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# Ethnobotanical Study of Medicinal Plants Among the Paser Telake Tribe in Pinang Jatus Village, East Kalimantan, Indonesia

**Frederika Erwina Rani[1] and Paula Mariana Kustiawan[*2]**

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[1,2]Undergraduate Program of Pharmacy, Faculty of Pharmacy, Universitas Muhammadiyah Kalimantan Timur, Samarinda, East Kalimantan 74251, Indonesia.

*e-mail:*
*[1]frederikaerwina@gmail.com,*
*[*2]pmk195@umkt.ac.id,*

**Corresponding author*

***Abstract.*** *Ethnobotany is an interdisciplinary field that explores the relationship between humans and plants, particularly in the context of traditional medicinal practices. In many rural and indigenous communities, traditional knowledge of medicinal plants remains essential for primary healthcare, especially where access to modern medical services is limited. Pinang Jatus Village, Paser District, East Kalimantan Province, is one such community where ethnobotanical practices continue to play a significant role in daily life. However, the specific plants used, methods of preparation, and ailments treated have not been systematically documented. This study aimed to identify the types of medicinal plants used by the residents of Pinang Jatus Village, the traditional methods of preparation, and the diseases commonly treated with these plants. A quantitative and descriptive research approach was applied, using purposive and snowball sampling techniques to select 30 informants. The study employed a qualitative framework through in-depth interviews, complemented by quantitative analyses using the Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL) measures. Data were collected through semi-structured interviews. The study identified 24 plant species used for medicinal purposes, with the Asteraceae family being the most dominant. The most commonly utilized plant parts were leaves, followed by roots and seeds. The findings demonstrate that the community possesses rich ethnobotanical knowledge and continues to rely on a diverse range of plant species for traditional healing. These results not only fulfill the study's objectives but also emphasize the importance of preserving traditional knowledge and highlight the potential for future pharmacological research based on these local practices.*

***Keywords:*** *east Kalimantan, medicinal plants, Paser tribe*

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## INTRODUCTION

In recent decades, there has been a growing global interest in traditional medicine as an alternative and complementary health care practice, driven by its accessibility, cultural relevance, and perceived efficacy. Within this context, ethnobotany, defined as the interdisciplinary study of the relationships between people and plants, plays a crucial role in documenting and analyzing indigenous knowledge on plant use for medicinal, nutritional, and cultural purposes. Traditional medicine is a form of treatment that is processed and passed down through ancestral heritage, customs, beliefs, or local wisdom, often incorporating spiritual elements or inherited knowledge. The use of traditional medicine has been proven to provide benefits for physical well-being. In this modern era, its use is increasing due to its affordable accessibility for the community, in terms of both cost and availability (Kustiawan et al., 2023). Traditional medicine is now in increasing demand because various scientific studies have shown minimal adverse impacts. The components of traditional medicine ingredients commonly used by the community include various parts of plants, such as roots, rhizomes, stems, fruits, leaves, and flowers (Parwata, 2017; Setyowati, 2010).

Several studies suggest that the Indonesian rainforest harbors approximately 1,300 plant species with medicinal properties, positioning the country as a global hotspot for ethnomedicinal resources. For comparison, the World Health Organization estimates that around 21,000 plant species are used for medicinal purposes worldwide, highlighting Indonesia's significant contribution to global ethnopharmacology. Furthermore, the cultural diversity of more than 370 indigenous communities, along with their local wisdom, enriches the ethnomedicine and cultural heritage of the archipelago (Falah et al., 2013).

Ethnomedicine is a cross-disciplinary field that examines how specific ethnic groups utilize natural substances and traditional medicines in their health care systems (Roudotuljannah & Azizah, 2019). It encompasses studies on the discovery of medicinal ingredients and their local contexts (ethnobiology), methods of drug preparation (ethnopharmacy), modes of application (ethnopharmacology), and the cultural knowledge underpinning these practices (Ningsih, 2018). In Indonesia, diverse ethnic communities exhibit unique customs and local wisdom that shape their approaches to health and traditional healing. These practices not only represent cultural identity but also contribute valuable knowledge that supports the rediscovery of traditional medicine formulas and the identification of potential new drug components (Mirza, 2018).

