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The use of medicinal plants in the Aneuk Jamee tribe in Kota Bahagia, South Aceh District, Indonesia

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Abstract. *Nursamsu, Nuraini, Sarjani TM, Mardudi. 2024. The use of medicinal plants in the Aneuk Jamee tribe in Kota Bahagia, South Aceh District, Indonesia. Biodiversitas 25: 2524-2540.* The Aneuk Jamee tribe comes from the Acehnese language, namely "Aneuk" which means child, while "Jamee" means guest/immigrant who is in the south of Aceh. The development of the use of medicinal plants is very promising in terms of supporting factors such as the availability of rich and diverse biological resources which can be developed as alternative treatment options for various types of diseases. The aim of this research is to document and study further the medicinal plants used by the Aneuk Jamee tribe in Kota Bahagia Sub-Sub-district, South Aceh, Indonesia, in four villages, namely Jombo Keupok, Alur Dua Mas, Ujong Tanoh and Beutong. This research is based on field surveys, plant collections, and interviews with local people. Interviews were conducted with 11 key respondents who are experts in the field of local medicine who were selected using the purposive snowball sampling method. This research highlights around 152 plant taxa belonging to 59 families. Poaceae (13 taxa) are the dominant family of medicinal plants. In the medicinal plant habitat, 77 taxa (50.7%) are predominantly wild and 75 taxa (49.3%) are cultivated. The part of the plant that is commonly used is the leaves (46.1%) which is the dominant part used. Squeezing (24%) was the main preparation method, and drinking (60.4%) was the commonly used method. The study categorizes 59 diseases into 16 categories. A high Informant Consensus Factor (ICF) value indicates that symptoms and signs affecting the skin and subcutaneous tissue (SCT), as well as diseases related to the blood and blood-forming organs, including certain disorders involving the body's immune mechanisms (DBF), have a significant level of agreement among the informants.

Keywords: Ethnobotany, knowledge of traditional medicine, medicinal plants, traditional healers, traditional medicine

Abbreviations: ICF: Informant Consensus Factor, RFC: Relative Frequency of Citation, UV: Use Value

INTRODUCTION

The development of medicinal plant utilization is highly prospective, considering supportive factors such as the abundant and diverse availability of biological resources (Falah 2013; Marques et al. 2019). The utilization of plants as medicinal ingredients in Indonesia is diverse due to the trust in the environmental biodiversity, cultural, and ethnic backgrounds (Silalahi et al. 2015). The community utilizes medicinal plants for various medical needs (Yeung et al. 2020; Rasyidah and Hutasuhut 2021). Medicinal plants can serve as an alternative in addressing various types of diseases (Farista et al. 2021).

Ethnobotanical science, a multidisciplinary field, examines the relationship between humans and plants, particularly in traditional medicine, food, and cultural practices, generating comprehensive knowledge of traditional medicine nuances (Heinrich 2015; Albuquerque et al. 2017). These practices reflect cultural diversity, richness, and local wisdom in traditional medicine, but standardization is needed to ensure cultural practices and traditional medicinal knowledge guarantee the safety and effectiveness of treatments (Lulekal et al. 2008; Meresa et al. 2019).

Medicinal plants encompass all types of plants known to contain beneficial and therapeutic compounds capable of preventing, alleviating, or curing a disease (Helmina and Hidayah 2021). These plants also produce various organic compounds believed to have medicinal properties (Mais et al. 2018; Diniz et al. 2020). While primary metabolites (nucleotides, amino acids, and organic acids) directly contribute to the primary functions of plants, secondary metabolites (alkaloids, terpenoids, and phenolics) are compounds that do not directly contribute to the vital functions of plants (Karaköse 2022) but have the potential to contribute to scientific knowledge for the conservation and sustainable utilization of biodiversity (Gaoue et al. 2017).

