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Identification of the Ethnobotanical Plants in Pantar Lanao del Norte, Philippines

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ABSTRACT

This ethnomedicinal survey documented the traditional plant knowledge of the Maranaos in Pantar, Lanao del Norte. Findings indicate that older women, particularly those aged 61 and above, are the primary custodians of medicinal knowledge, acquired mainly from elders and parents, while men rely more on the broader community. A total of 75 medicinal plant species from 38 families were recorded, with leaves being the most frequently used part (56%), followed by bulbs, fruits, roots, stems, and bark, reflecting both therapeutic efficacy and sustainability considerations. Six main preparation methods were identified, with infusions (30%) and decoctions (27%) most common, demonstrating adaptive techniques aligned with plant properties and targeted ailments. Informant Consensus Factor (ICF) analysis revealed high agreement among respondents, particularly for asthma, labor pain, and promoting healthy hair (ICF = 0.98), highlighting the coherence and reliability of traditional knowledge and identifying plants with potential for further pharmacological investigation. These findings underscore the importance of preserving intergenerational ethnomedicinal knowledge and prioritizing high-ICF species for future research.

Figure : 01 References : 16 Tables : 05
KEY WORDS : Ethnobotanical plants, Maranaos, Pantar Lanao del Norte, Philippines

Introduction

Despite the increasing dominance of biomedical healthcare, many indigenous communities continue to rely on traditional herbal medicine as a primary source of health care. Among the Maranao of Lanao del Norte, this reliance is shaped by limited access to formal medical services, economic constraints, and deeply rooted cultural traditions. Traditional medicinal knowledge remains robust and culturally embedded; however, rapid modernization and shifting healthcare preferences threaten its continuity. Consequently, there is an urgent need to bridge indigenous healing practices with scientific documentation frameworks to support their validation, preservation, and intergenerational transmission.

Maranao traditional medicine reflects not only practical healthcare strategies but also spiritual beliefs and ancestral knowledge passed down through oral tradition. Medicinal plants are used for both therapeutic and ritual purposes, with healers demonstrating detailed understanding of plant selection, preparation, dosage, and contraindications. Previous ethnobotanical studies have documented this knowledge across several Maranao communities, including Madalum and urban Iligan City, highlighting the resilience of ethnomedicinal practices despite increasing exposure to Western medicine.

However, these studies collectively reveal a notable research gap in Pantar, Lanao del Norte—a municipality situated between Lanao del Sur and Iligan

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TABLE-1 : Age of the Respondents Categorized by Gender

Gender	Population	Age			
		30-40	*41-50*	*51-60*	*61+*
Female	305	54	43	56	152
Male	81	9	33	18	21

City, where rural traditions and urban influences may intersect. No ethnobotanical research has yet focused on this area, limiting comparative understanding of how Maranao medicinal knowledge is maintained or transformed across different settings. Thus, this study aims to document the ethnobotanical use of medicinal plants in Pantar by identifying treated health conditions, plant parts used, methods of preparation, and associated bioactive constituents based on existing literature. Additionally, the study calculates the Informant Consensus Factor (ICF) to assess agreement among community informants, contributing to indigenous knowledge preservation and sustainable use of natural resources in Northern Mindanao.

Methods

2.1 Research Design

This study employed a qualitative–descriptive research design complemented by quantitative analysis to document and evaluate the ethnomedicinal knowledge of the Maranao community in Pantar, Lanao del Norte, Philippines. Data were collected through key informant interviews, focus group discussions, and field observations involving community elders aged 30 years and above, selected for their extensive indigenous knowledge of medicinal plants. The Informant Consensus Factor (ICF) was calculated to assess the level of agreement among informants regarding medicinal plant use, providing a quantitative measure of knowledge reliability[7,14]. Ethical protocols, including informed consent and respect for indigenous intellectual property rights, were strictly observed throughout the study[5,13].