Nevertheless, Ethnopharmaceutical investigations have not yet encompassed all indigenous communities across the Indonesian archipelago. This raises considerable concern that traditional knowledge associated with the use of endemic plants for medicinal purposes may progressively vanish under the influence of modern transformation and technological advancement. Such dynamics have been shown to erode local wisdom, reshape lifestyles, and reorient health-seeking behaviors from traditional remedies toward contemporary medicine (Anggreini & Norma, 2022), a trend also documented globally as globalization and cultural homogenization drive the decline of ethnomedicinal knowledge systems.

Indonesia is home to approximately 400 ethnic groups, comprising various tribes

and sub-tribes, each with distinctive knowledge and practices in the use of medicinal ingredients that are passed down through generations. Among these communities, the Paser Telake tribe in East Kalimantan, particularly those residing in Pinang Jatus Village, Long Kali District, Paser Regency, has preserved unique ethnomedicinal traditions. This village is relatively isolated and is recognized for its rich diversity of medicinal plants, many of which are locally endemic and remain integral to community health care practices (Hidayat et al., 2022). Such characteristics make Pinang Jatus Village and the Paser Telake tribe a valuable locus for ethnomedicinal research. Therefore, this study aims to document the medicinal plant species used by the Paser Telake tribe, describe their preparation methods, and identify the diseases treated.

## MATERIALS AND METHODS

### Study Site

The Paser community is a group that administratively occupies the southern part of East Kalimantan, especially in the Paser and Penajam Paser Utara districts (Hidayat et al., 2022). The area that has preserved traditional wisdom to this day, especially in the use of traditional medicine sourced from natural medicinal ingredients, is Pinang Jatus village, located in Long Kali District, Paser Regency, East Kalimantan, Indonesia. Pinang Jatus Village, located in Paser Regency (Figure 1), is an area rich in medicinal plants, where the use of plants as medicinal ingredients has been passed down from generation to generation since the era of our ancestors to the present.

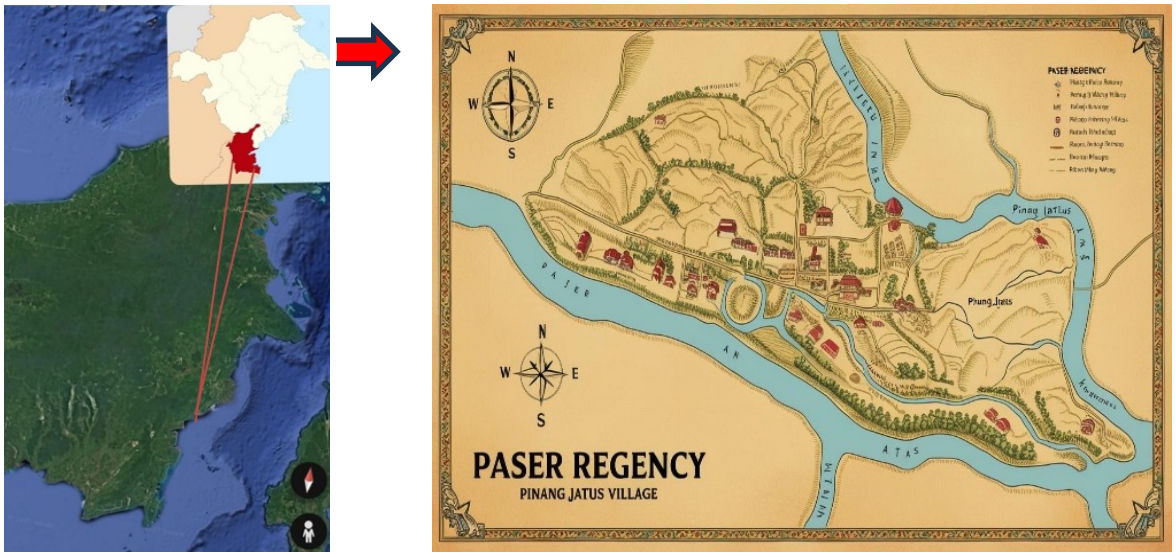


**Figure 1**. Location of Pinang Jatus Village, Long Kali District, Paser Regency, East Kalimantan, Indonesia (–1.381498, 116.146668; WGS84 datum). The map shows the position of Pinang Jatus within the Indonesian archipelago, with successive zooms highlighting East Kalimantan Province, Paser Regency, and the Long Kali District. Base map data were obtained from Badan Informasi Geospasial (BIG) and supplemented with satellite imagery (Google Earth, 2025)

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**Data Collection and Analysis**

The method used in this study is descriptive. The information collected includes both important and selected details. Important sources of information were obtained directly from Pinang Jatus through a series of meetings and conversations with several Paser Telake Tribe communities (Mubarok et al., 2021). The research instruments used in this study were interviews, documentation, and recording tools. The techniques used in this study were semi-structured interviews and plant identification, with respondents selected using purposive and snowball sampling strategies. The interviews were conducted primarily in the local language to ensure clarity of meaning, with assistance from a translator when necessary, and were accompanied by visual documentation. Additionally, voucher specimens of the reported plants were collected and deposited as herbarium samples for taxonomic verification.