Community knowledge about medicinal plants is often associated with local languages through plant names and specific terms, as well as customs within a particular ethnic group (Martin 1995), where communities have a unique understanding of environmental management, including in terms of treatment, by utilizing medicinal plants (Purwanto dan Susilowati 2000). For example, the Aneuk Jamee tribe also utilizes plants as medicinal ingredients. The Aneuk Jamee tribe has a unique approach to processing plants, which are harvested directly from nature and transformed into medicines through methods passed down through generations. Interestingly, almost all types of plants are believed to have medicinal properties. This phenomenon is particularly intriguing to study, as the tribe still holds the

belief that illnesses are caused by jinn and demons, commonly referred to as resident jinn. Such beliefs are commonplace among the Aneuk Jamee people. They believe that when someone falls ill in a valley, they should use plants growing in that area, following the guidance of a local healer or medicine expert. The Aneuk Jamee tribe is one of the ethnic groups in Indonesia, located in the province of Aceh, spread along the southern coast of West Aceh. The term 'Aneuk Jamee' comes from the Acehnese language, where 'Aneuk' means child and 'Jamee' means guest/foreigner (Melalatoa 1995). The utilization of medicinal plants has long been practiced among the Aneuk Jamee community in the Kota Bahagia Sub-district of South Aceh District, where the community processes and utilizes plants as medicine with the assistance of village doctors as an alternative to modern treatment (McGaw et al. 2008; McGaw et al. 2020). Factors influencing the community's continued use of traditional healers and materials to treat various diseases include economic factors, limited medical personnel, social factors, belief in the healers' ability to cure diseases, the perception of medicinal plants as safe but minimally effective, low knowledge about medical treatment, and easy access to services (Raodah 2019; Dzoyem et al. 2020; Gonfa et al. 2020).

Medicinal plants are an integral part of the local healthcare system worldwide, utilizing local flora as alternative sources of treatment that can be developed for various illnesses (Yuan et al. 2016). Traditional herbal remedies generally have milder effects compared to synthetic chemical drugs (modern medicine); however, plant-based traditional remedies typically require longer healing periods compared to chemical drugs. Nevertheless, traditional plant-based treatments are believed to be much safer as they do not cause significant side effects, are non-toxic, easily accessible, and simple to produce (Galingping 2007; Kartika 2017; Mismawati et al. 2015; Nugroho 2017; Denny and Kalima 2018).

The utilization of plants as medicine has undergone a shift since the advent of modern medicine in Indonesia (Hilaliyah 2021). Previous research by Suwardi et al. (2021) indicated that the utilization of medicinal plants among the Aneuk Jamee tribe has begun to decline. The utilization of medicinal plants, once considered the primary treatment, has now shifted towards modern medicine, which has been applied from a young age, impacting the decrease in utilization and knowledge of medicinal plants solely among certain segments of the community, particularly among older generations familiar with traditional plant use. Therefore, this study aims to document the types of medicinal plants, to examine and to preserve the traditional knowledge about medicinal plants used by the Aneuk Jamee tribe in Kota Bahagia Sub-district, South Aceh District, Indonesia.

MATERIALS AND METHODS

Study area

This study was conducted in Kota Bahagia Sub-district, South Aceh District, Aceh Province, Indonesia, located between 02°23'24"-03°44'24" N and 96°57'36"- 97°56'24" E, with an average elevation of 25 meters above sea level (MASL). The climate in this Sub-district is classified as humid tropical, with an average annual rainfall ranging from 71 mm to 395 mm, and an average daily temperature of 29°C. Covering an area of 195.82 km², the Sub-district has a population of 7,266 people, consisting of 3,580 males and 3,686 females (The Central Statistics Agency of South Aceh District 2023). The uniqueness of this research location lies in its intriguing geographical features, being situated within the Gunung Leuser National Park area and adjacent to the coastline as well as vast mountain ranges, which results in a rich diversity of flora and fauna. The abundance of medicinal plants and the preservation of traditional treatment practices in this area are remarkable, yet unfortunately, they have not been well-documented. This has sparked interest in conducting research in this location. The study was carried out in August 2024, covering the villages of Jombo Keupok, Alur Duamas, Ujong Tanoh, and Beutong, in Kota Bahagia Sub-district, South Aceh District, Aceh Province, Indonesia (Figure 1).