2.2 Research Instruments

The study utilized an institutional informed consent form approved by Mindanao State University–Iligan Institute of Technology (MSU-IIT) to ensure ethical compliance, voluntary participation, confidentiality, and respondents' right to withdraw at any time. Data were collected using an adapted semi-structured interview questionnaire, which was modified to suit the cultural and environmental context of Pantar, Lanao del Norte. This instrument enabled the systematic and culturally sensitive documentation of medicinal plant species, their therapeutic uses, and preparation methods among the Maranao community.

2.3 Data Gathering Procedure

Data were collected using a triangulated mixed-methods approach that integrated qualitative ethnobotanical documentation and quantitative analysis. Semi-structured interviews were conducted with 386 Maranao informants from Pantar, Lanao del Norte, following informed consent and translation of the interview guide into the Maranao dialect to ensure cultural appropriateness, complemented by informal conversations and focus group discussions[3,9]. Information gathered included medicinal plant species, treated ailments, plant parts used, preparation methods, routes of administration, and reported bioactive constituents. Plant species were identified and validated using Co's Digital Flora of the Philippines, the Philippine Traditional Knowledge Digital Library on Health, and the World Flora Online Plant List, with verification conducted by a botanist from MSU-IIT. The Informant Consensus Factor (ICF) was computed to assess the level of agreement among informants on medicinal plant use, while ethical standards on informed consent, confidentiality, and protection of indigenous intellectual property were strictly observed[5,7,13].

RESULTS

3.1. Demographic profile of the respondents

The age and gender distribution of respondents provides insight into patterns of ethnomedicinal knowledge transmission within the community. As shown in Table-1, female respondents constituted the majority of participants, with nearly half belonging to the 61 years and above age group, indicating that traditional medicinal knowledge is largely retained by older women, while male respondents were fewer and more evenly distributed

TABLE-2 : Source of Traditional Knowledge

Gender	Parents	Elders	Community	Doctors
Female	109	136	59	1
Male	25	23	33	0

across age categories. These patterns underscore the significance of both age and gender in shaping the custodianship of ethnobotanical knowledge.

The sources of traditional knowledge further highlight gender-based differences in knowledge acquisition (Table-2). Among female respondents, elders and parents were the primary sources of ethnomedicinal knowledge, emphasizing strong intergenerational and familial transmission, whereas male respondents most frequently cited the community as their main source. Reliance on medical professionals was negligible for both genders, reinforcing the continued importance of indigenous knowledge systems in local healthcare practices.

3.2 Plant species recorded

In this ethnomedicinal survey, Table-3 shows the 75 plant species used for medicinal purposes were documented in various areas of Pantar, Lanao del Norte. The plant families represented include Acanthaceae (1 species), Acoraceae (1), Amaranthaceae (3), Annonaceae (1), Apiaceae (1), Arecaceae (1), Asparagaceae (1), Asphodelaceae (1), Asteraceae (9), Athyriaceae (1), Boraginaceae (2), Caricaceae (1), Clusiaceae (1), Combretaceae (1), Convolvulaceae (1), Crassulaceae (1), Cucurbitaceae (2), Euphorbiaceae (4), Fabaceae (4), Lamiaceae (5), Lauraceae (1), Lythraceae (1), Malvaceae (5), Menispermaceae (1), Moraceae (1), Musaceae (2), Myrtaceae (2), Orthotrichaceae (1), Pinaceae (1), Piperaceae (2), Poaceae (2), Portulacaceae (1), Primulaceae (1), Rosaceae (1), Rubiaceae (1), Rutaceae (2), Sapotaceae (1), Solanaceae (3), Verbenaceae (1), and Zingiberaceae (2). This taxonomic variety reflects the rich ethnomedicinal plant resources within the study area.

3.3 Plant parts utilized as medicine

The Maranaos of Pantar Lanao del Norte utilize various plant parts in herbal medicine, demonstrating extensive ethnobotanical knowledge. Figure 1 shows that the leaves are the most frequently used plant part (56%), largely due to their ease of collection, renewability, and high concentration of bioactive compounds, making them both effective and sustainable. Bulbs and fruits follow at 15%, valued for their rich nutrients and secondary metabolites, while roots account for 13% and are recognized for their strong medicinal potency despite sustainability concerns. Stems and stalks (8%) and bark (5%) are used less often, typically for decoctions containing potent phytochemicals, and the use of the whole plant is rare (3%).