A preliminary study was conducted to determine the sampling technique, which involved interviewing informants selected based on initial observations. The interview was conducted in a semi-structured manner, utilizing open-ended questions (Kustiawan et al., 2021). Interviews with informants were conducted using open-ended questions and were assisted by a voice recorder and a survey medium (questionnaire), both of which were provided by the researcher. Open questions are questions that provide choices for the person being interviewed to answer. Determination of the sample was carried out using Purposive Sampling and Snowball Sampling techniques. The inclusion criteria of the informant were that they were descendants of the original Paser Telake who knew and used plants as traditional medicine, while the exclusion criteria were that they had migrated and learned treatment methods from other tribes (Feng et al., 2023).

Data analysis was conducted using quantitative and descriptive approaches, with interview findings systematically tabulated (Supriyadi et al., 2020). The ethnobotanical indices, including Use Value (UV), Informant Consensus Factor (ICF), and Fidelity Level (FL), were calculated and processed using Microsoft Excel to organize the data, perform basic statistical calculations, and ensure accurate quantification of plant use. To provide findings on the medicinal plant parts utilized, processing techniques and applications, and types of diseases treated, descriptive analysis attempts to provide an overview and explanation of all collected data. Furthermore, quantitative analysis related to the type and pattern of use will be calculated using several formulas.

**Use Value (UV)**

Use Value (UV) shows the relative significance of plant species known locally and is calculated based on the total use records provided by each informant for each species (Napagoda et al., 2014). The UV index was used to identify plant benefits during the Q&A process and to evaluate the level of importance of specific medicinal plants based on the uses reported by informants (Cruz & Andrade-Cetto, 2015). The calculation of Use Value is carried out using the following formula (Kurniawan & Jadid, 2015).

$$\mathrm{UVs} = \frac{\sum \mathrm{UVis}}{\mathrm{ni}}$$

where *UVs* is use value of a species, *UVis* is total value obtained from each species, and *ni* is total number of respondents interviewed.

**Informant Consensus Factor (ICF)**

This method is used to analyze the collective use of plants in the study area for specific

disease classification (Usha et al., 2016). ICF is calculated for each disease category to determine community consensus regarding the types of plants used to treat certain diseases (Jan et al., 2022). Based on this, it can be inferred that the ICF value represents the level of similarity between data from respondents who participated in the study, categorized by the same category. ICF is calculated using the following formula:

$$ICF = \frac{nar - na}{nar - 1}$$

where *ICF* is Informant Consensus Factor Value, *nar* is number of uses of plant species in each disease category, and *na* is number of taxa utilized in a particular category by all respondents.

**Fidelity Level (FL)**

Fidelity Level (FL) contributes to establishing the names of plants that are often used by the community to treat specific diseases.

$$FL\ (\%) = \frac{Np}{N} \times 100\%$$

where *FL* is Fidelity Level value, *Np* is number of respondents who reported the use of medicinal plants/specific diseases. *N* is total number of respondents who mentioned the same plant for each type of disease.

## RESULTS AND DISCUSSION

**Use Value (UV)**

The Use Value (UV) index is a quantitative measure that reflects the relative importance of plant species to a community. It is calculated based on the frequency of citation by respondents and indicates how widely and frequently a species is used within local traditions. A higher UV suggests that a plant is well-recognized and commonly applied, while lower values indicate limited or more specific use. In this study, interviews with 30 respondents from the Paser Telake tribe community revealed the use of 24 plant species for various medicinal purposes. The list of these species and their corresponding UVs is presented in Table 1.