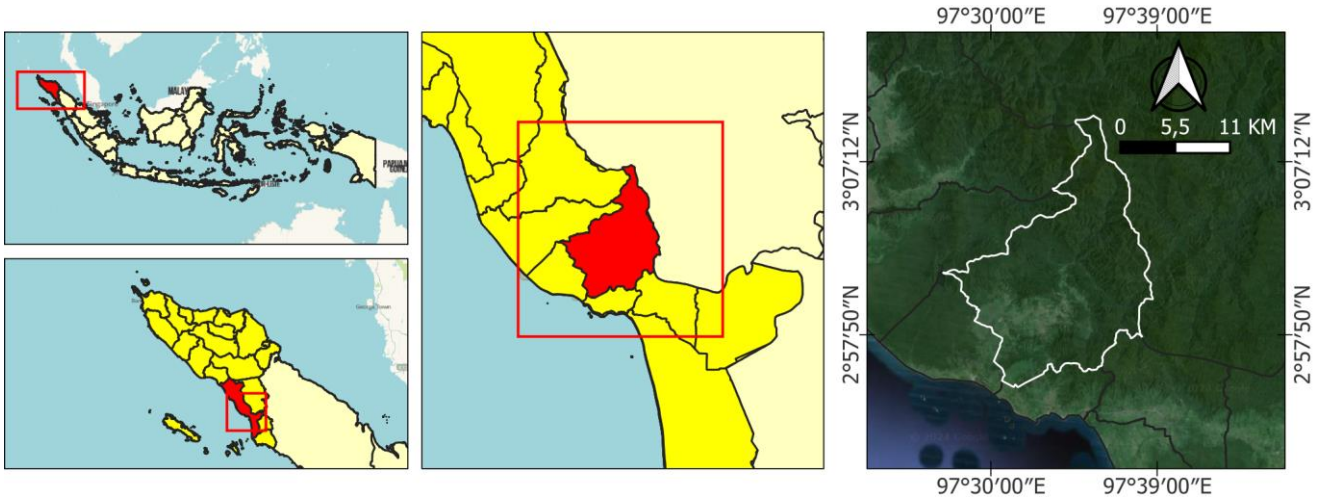

Figure 1. Map of Kota Bahagia Sub-district, South Aceh District, Aceh Province, Indonesia, as a research area

Procedures

This research was conducted in four villages, Jambo Keupok, Alur Dua Mas, Ujong Tanoh, and Beutong, in the Kota Bahagia Sub-district, South Aceh District, Aceh Province. Information regarding the diversity of medicinal plants was obtained through field surveys involving 11 key respondents (Table 1), Who are experts in local medicine selected using the purposive snowball sampling method (Martin 1995; Albuquerque et al. 2014) and semi-structured interviews with informants (Bernard 2017).

The selection of these informants was intentional to ensure the conveyance of comprehensive and useful data for the researcher and the field of medicine, and to ensure that their information would not be misused in the future (Bender et al. 2014; Espinoza-Pérez et al. 2021). The respondents consisted of local Aneuk Jamee tribe members aged between 30-80 years (Table 1). The interviews utilized a questionnaire covering plant types, local names, parts used, processing methods, and usage methods (Yineger et al. 2007; Heinrich et al. 2009; Lulekal et al. 2014). Plant identification was carried out directly in the field (Hedberg et al. 1989; Hedberg et al. 2003). Botanical names were updated using medicinal plants utilized by the local community, documented in the form of photographs, and then the medicinal plants were identified and matched with this plant website online (https://powo.science.kew.org/) (Royal Botanic Gardens 2024).