3.4 Veriety of preparations

The study documented (Table-4) six main methods for preparing and administering medicinal plants among the Maranaos of Pantar, Lanao del Norte, reflecting a highly adaptive traditional knowledge system. Infusion was the most common method (30%), typically using leaves or flowers steeped in hot water to extract active compounds. Decoction (27%) involved boiling tougher plant parts such as roots, bark, or stems. Poultices (22%) were applied externally to treat localized conditions like wounds, inflammation, or skin irritations. Less frequent methods included consuming raw plant material (13%), extract preparation (5%) for concentrated bioactive compounds, and heating over fire (3%) to activate or modify chemical properties. Each method corresponded to specific health conditions: infusions were used for ailments such as toothache, high blood pressure, urinary issues, and menstrual stimulation; decoctions for postnatal recovery, coughs, fevers, and rheumatism; poultices for skin, hair, and wound treatments; raw consumption for digestive, reproductive, and inflammatory conditions; extracts for hair health, cough, and postpartum strength; and heating over fire for wounds, sprains, and flatulence. This variety demonstrates the Maranaos' empirical knowledge in selecting preparation techniques that optimize therapeutic efficacy according to both the plant's properties and the ailment being treated.

3.5 The Informant Consensus Factor (ICF)

In this study, ICF values revealed a high level of agreement among the Maranaos of Pantar, Lanao del Norte. The highest consensus was observed for treating asthma, reducing labor pain, and promoting healthy hair (ICF = 0.98), followed closely by arthritis, insect bites, and menstrual cramps (ICF = 0.97). Even ailments with comparatively lower ICF values, such as bleeding (0.76) and urinary tract infections (0.77), showed notable

TABLE-3 : Over-all distribution of species across different families of medicinal plants used by the Maranaos in Pantar LDN

Family	Species	Family	Species	Family	Species	Family	Species
Acanthaceae	1	**Caricaceae**	1	**Menispermaceae**	1	**Rubiaceae**	1
Acoraceae	1	**Clusiaceae**	1	**Moraceae**	1	**Rutaceae**	2
Amaranthaceae	3	**Combretaceae**	1	**Musaceae**	2	**Sapotaceae**	1
Annonaceae	1	**Convolvulaceae**	1	**Myrtaceae**	2	**Solanaceae**	3
Apiaceae	1	**Crassulaceae**	1	**Orthotrichaceae**	1	**Verbenaceae**	1
Arecaceae	1	**Cucurbitaceae**	2	**Pinaceae**	1	**Zingiberaceae**	2
Asparagaceae	1	**Euphorbiaceae**	4	**Piperaceae**	2	**Rubiaceae**	1
Asphodelaceae	1	**Fabaceae**	4	**Poaceae**	2	**Rutaceae**	2
Asteraceae	9	**Lamiaceae**	5	**Portulacaceae**	1	**Sapotaceae**	1
Athyriaceae	1	**Lauraceae**	1	**Primulaceae**	1	**Solanaceae**	3
Boraginaceae	2	**Lythraceae**	1	**Rosaceae**	1	**Verbenaceae**	1

agreement. These results highlight the coherence and reliability of traditional medicinal knowledge in the community and suggest that plants associated with high ICF values may hold significant therapeutic potential for further pharmacological study and integration into primary healthcare.