The Use Value (UV) index is applied to assess which plant species are most frequently recognized and utilized in traditional medicine (Kaunang et al., 2019). Table 1 demonstrates the distribution of UV values across 24 plant species. The data show that several plants hold particularly high cultural importance, as indicated by their higher UV scores. The species with the highest score was Ageratum conyzoides (bandotan), with a value of 0.36, and is primarily used for wound treatment. Previous reports indicate that A. conyzoides is widely employed among various Kalimantan tribes to treat ailments such as stomach pain, postpartum recovery, and cough. The predominance of this species may be attributed to multiple factors. Ecologically, A. conyzoides is abundant and widely distributed in open fields and disturbed habitats, making it highly accessible to rural communities. Culturally, its use has been embedded in traditional healing practices and transmitted across generations, reinforcing its perceived efficacy. Pharmacologically, A. conyzoides contains bioactive compounds, including alkaloids, flavonoids, and terpenoids, which have been shown to exhibit antimicrobial, anti-inflammatory, and wound-healing properties. These ecological availability, cultural acceptance, and pharmacological efficacy collectively explain why A. conyzoides emerges as a species of high ethnomedicinal importance in the study area.

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| No. | Plant Name | Total Respondent (n) | Informants who utilize species | Use Value (UV) |
|---|---|---|---|---|
| 1 | Sembung Leaves (*Blumea blasmifera* L.) | 30 | 2 | 0.06 |
| 2 | Brotowali (*Tinospora crispa* L) | 30 | 3 | 0.10 |
| 3 | Cherry Leaves (*Mutingia calabura* L) | 30 | 1 | 0.03 |
| 4 | Betle Leaves (*Piper betlle*) | 30 | 2 | 0.06 |
| 5 | Pasak Bumi (*Eurycoma longifolia*) | 30 | 9 | 0.30 |
| 6 | Ketepeng Cina (*Cassia alata* L.) | 30 | 1 | 0.03 |
| 7 | Jinten (*Plectranthus amboinicus* (Lour.) Spreng.) | 30 | 1 | 0.06 |
| 8 | Bandotan (*Ageratum conzyodes* ) | 30 | 11 | 0.36 |
| 9 | Cocor bebek (*Kalanchoe pinnata*) | 30 | 1 | 0.03 |
| 10 | Pinang (*Areca catechu* L.) | 30 | 1 | 0.03 |
| 11 | Pepaya (*Carica papaya*) | 30 | 1 | 0.03 |
| 12 | African Leaves (*Vernonia amygda* Lina) | 30 | 7 | 0.23 |
| 13 | Engkerebai Kayoh (*Psychotria malayana*) | 30 | 1 | 0.03 |
| 14 | Karamunting (*Rhodomytus tomentosa*) | 30 | 1 | 0.03 |
| 15 | Langsat (*Lanstium domesticum*) | 30 | 1 | 0.03 |
| 16 | Bajakah (*Spatholobus littoralis*) | 30 | 1 | 0.03 |
| 17 | Meniran (*Phyllanthus urinaria*) | 30 | 1 | 0.03 |
| 18 | Weeds (*Imperata cylindra*) | 30 | 1 | 0.03 |
| 19 | Jambu biji (*Psidium guava* L.) | 30 | 3 | 0.10 |
| 20 | Jarak leaves (*Jatropha curcas*) | 30 | 2 | 0.06 |
| 21 | Sambiloto (*Andrographis paniculata* Nees) | 30 | 1 | 0.03 |
| 22 | Hanjuang (*Cordyline fruticosa*) | 30 | 1 | 0.03 |
| 23 | Sungkai leaves (*Peronema canescens* Jack) | 30 | 1 | 0.03 |
| 24 | Kumis kucing (*Orthopison arisatus*) | 30 | 1 | 0.03 |

**Informant Consensus Factor (ICF)**

ICF analysis is used to determine the uniformity of information regarding the use of plants for treating specific disease categories (Syarifuddin & Amalia, 2021). Low ICF values indicate fragmented knowledge and a higher risk of local knowledge loss, whereas high values reflect strong consensus, often supported by knowledge exchange among community members. In this study, disease classification was derived from local perceptions and subsequently aligned with biomedical references to ensure both cultural validity and scientific comparability. The detailed distribution of plant species associated with each disease category is presented in Table 2.

