ICF), Use Value (UV), and Fidelity Level (FL) were calculated. Plant documentations were authenticated by an agriculturist. ***Results:*** A total of 107 medicinal plant species from 56 families were documented, treating 80 ailments. Fabaceae (11 species) was the dominant family. Leaves (66%) and decoction (55%) were the most utilized plant part and preparation method, respectively. The overall ICF was 0.73, with infectious diseases achieving perfect consensus (ICF=1.00). *Persea americana* showed the highest UV (0.78), while *Lagerstroemia speciosa* demonstrated the highest FL (92.31%) for genitourinary diseases. ***Conclusion:*** The Bago community possesses a rich and well-preserved ethnomedicinal knowledge system characterized by strong informant consensus. The documented plants, particularly those with high quantitative indices, warrant further phytochemical and pharmacological validation.

Keywords: Bago tribe, ethnomedicinal plants; quantitative indices; Sudipen; La Union; Philippines

INTRODUCTION

Plants have historically played an essential role in human health and well-being, providing vital nutrients and serving as the oldest form of healthcare known to mankind (Azizi et al., 2023). According to the World Health Organization most of the world population chiefly relies on traditional, mostly herbal medicine to meet primary healthcare needs (Pe & Pe, 2023). The global demand for herbal medicines continues to grow, with approximately 85% of traditional medicines derived from plants. The Philippines, one of the most biodiverse countries in Asia, hosts more than 12,000 plant species, with approximately 1,500 identified as

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medicinal (Dapar et al., 2020). The country's indigenous medicinal systems rely heavily on these medicinal plants, yet this knowledge remains poorly documented in many rural areas. Indigenous knowledge of medicinal plants is passed down orally through generations but is rapidly diminishing due to lack of interest among younger generations and the loss of plant species (Cordero et al., 2022). The municipality of Sudipen, located in the province of La Union, is home to the Bago indigenous people. Ancestral domains in the region are situated in mountainous areas where traditional healing practices remain active. As of the present, ethnobotanical studies documented in La Union have focused only on indigenous groups from Santol (Ducusin, 2018). No recent study has documented the ethnomedicinal knowledge of the Bago people on Sudipen. This research represents within this indigenous group, aiming to document medicinal plants, their uses, preparation methods, and quantitative ethnomedicinal indices before this knowledge is lost.

MATERIALS AND METHODS

Study area

The study was conducted in selected barangays of Sudipen, La Union, Philippines. The municipality is located 312 kilometers northwest of Manila and 43 kilometers from San Fernando, La Union. Forest, mountains, and hills cover approximately 63% of the total land area ("Sudipen Profile," 2019). The population predominantly speaks Ilocano (93.30%), with Kankanaey (3.06%) and Tagalog (0.5%) as minority languages.

Ethical considerations and community consent

Prior to data collection, the researcher obtained Certification Precondition from the National Commission on Indigenous Peoples (NCIP)- Region I in accordance with Republic Act No. 8371 (The Indigenous Peoples Rights Act of 1997). A Memorandum of Agreement (MOA) was signed with the indigenous community following Free and Prior Informed Consent (FPIC) protocols. The research was also approved by the Research Ethics Committee of Saint Louis University.

Selection of key informants

Eighteen (18) key informants (KIs) were selected using purposive snowball sampling methods. Inclusion criteria required informants to be adults eighteen years old and above, members of the Bago tribe, recognized by the community as knowledgeable in medicinal plant use, and willing to provide informed consent. The indigenous Peoples Mandatory Representatives (IPMRs) facilitated the identification and selection of KIs.

Data collection

Data were collected through one-on-one semi-structured interviews conducted in Ilocano, the native language of the KIs. An interview guide containing open-ended questions covered demographic profiles, plant names, plant parts used, preparation methods, administration routes, and ailments treated. All interviews were audio-recorded with informed consent. Focus group discussions with IPMRs were subsequently conducted for community validation of the findings.

Plant identification

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Plant photographs were obtained and authenticated by an agriculturist/plant pathologist. Scientific names were further verified using authoritative botanical databases.

Data analysis

Informant Consensus Factor (ICF). ICF was calculated to determine agreement among informants on plant uses within specific disease categories using the formula: ICF= (NUR-Nt)/(Nur-1), where NUR is the number of use citations and Nt is the number of species used per category (Khan et al., 2014). Disease categories were based on the International Classification of Diseases (ICD-11) of the World Health Organization. Use Value (UV). UV was calculated to quantify the relative importance of each plant species using the formula: UV= ΣUi/n, where Ui is the number of uses recorded for each species and n is the total number of informants. Fidelity Level (FL). FL was calculated to determine the preference of informants for a particular plant specie to treat a specific ailment category using the formula:

$$FL=(lp/lu) \times 100$$

where lp is the number of informants who reported the plant for a specific ailment and Iu is the total number of informants who mentioned the plant for any ailment.