DISUSSIONS

The findings that ethnomedicinal knowledge is predominantly retained by older women, particularly those aged 61 and above, align with recent research indicating that age significantly influences the retention and depth of traditional medicinal knowledge, with older community members serving as primary custodians[1]. Furthermore, the observation that knowledge acquisition is gendered—where women learn mainly from elders and parents while men rely more on the broader community—is supported by studies showing that women typically possess greater medicinal plant knowledge due to household and caregiving roles, highlighting the strong intergenerational and familial transmission of ethnobotanical knowledge[2].The ethnomedicinal survey documented 75 plant species used by the Maranaos in Pantar, Lanao del Norte, representing a diverse range of 38 plant families, with Asteraceae (9 species), Lamiaceae (5), Malvaceae (5), Euphorbiaceae (4), Fabaceae (4), and Solanaceae (3) among the most represented. This wide taxonomic variety highlights the richness and diversity of the community's medicinal plant resources in the study area.

The Maranaos of Pantar, Lanao del Norte, primarily use leaves (56%) in herbal medicine due to their accessibility, renewability, and high concentration of bioactive compounds. Other plant parts include bulbs and fruits (15%), roots (13%), stems and stalks (8%), bark (5%), and rarely the whole plant (3%), reflecting both medicinal efficacy and sustainability considerations. Several recent ethnobotanical studies corroborate that **leaves are the most frequently used plant part** in traditional medicinal practices due to their accessibility, renewability, and high concentrations of bioactive compounds, followed by other parts like fruits, roots, stems, and bark, reflecting both therapeutic efficacy and sustainability considerations in community herbal medicine use. For example, a 2025 survey in the Philippines found that leaves were the dominant plant part used in herbal remedies (62.3%), with other parts

TABLE-4 : Method of preparation of medicinal plants used by the Maranaos in Pantar LDN, Philippines

Method of Preparations	Percentage	
Infusion	33	30%
Decoction	30	27%
Poultice	24	22%
Raw/Eat Directly	15	13%
Extract	5	5%
Heating over fire	3	3%
Total	110	100%

used to a lesser extent, highlighting similar patterns of plant part preference in ethnomedicinal traditions[6]. Likewise, a 2024 study in Benguet Province documented that leaves were the most utilized plant part (61.5%) among indigenous communities, followed by whole plants, stems, bark, and flowers[16].

The Maranaos of Pantar use six main methods to prepare medicinal plants, with infusions (30%) and decoctions (27%) being the most common, followed by poultices (22%), raw consumption (13%), extracts (5%), and heating over fire (3%). Each method is tailored to specific ailments, reflecting the community's adaptive knowledge in optimizing therapeutic efficacy based on both plant properties and the conditions treated. Recent ethnobotanical studies similarly document a range of preparation techniques for medicinal plants, with infusion, decoction, poultices, and raw consumption among the most commonly reported methods, reflecting how traditional communities tailor preparation to optimize therapeutic benefit based on plant properties and ailments treated. For example, a study among indigenous communities in Mizoram, India found decoction, crushing, chewing, poultice, and heating were widely used for remedy preparation, demonstrating diverse, adaptive traditional knowledge in medicinal plant use[15] and another recent survey reported multiple preparation methods including decoction, raw food, poultice, and heating in a similar ethnobotanical context[12].

The Informant Consensus Factor (ICF) analysis showed a high level of agreement among the Maranaos of Pantar regarding the use of medicinal plants, with the highest consensus for treating asthma, labor pain, and promoting healthy hair (ICF = 0.98), followed by arthritis, insect bites, and menstrual cramps (ICF = 0.97). Even conditions with lower ICF values, such as bleeding (0.76) and urinary tract infections (0.77), demonstrated notable agreement, indicating the community's coherent and reliable traditional medicinal knowledge and highlighting plants with potential for further pharmacological study. Recent ethnobotanical research has similarly documented high Informant Consensus Factor (ICF) values, highlighting strong agreement among informants on the use of specific medicinal plants for particular ailments, which underscores the reliability of traditional knowledge and suggests priority species for further pharmacological study. For example, a study among urban and rural communities in Khyber Pakhtunkhwa, Pakistan reported a high ICF value of 0.97 for the use of plants to treat kidney disorders, indicating consistent community agreement on plant use[8], and another investigation in northeast India found ICF values ranging from 0.97 to 0.98 for several ailment categories, demonstrating a robust shared knowledge base regarding medicinal plant applications[4].