As shown in Table 2, the dominance of a few species in highly consensual categories, such as wounds, demonstrates both the strength of traditional knowledge transmission and the potential pharmacological relevance of these plants. Among the 21 categories assessed, wounds exhibited the highest consensus (ICF = 1), indicating that many informants relied on the same limited number of plant species

**Table 2.** Plants frequently used by the Paser Telake Tribe

| No | Name of disease | Number of informant | Total species | ICF |
|---|---|---|---|---|
| 1. | Diabetes | 3 | 3 | 0 |
| 2. | Malaria | 4 | 2 | 0.8 |
| 3. | Cancer | 1 | 1 | 0 |
| 4. | Cholesterol | 1 | 1 | 0 |
| 5. | Flu | 6 | 3 | 0.6 |
| 6. | Low back pain | 3 | 2 | 0.5 |
| 7. | Gout | 2 | 2 | 0 |
| 8. | Heart Failure | 1 | 1 | 0 |
| 9. | Fever | 5 | 4 | 0.25 |
| 10. | Stomach pain | 3 | 1 | 1 |
| 11. | Cough | 1 | 1 | 0 |
| 12. | Vaginal Discharge | 1 | 1 | 0 |
| 13. | Ringworm | 1 | 1 | 0 |
| 14. | Allergy | 1 | 1 | 0 |
| 15. | Headache | 1 | 1 | 0 |
| 16. | Cyst | 1 | 1 | 0 |
| 17. | Prostate | 1 | 1 | 0 |
| 18. | Blain | 1 | 1 | 0 |
| 19. | Annemia | 7 | 2 | 0.83 |
| 20. | Wound | 11 | 1 | 1 |

for treatment. The predominance of medicinal uses for wounds and digestive disorders carries important sociocultural implications. Wound remedies are closely linked to subsistence activities such as farming and forest foraging, while digestive disorders reflect dietary habits, food availability, and sanitation conditions in rural contexts. These findings illustrate how ethnomedicinal knowledge is shaped by ecological setting and cultural practice, while also underscoring the urgency of documenting categories with low ICF values before such fragmented knowledge disappears.

**Fidelity Level (FL)**

Based on the results of data analysis, 21 categories were obtained for each species of medicinal plants in the Paser Telake tribe (Table 3). Fidelity Level (FL) Fidelity level (FL) is a parameter used to measure the percentage of respondents who use particular plant species to treat certain diseases. (Yusro et al., 2020). The FL value indicates the percentage of informants utilizing particular plant species with the same primary objective (Fatimah, 2021; Mazzei et al., 2024). If a plant shows a high FL value (close to 100%), it indicates a strong consensus among informants regarding the primary use of that plant. The plant is consistently used for a specific disease or condition, suggesting high cultural importance and perceived effectiveness. It can be considered a prime candidate for further pharmacological and phytochemical research.

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**Table 3.** Fidelity Level of Plant Species Based on Disease Category

| No. | Name of disease | Plants species |
|---|---|---|
| 1 | Diabetes | Cherry Leaves (60%), Kumis Kucing leaves (40%) |
| 2 | Malaria | Sambiloto (29%), Pasak Bumi (43%), Papaya Leaves, Brotowali (15%) |
| 3 | Cancer | Bajakah (100%) |
| 4 | Cholesterol | Papaya Seeds (100%) |
| 5 | Flu | Aficans Leaves (10%), Sembung Leaves (34%), Cocor Bebek Leaves (66%) |
| 6 | Low Back Pain | Meniran Leaves (67%), Betle Leaves (33,3%) |
| 7 | Gout | Ilalang (50%), Areca Root (50%) |
| 8 | Fever | Sungkai Leaves (50%), Africans Leaves (17%), Jarak leaves (17%), Jinten (17%) |
| 9 | Stomach Pain | Guava Leaves (100%) |
| 10 | Cough | African Leaves (100%) |
| 11 | Vaginal Discharge | Bandotan Leaves (100%) |
| 12 | Ringworm | Ketepeng Cina Leaves (100%) |
| 13 | Cyst | Karamunting Leaves (100%) |
| 14 | Prostate | Engkerebai Kayoh (100%) |
| 15 | Annemia | Africans Leaves (71%), Sembung Leaves (29%) |
| 16 | Wound | Bandotan Leaves (100%) |
| 17 | Headache | Sambiloto Leaves (100%) |
| 18 | Ulcer | Cocor bebek Leaves (100%) |
| 19 | Allergy | Ketepeng Cina Leaves (100%) |
| 20 | Heart | Hanjuang Leaves (100%) |