Data analysis

This study employs both qualitative descriptive analysis and quantitative descriptive analysis techniques using a survey method, where data are collected directly in the field under actual conditions. The qualitative analysis is conducted by categorizing interview data based on the species of medicinal plants, the parts used, the processing methods, and the usage methods. Subsequently, the data are analyzed by calculating the Use Value (UV), Relative Frequency of Citation (RFC), and Informant Consensus Factor (ICF).

Use Value (UV)

Use Value is a quantitative index to evaluate the relative usefulness of an area and is useful for indicating which plants have the most benefits from plants for disease control in that area. Use value is calculated using the formula:

$$UV = U/N$$

Where U is the number of reports mentioning the use of the species, and N is the number of informants.

The higher the UV value indicates the type of nutritious plant which is mainly used as a medicinal plant (Tardio and Pardo-de-Santaya 2008).

Relative Frequency of Citation (RFC)

Relative frequency of citation (RFC) was developed by Tardio and Pardo-de-Santayana (2008), which shows the local importance of each species where the higher the RFC value, the more popular a plant is, which results from the equation:

$$RFC = FC/N$$

Where FC is the number of informants who mentioned the species and N is the number of informants.

Informant Consensus Factor (ICF)

The Informant Consensus Factor (ICF) it is used in ethnobotanical studies to measure the level of agreement or consensus among informants (usually members of the local community or tribe) regarding the use of medicinal plants to treat specific ailments. The ICF value ranges from 0 to 1, where a higher value indicates a higher level of agreement among informants. In the context of the research, a high ICF value indicates significant consensus among informants regarding the use of medicinal plants to treat particular types of diseases. Informant Consensus Factor (ICF) is determined by using the following Cornara et al. (2014):

$$ICF = (Nur - Nt)/ Nur - 1$$

Where Nur is the number of useful reports in each category and Nt is the number of species used by all informants for a particular category (Heinrich et al. 1989; Vitalini et al. 2013)

RESULTS AND DISCUSSION

Characteristics of medicinal plants

A total of 152 taxa of medicinal plants, consisting of 59 families were recorded to be utilized by the Aneuk Jamee Tribe in the Kota Bahagia Sub-district, South Aceh District, Aceh, Indonesia (Table 2, Figure 2).

Table 1. Demographic structure of respondents in the Aneuk Jamee tribe community in Kota Bahagia Sub-district, South Aceh District, Aceh, Indonesia

Parameter	Specification	Frequency	Percentage
Gender	Male	4	31
	Female	7	69
Age	15-25	0	0
	26-35	0	0
	36-45	3	26
	46-55	0	0
	56-65	1	18
	>65	7	56
Education	No school	2	18
	Elementary school	6	55
	Junior high school	3	27
	Senior High School	0	0
	University	0	0

The most typically utilized family is Poaceae, which includes 13 taxa in the research region, it should be noted that the identification of observed species is relatively higher compared to previous studies conducted by Suwardi et al. (2021), which show that the Aneuk Jamee tribe in South Aceh possesses deep knowledge of medicinal plants, using 96 taxa for various traditional treatments. *Piper betle* and *Psidium guajava* are two of the most commonly used species for traditional medicine there. As for comparisons with other tribes in Indonesia, research by Supardi et al. (2023). Meanwhile, a study by Silalahi et al. (2019) identified around 149 species of medicinal plants used by the Batak tribe in Sumatra, including *Eurycoma longifolia*, *Curcuma longa*, and *Zingiber officinale* as the most frequently used medicinal plants. Nurcahyo et al. (2024) reported their findings on Java Island, specifically in the upstream area of the Bengawan Solo River, Central Java, revealing a total of 88 taxa, with boiling being the preferred method to combine several plants due to its perceived simplicity and cost-effectiveness. Zingiber officinale Roscoe, Alpinia galanga, and Curcuma longa are the most commonly utilized plants.According to Rahmawati et al. (2020), they reported 89 taxa in Rongkong, North Luwu Regency, South Sulawesi Province, revealing medicinal plants used and practiced by traditional healers in Rongkong to treat 31 diseases, with Allium cepa having the highest utility among all medicinal plants in Rongkong.In the study by Lense (2012) in West Papua, they reported 99 taxa. Leaves are the most commonly used plant part to treat medical conditions. The high utilization of *Piper betle* (*sirih*) is driven by the habit of women aged 30-80 years consuming betel, a tradition known as *sekapur sirih* or commonly referred to as betel chewing. These data imply that the research region is rich in biodiversity. Furthermore, this high variety aids in the preservation of varied and important traditional knowledge. Furthermore, the numerous species discovered and documented show that the vegetation in the research region serves as a reservoir of diverse sorts of medicinal plants, emphasizing the role of the traditional medicinal plant industry in providing basic healthcare requirements (Zemede et al. 2024).