RESULTS

Demographic profile of key informants

The study involved 18 KIs comprising 10 females (55.56%) and 8 males (44.44%), all members of the Bago tribe. Ages ranged from 45 to 86 years, with a mean of 74.2 ± 12.4 years. Ethnomedicinal experience ranged from 8 to over 60 years, with 11 informants (61.11%) reporting initiation into traditional healing during childhood (Table 1).

Table 1. Demographic profile of key informants

Parameter	Female (n=10)	Male (n=8)	Total (n=18)
Age Range	52-86 years	45-82 years	45-86 years
Mean Age (±SD)	76.8 (±8.2)	71.3 (±15.1)	74.2 (±12.4)
Experience Range	12→ 60 years	8 → 55 years	8→ 60 years
Childhood Initiation	7 (70%)	4 (50%)	61.11%)

Diversity of medicinal plants

A total of 107 medicinal plant species from 79 genera belonging to 56 botanical families were documented. Fabaceae was the most represented family (11 species, 10.3%), followed by Asteraceae and Apocynaceae (6 species each, 5.6%), Malvaceae (5 species, 4.7%), and Euphorbiaceae, Lamiaceae, Poaceae, and Solanaceae (4 species each, 3.7%). The remaining 36 families were represented by a single species.

Plant parts used and methods of preparation

Leaves were the most utilized plant part, accounting for 66% of use reports, followed by fruits (5%), whole plant (5%), and stem (5%). Underground parts (roots, rhizomes, bulbs) comprised only 7% of total use reports, indicating

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conservative harvesting practices. Decoction was the predominant method of preparation (55% of use reports), followed by pounding and direct application (13.7%), and extraction of juice or gel (11.1%). Other methods included direct application of fresh parts, medicinal baths, ingestion of cooked or raw material, and infusions.

Ethnomedicinal uses

The documented medicinal plants were used to treat 80 distinct ailments. The most frequently cited conditions were diarrhea (22 use reports), wounds (18), stomachache (17), fever (16), cough (15), urinary tract infection (13), and kidney problems/stones (10).

Informant Consensus Factor (ICF)

The overall ICF across all disease categories was 0.73, indicating substantial informant consensus. The highest ICF values were recorded for tetanus prophylaxis/treatment (ICF=1.00), genitourinary system disorders (ICF=0.64), and hemorrhage/hemostatic concerns (ICF=0.60). Moderate consensus was observed for respiratory system diseases (ICF=0.50) and digestive system diseases (ICF=0.41). Zero ICF values were noted for blood disorders, eye diseases, nervous system disorders, and pregnancy-related conditions, indicating limited informant agreement in these categories (Table 2).

Table 2. Informant Consensus Factor (ICF) values by disease category

Disease Category	Nur	Nt	ICF
Certain infectious or parasitic diseases (tetanus)	2	1	1.00
Disease of the genitourinary system	68	25	0.64
Hemorrhage/hemostatic concern	11	5	0.60
Certain infectious or parasitic diseases	20	9	0.58
Injury, poisoning, external causes	39	19	0.53
Neoplasms	16	8	0.53
Diseases of the respiratory system	33	17	0.50
Overall	432	117	0.73

Nur= number of use citations; number of species used

Use Value (UV)

Use value ranged from 0.06 to 0.78. *Persea americana* (avocado) exhibited the highest UV (0.78), followed by *Psidium guajava* (guava) and *Euphorbia hirta* (tawa-tawa), both with UV of 0.72. Moderate UV values (0.56-0.61) were recorded for *Lagerstroemia speciosa* (banaba), *Cymbopogon citratus* (baraniw), *Anona muricata* (bayubana), *Moringa oleifera* (marunggay), *Origanum vulgare* (oregano), *Blumea balsamifera* (sambong) (Table 3).