**Utilization of Plants**

The use of medicinal plant parts by the Paser Telake Tribe is illustrated in Figure 2. In traditional medicinal practices, multiple plant organs are utilized, including leaves, roots, and seeds, with leaves constituting the predominant part employed (63.3%). This preference is attributable to their sustainable availability, ease of harvest without causing irreversible damage to the plant, and their relatively high content of pharmacologically active secondary metabolites such as alkaloids, flavonoids, and phenolic compounds. Decoction is the most common preparation technique, reflecting both its efficiency in extracting water-soluble compounds and its cultural significance, often symbolically associated with purification and the removal of harmful agents. However, this method also entails the risk of thermal degradation of heat-labile constituents, which can potentially diminish therapeutic efficacy (Maretta et al., 2023). Such considerations highlight the importance of integrating ethnopharmacological perspectives with phytochemical stability assessments to ensure a comprehensive understanding of traditional medicinal practices.

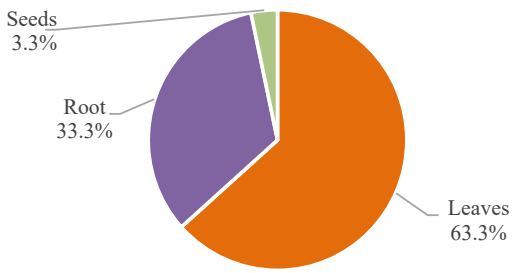


**Figure 2.** Parts of Plants Used by the Paser Telake Tribe

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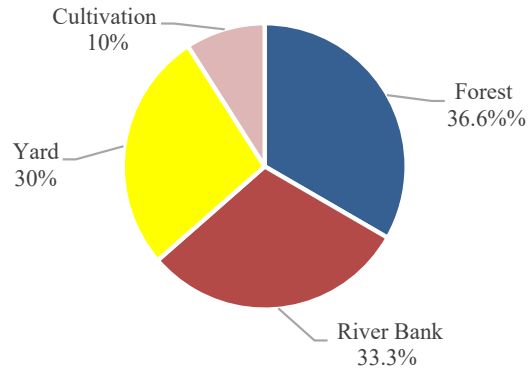


**Figure 3.** Utilization of medicinal plants by the Paser Telake Tribe

The utilization of medicinal plants in this tribe was shown in Figure 3. Indonesia is the second-largest archipelagic country (Jamilah & Disemadi, 2020). Forests in Indonesia have. One of the plant species is medicinal plants, consisting of leaves, rhizomes, stems, and roots. The most common sources of them are forests (36.6%), riverbanks (33.3%), yards (30%), and cultivation (10%) (Indrayangingsih et al., 2015). The use of medicinal plants, as indicated by their applications, is illustrated in Figure 4.

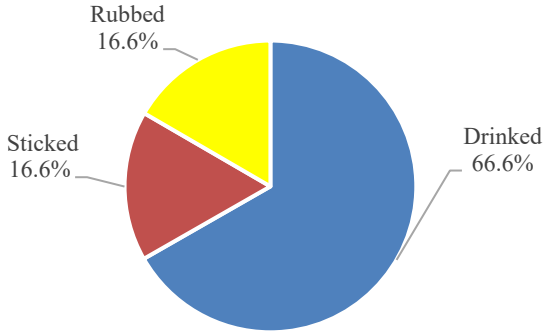


**Figure 4.** Methods of processing plants commonly used by the Paser Telake tribe

Another study on ethnomedicine also revealed that the most widely used methods of using plants are drinking (66.6%) and rubbing (16.6%) (Setyawan & Koeswanti, 2021). The utilization of plants, based on the method of processing, is illustrated in Figure 5.

The Paser Telake tribe uses medicinal plants, depending on the habits of one era to another, as reported by several informants who consider these plants beneficial and use them as first aid before visiting the hospital or local health center.