Plant interest index

The Use Values (UVs) of medicinal plants by the Aneuk Jamee tribe in the Kota Bahagia Sub-district, South Aceh District, Aceh, were calculated to measure the importance of a particular plant based on how frequently it is cited by a certain number of people. UV scores range from 0.09 to 0.36 (Figure 3) with *Psidium guajava, Oryza sativa, Ananas comosus, Arenga pinnata, and Curcuma longa* having lower values (0.09), while *Alpinia galanga*, *Acalypha australis*, *Trema orientale*, *Areca catechu* have the highest UV values (0.36). The high UV value is certainly influenced by the abundance of information regarding the usefulness of the medicinal plant itself, where a plant like *Alpinia galanga* has many medicinal properties that can treat various diseases such as fever and cough (Saragih et al. 2024). The relative frequency value of quotations of medicinal plants of the Aneuk Jamee tribe in Kota Bahagia Sub-district, South Aceh District, Aceh, is calculated to measure how popular a particular plant is based on how often it is mentioned by a number of people, so that the more people who mention a plant, it indicates that the plant It is popular and often used and there is also high public knowledge of this plant, the highest values were obtained for *Piper betle* and *Cocos nucifera* (1). This is followed by *Colubrina asiatica* (0.9), *Kalanchoe pinnata* (0.9), *Alpinia galanga* (0.81), *Myristica fragrans* (0.81), *Lawsonia inermis* (0.72), *Ageratum conyzoides* (0.72), *Chromolaena odorata* (0.63), *Clinacanthus nutans* (0.63), *Piper nigrum* (0.54), *Cymbopogon citratus* (0.54), *Ananas comosus* (0.45), *Areca catechu* (0.45), *Kaempferia galanga* (0.36), *Justicia gendarussa* (0.36), *Eleusine indica* (0.27), *Hibiscus arnottianus* (0.27), *Combretum indicum* (0.27), *Ocimum tenuiflorum* (0.18), *Clerodendrum indicum* (0.18) (Figure 3).