4.1 Summary of Findings

The ethnomedicinal survey of the Maranaos in Pantar, Lanao del Norte, shows that older women, particularly those aged 61 and above, are the primary holders of traditional knowledge, learning mainly from elders and parents, while men rely more on the broader community, highlighting strong intergenerational and gendered knowledge transmission. A total of 75 medicinal plant species from 38 families were documented, with leaves being the most frequently used plant part (56%), followed by bulbs, fruits, roots, stems, and bark, reflecting both efficacy and sustainability considerations. Six main preparation methods were identified—infusions (30%) and decoctions (27%) were the most common, followed by poultices, raw consumption, extracts, and heating over fire—demonstrating adaptive selection of techniques based on plant properties and targeted ailments. Informant Consensus Factor (ICF) analysis revealed high agreement among community members, especially for asthma, labor pain, and promoting healthy hair (ICF = 0.98), indicating coherent and reliable traditional medicinal knowledge and identifying plants with potential for further pharmacological research.

4.2 Conclusions

The ethnomedicinal knowledge of the Maranaos in Pantar is predominantly held by older

TABLE-5 : The level of agreement among the respondents in Pantar Lanao del Norte, Philippines

Indications	ICF	ICF Interpretations
Allergy	0.85	High Consensus
Arthritis	0.97	High Consensus
Arthritis	0.93	High Consensus
Asthma	0.98	High Consensus
Bleeding	0.76	High Consensus
Body pain	0.94	High Consensus
Boils and pus	0.75	High Consensus
Boosts sperm count	0.98	High Consensus
Cleanses toxins	0.92	High Consensus
Constipation	0.80	High Consensus
Cough	0.94	High Consensus
Dengue	0.96	High Consensus
Diabetes	0.89	High Consensus
Fever	0.95	High Consensus
Flatulence	0.86	High Consensus
Gives strength to a weak body	0.88	High Consensus
Healthy hair	0.98	High Consensus
High blood pressure	0.93	High Consensus
Inflammations inside the body	0.94	High Consensus
Insect bites	0.97	High Consensus
Kidney stones	0.86	High Consensus
LBM	0.94	High Consensus
Lessens labor pain	0.98	High Consensus

Indications	ICF	ICF Interpretations
Menstrual cramps	0.97	High Consensus
Migraine/headache	0.87	High Consensus
Myoma	0.91	High Consensus
Nosebleed	0.83	High Consensus
Indications	ICF	ICF Interpretations
Overfatigue	0.80	High Consensus
Rheuma	0.80	High Consensus
Skin irritation	0.85	High Consensus
Sprain	0.92	High Consensus
Stimulates period	0.92	High Consensus
Stomachache	0.93	High Consensus
Toothache	0.94	High Consensus
Ulcer	0.91	High Consensus
UTI	0.77	High Consensus
Vomiting	0.92	High Consensus
Wound	0.89	High Consensus

women and transmitted intergenerationally, with 75 plant species from 38 families documented. Leaves were the most used plant part, and six preparation methods—primarily infusions and decoctions—reflect adaptive practices tailored to specific ailments. High Informant Consensus Factor values indicate reliable traditional knowledge and highlight plants with potential for further pharmacological study.

4.3 Recommendations

1. Further research should document and preserve the ethnomedicinal knowledge of older women, particularly those aged 61 and above, to safeguard intergenerational transmission of traditional practices.
2. Medicinal plants with high Informant Consensus Factor (ICF) values, such as those used for asthma, labor pain, and promoting healthy hair, should be prioritized for phytochemical and pharmacological investigations to validate their therapeutic potential.
3. Studies should explore sustainable harvesting and utilization of plant parts, especially leaves and roots, to ensure long-term availability and conservation of local medicinal plant resources.
4. Efforts to engage younger generations and male community members in ethnomedicinal practices should be encouraged, promoting wider knowledge transfer and integration into community healthcare systems.