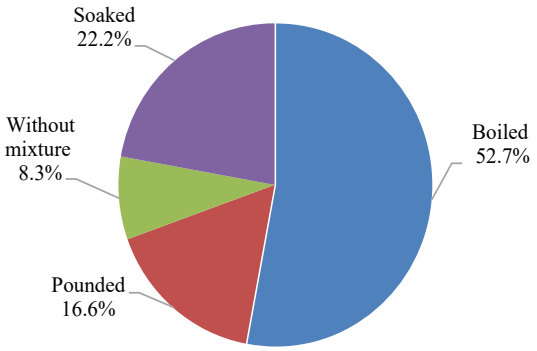


**Figure 5**. The plants processed for medical purpose by the Paser Telake tribe

The processing of these plants is straightforward, including boiling, pounding, and soaking without a mixture. The most widely used processing method is boiling, accounting for 52.7%, followed by soaking at 22.2%, pounding at 16.6%, and a combination of these methods at 8.3%. It is worth noting that boiling is the most widely used method of processing. Processing medicinal plants by boiling can reduce their bland and bitter taste compared to eating them directly, and boiling is a more sterile method because it can kill pathogenic germs or bacteria. (Lestari & Susanti, 2019; Seran, 2023). The boiling process can remove substances contained in plants and has a swift reaction. The use of medicinal plants, categorized by plant family, is illustrated in Figure 6.

The species of plants used by the Paser Telake tribe comprises 24 families, dominated by Asteraceae and Acanthaceae. This result was supported by other ethnomedicinal studies, which state that Asteraceae, in addition to being used as ornamental plants, are also utilized as herbal medicines and biological agents by the community (Rahmawati & Sulistiyowati, 2021). One example of the

Achantaceae family is sambiloto (Fadhil et al., 2024). The use of these plants is often traditional in treating various diseases.

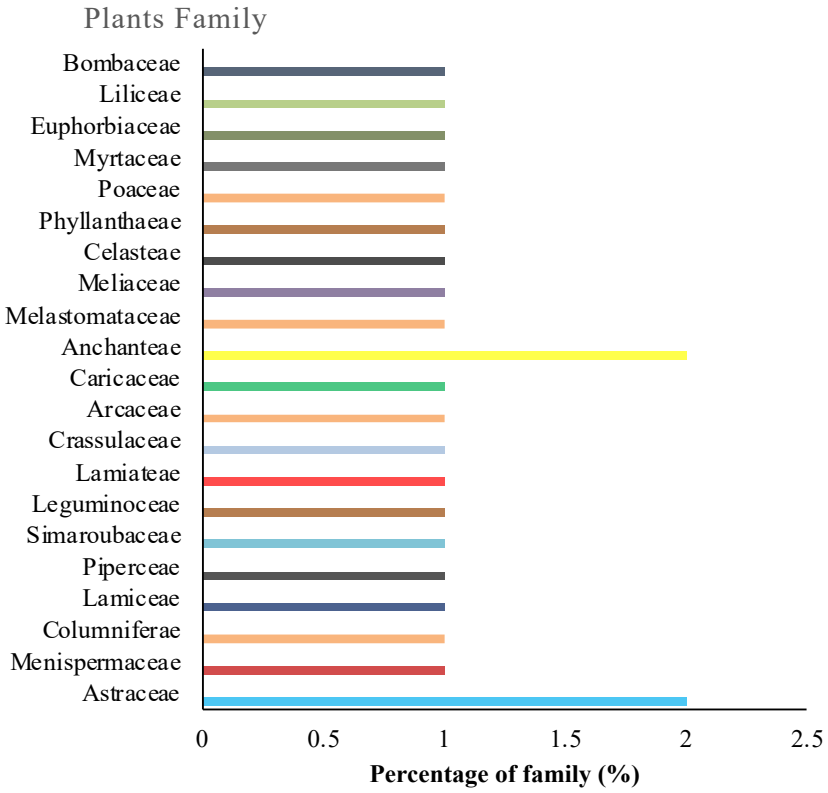


**Figure 6.** The classification of plant family for medicinal purpose by Paser Telake tribe

## CONCLUSION

There were 24 plant species from 20 families, including *Ageratum conyzoides*, *Vernonia amygdalina*, *Blumea balsamifera*, *Piper betle*, *Cassia alata* L., and *Peronema canescens* Jack, which were used by the Paser Telake Tribe (with High UV and FL values) for medicinal purposes. This tribe mainly obtains plants from the forest (16%), the riverbank (27%), the yard (27%), and cultivation (10%). The boiling process was mainly used to process traditional medicine. The Paser Telake tribe has specific medicinal plants used to treat the disease. Seven types of diseases have a high ICF value, including joint pain, cysts, ulcers, malaria, fever, vaginal discharge, and menstruation. This knowledge is expected to serve as a reference for researchers seeking to provide scientific evidence regarding the use of medicinal plants.

## AUTHOR CONTRIBUTION

**P.M.K.** Funding acquisition, resources, supervision, writing-review, and editing, **F.E.R.** collected and analyzed the data and wrote the manuscript.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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