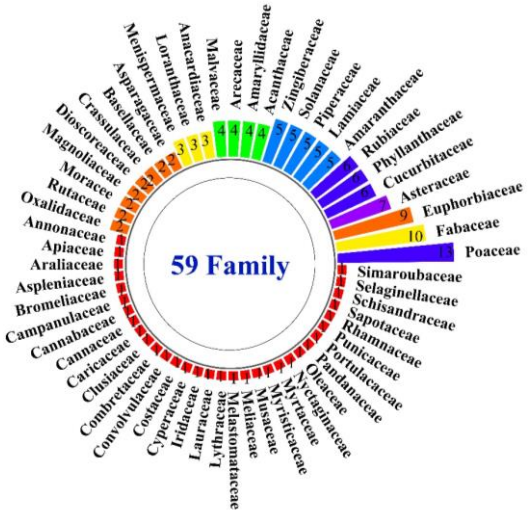

Figure 2. Family of medicinal plants

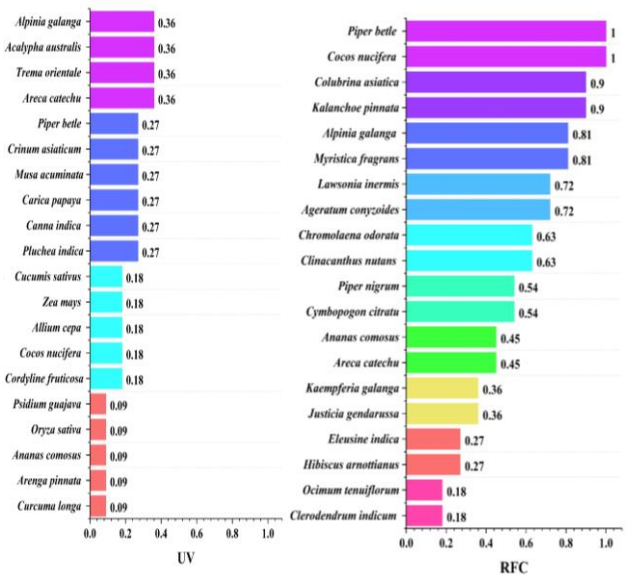

Figure 3. Plant interest index

Plant part used as medicine by the Aneuk Jamee Tribe

In terms of plant parts, leaves (46.1%) are the most frequently used, followed by fruits (17.4%), flowers (7.2%), whole plants (4.8%), stems (4.2%), roots (4.2%), seeds (4.2%), rhizomes (3.6%), latex (3%), tubers (3%), and bark (2.4%) (Figure 4).

Leaves are highly utilized because they contain bioactive substances that have multiple healing effects compared to other parts and are considered easier to handle by the community (Ismail and Ahmad 2019; Helmina and Hidayah 2021; Nehru et al. 2024). The usefulness or importance of a medicinal species encompasses various components (Papageorgiou et al. 2020), such as fruits, flowers, bark, stems, tubers, latex, seeds, rhizomes, and whole plants, which are also used by the Aneuk Jamee tribe's traditional healers in ethnomedicinal preparations. Local groups' knowledge of ethnobotany is heavily influenced by environmental factors and plant availability (Beltran-Rodríguez et al. 2014; Quave and Pieroni 2015; López-Patiño et al. 2022).

Plant availability in nature varies by species, which can be attributed to various factors, including chemical components and unique therapeutic characteristics present in plants (Az-Zahra et al. 2021). These findings are similar to previous research reported by Suwardi et al. (2021) in South Aceh, which shows that leaves are the most frequently used plant part. This aligns with reports that leaves are easier to collect and are the most abundant plant part. The Aneuk Jamee tribe's therapy involves harvesting various plant components for medicinal preparation, both fresh and dried. They prefer to make fresh medicine when patients arrive, and most plant species are often used fresh. This is done because the therapeutic culture at that time preferred immediate procedures. However, if the plants are not easily accessible, such as those difficult to obtain or far from human settlements, herbal experts suggest and process them in dried form. Some plants that are readily available are also presented in dried form because they require preparation processes (Zemede et al. 2024). This clearly underscores the importance of ethnomedicine in this culture, particularly in locations where modern healthcare facilities are few and difficult to access (Hussain et al. 2023; Magtalas et al. 2023).

Mode of preparation

The most common method of processing traditional medicine from plants is through squeezing (24%), finely chopping (18.2%), boiling (14.3%), direct consumption (11%), fine grinding (8.4%), pounding (7.1%), roasting (3.9%), grating (3.2%), chewing (2.6%), dropping (2.6%), pounding (1.3%), wilting (1.3%), shaking (1.3%), and scraping bark (0.6%) (Figure 5). The most frequently practiced treatment method is oral ingestion (60.4%), followed by topical application (9.7%), direct consumption (8.4%), application (7.8%), instillation (5.2%), vegetables (3.2%), rubbing (1.9%), washing (0.6%), pouring (0.6%), bathing (0.6%), smearing (0.6%), and attaching (0.6%) (Figure 5).