Table 3. Use values

Local Name	Scientific name	Ui/N (18)	UV
Abukado	*Persea americana*	14	0.78
Bayabas	*Psidium guajava*	13	0.72
Tawa-tawa	*Euphorbia hirta*	13	0.72
Bayubana	*Annona muricata*	11	0.61
Banaba	*Lagerstroemia speciosa*	10	0.56
Baraniw	*Cymbopogon citratus*	10	0.56

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Marunggay	*Moringa oleifera*	10	0.56
Oregano	*Origanum vulgare*	10	0.56
Subusob/Sambong	*Blumea balsamifera*	10	0.56

Fidelity Level (FL)

Fidelity levels revealed strong informant agreement on specific plant uses. *Lagerstroemia speciosa* (banaba) achieved the highest FL (92.31%) for genitourinary diseases, followed by *Dillenia philippinensis* (katmon) with 75% for neoplasms, and *Euphorbia hirta* (tawa-tawa) with 73.33% for infectious diseases (Table 4).

Table 4. Fidelity values

Plant name	Primary Disease Category	FL (%)
Banaba (*Lagerstroemia speciosa)*	Genitourinary diseases	92.31
Katmon *(Dillenia philippinensis)*	Neoplasm	75.00
Tawa-tawa *(Euphorbia hirta)*	Infectious diseases	73.33
Tagumbaw *(Jatropa curcas)*	Musculoskeletal diseases	71.43
Taltalikod/Salsalamagi *(Phyllanthus niruri)*	Genitourinary diseases	71.43
Oregano *(Origanum vulgare)*	Respiratory diseases	69. 23
Bayabas *(Psidium guajava)*	Digestive diseases	68.42

DISCUSSION

The demographic profile of the KIs in this study with a mean age of 74.2 years, predominantly female (55.56%), and with extensive experience (8→ 60 years), aligns with Philippine ethnomedicinal research documenting the concentration of traditional knowledge among elderly community members (Fajardo, 2018; Dapar et al., 2020). The predominance of female informants reflects women's roles as primary caregivers and custodians of family health in indigenous communities (Mantuan & Sannomiya, 2024; Sari et al., 2025). The dominance of the Fabaceae family (11 species) as the primary source of medicinal plants in Sudipen is consistent with ethnobotanical studies across the Philippines, including Panay Bukidnon (13 species), Ati tribe (15 species), and a Mindanao0wide review documenting 530 predominantly Fabaceae species (Cordero et al., 2022; Naïve et al., 2021). The therapeutic versatility of Fabaceae is attributed to its rich phytochemical diversity, including flavonoids, alkaloids, and terpenoids (Maroyi, 2023). The strong preference for leaves (66%) and decoction (55%) reflects both pharmacological rationale, leaves are rich in secondary metabolites and practical sustainability, as leaf harvest is less destructive than root or bark collection (Sign et al., 2020; Mir et al., 2022). The low utilization of underground parts indicates conservative harvesting practices that promote plant conservation, contrasting with international studies where root use predominates (Umair et al., 2019). The overall ICF of 0.73 indicates substantial informant consensus, comparable to other Philippine ethnobotanical studies (Caunca & Balinado, 2021). The perfect consensus (ICF=1.00) for tetanus prophylaxis/treatment demonstrates unanimous agreement among all 18 informants on the efficacy of a specific plant species, *Euphorbia hirta,* representing a culturally and therapeutically significant finding. The high Use Value of *Persea americana* (0.78) reflects its multipurpose therapeutic applications and cultural importance. Similarly, the elevated Fidelity Level of

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Lagerstroemia speciosa (92.31%) for genitourinary diseases indicates strong cultural specialization and positions this species as a priority candidate for pharmacological validation.

CONCLUSION

This first ethnomedicinal study of the Bago indigenous people in Sudipen, La Union, documented 107 medicinal plant species from 56 families used to treat 80 ailments. The quantitative indices revealed substantial informant consensus (overall ICF=0.73), with *Persea americana* showing the highest cultural importance (UV=0.78) and *Lagerstroemia speciosa* demonstrating the strongest therapeutic specialization for genitourinary disease (FL=92.31%). The predominance of leaves and decoction reflects both pharmacological rationale and sustainable harvesting practices.

The preservation of Bago ethnomedicinal knowledge is integral to cultural heritage conservation and biodiversity protection. While these findings serve as foundational documentation, they should not be construed as medicinal prescriptions. Future phytochemical and pharmacological studies on high value species, particularly *Lagerstroemia speciosa, Euphorbia hirta,* and *Psidium guajava,* are warranted to validate therapeutic efficacy and identify bioactive compounds.

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DECLARATION OF CONFLICT OF INTEREST

The authors declare no conflict of interest.

DECLARATION OF HONOUR

We declare in our honor that our results are not fake and made up.

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