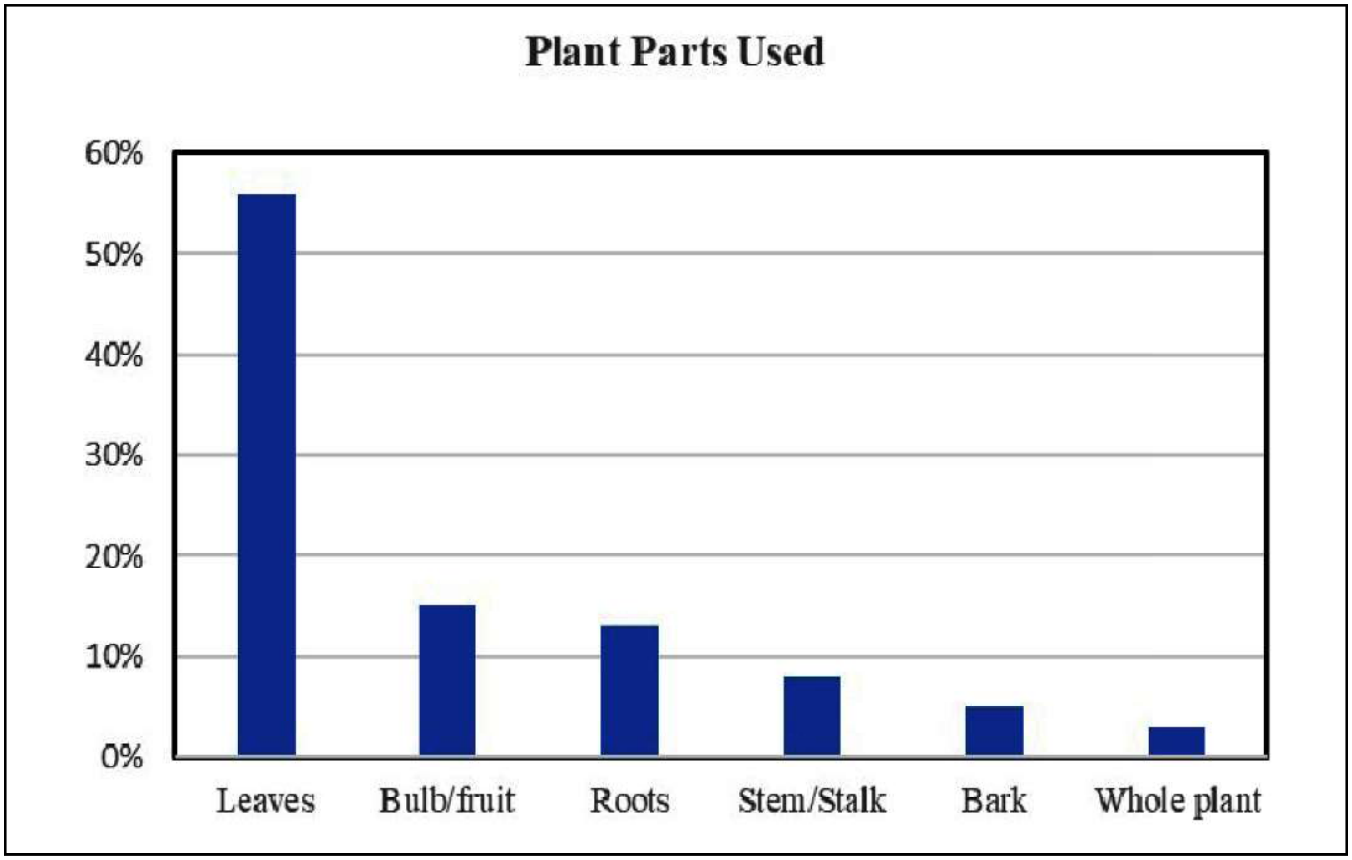

Fig. 1 : Plant parts used in herbal preparations by the Maranaos in Pantar LDN, Philippines

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