Practitioners of ethnomedicine in the Aneuk Jamee ethnic community, commonly known as "*Dukun kampuong*" utilize basic techniques and locally available materials to prepare treatments. A "*dukun kampung*" is an important figure who possesses expertise in healing and concocting traditional medicinal remedies (Arifin et al. 2018). In addition to herbal remedies, Aneuk Jamee healers also incorporate other ingredients into their traditional medicinal concoctions such as eggs, honey, grams, sugar, lime, and others. These additional ingredients serve to enhance flavor, alleviate bitterness, and increase the nutritional and medicinal efficacy for patients. Similar practices have also been reported in the traditional medicine of the Maonan community in China, where locals add ingredients like honey, butter, and meat to enhance the nutrition and flavor of the medicine they prepare for treatment (Ayalew et al. 2017). Practices and processing methods vary from region to region, influenced by cultural diversity and customs in each area. Cultural interactions and traditions serve as conduits for the transfer of ethnobotanical knowledge among communities.

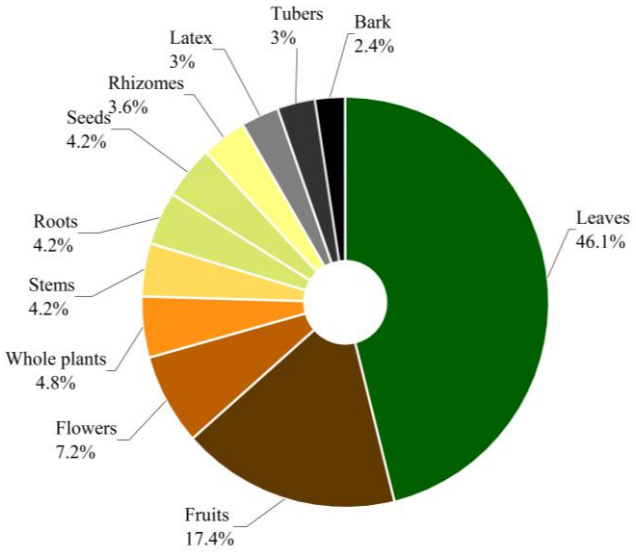

Figure 4. Plant part used

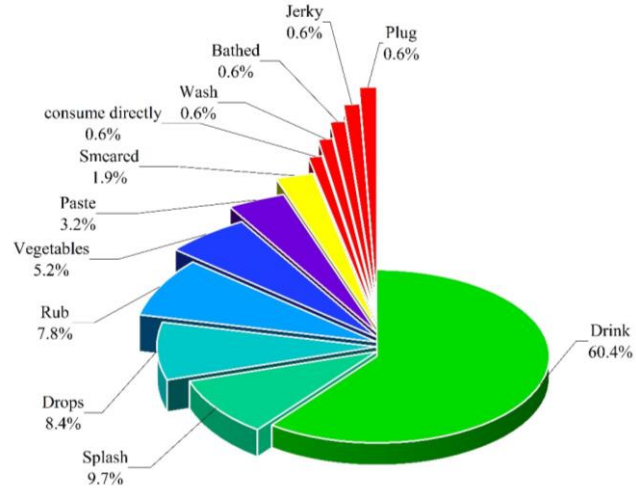

Figure 5. Mode of preparation

Mode of use

The most frequently practiced treatment method is oral ingestion (60.4%), followed by topical application (9.7%), direct consumption (8.4%), application (7.8%), instillation (5.2%), vegetables (3.2%), rubbing (1.9%), washing (0.6%), pouring (0.6%), bathing (0.6%), smearing (0.6%), and attaching (0.6%) (Figure 6).

The treatment method involves ingesting concoctions made from plants mixed with various other plants believed to have medicinal properties. This technique is believed to be capable of treating various ailments due to its ease of use, efficiency, and longstanding generational use (Hu et al. 2020). The utilization of medicinal plants has long been practiced by the Aneuk Jamee community in the Kota Bahagia Sub-district, South Aceh District, relying on local plant resources passed down through generations (Atmojo 2015; López-Patiño et al. 2022).

Practitioners' methods of applying treatment in one region undoubtedly differ from those in other regions, influenced by traditions and cultures passed down through generations and still practiced today (Nascimento et al. 2018). Such practices are considered unique and beautiful aspects of traditions and cultures that deserve preservation. In their treatments, the Aneuk Jamee community has rules requiring patients to adhere to certain guidelines; for example, when a patient suffers from coughing, they are not allowed to consume oily or itchy foods during the treatment process. Medical practitioners employ this method to expedite the healing process. Similarly, in research conducted in Gamo, Ethiopia, specific preventive measures are applied to patients, such as refraining from eating and drinking and avoiding food in the morning, aimed at enhancing treatment effectiveness. For instance, in treating tapeworm disease, herbal experts prepare medicine from *Hagenia abyssinica* which patients consume before breaking their fast and then fast for an extended period, usually six hours, to effectively expel tapeworms from the intestines (Zemede et al. 2024).

Informant consensus factor

In this study, diseases reported by traditional medicine practitioners have been classified according to the International Classification of Diseases - 10th revision, 2019 version (https://icd.who.int). From this classification, the ICF values were determined as shown in Table 3. A total of 59 diseases across 16 categories were documented in the study area (Yineger et al. 2007; Yigezu et al. 2014; Assefa and Bahiru 2018). The most common category of reported usage was symptoms, signs, and clinical and laboratory findings (261 reported uses, 41 species), followed by diseases of the digestive system (123 reported uses, 34 taxa), skin and subcutaneous tissue diseases (82 reported uses, 14 taxa), certain infectious and parasitic diseases (67 reported uses, 17 taxa), and diseases of the respiratory system (63 reported uses, 15 taxa) (Table 3).

The high number of reports of symptoms, signs, and clinical and laboratory findings (fever, bloating, headache, internal heat) among the Aneuk Jamee tribe is attributed to their extreme work habits under the scorching sun, mostly as farmers in fields constantly exposed to the sun's heat, especially weather changes. ICF values ranged from 1 to 0.675. The highest ICF score (1) was for symptoms and signs affecting the skin and subcutaneous tissue (hair growth) and diseases of the blood and blood-forming organs as well as certain disorders involving the body's immune mechanism (cancer), while the lowest value was for diseases of the circulatory system (0.675). The ICF analysis results indicate that the Aneuk Jamee tribe utilizes various plant species to treat specific diseases, highlighting the importance of the ecosystem in the region. Additionally, the heterogeneity of medicinal plants used by the Aneuk Jamee tribe serves as evidence of their extensive knowledge in treating diseases through traditional medicine and their ability to interact with natural phenomena for the identification of important plants.

Major threats and conservation efforts of the Aneuk Jamee tribe medicinal plants

There are several factors that pose major threats to the sustainability and knowledge of medicinal plants, including the loss of their natural habitats (Chen et al. 2016), deforestation, agricultural expansion, and drought, which are major threats to local biodiversity. Besides natural factors, there are also societal factors (Sloan and Sayer 2015) that contribute to the loss of knowledge about traditional medicine and medicinal plants, such as the trend among the Aneuk Jamee community to increasingly utilize modern medicines and gradually abandon traditional remedies (Tuttolomondo et al. 2014). Additionally, there is a lack of concern among the community regarding the importance of medicinal plants (Grasser et al. 2012), deforestation, and land expansion leading to the loss of natural habitats for wild medicinal plants (Christanell et al. 2010; Wehi and Wehi 2010).

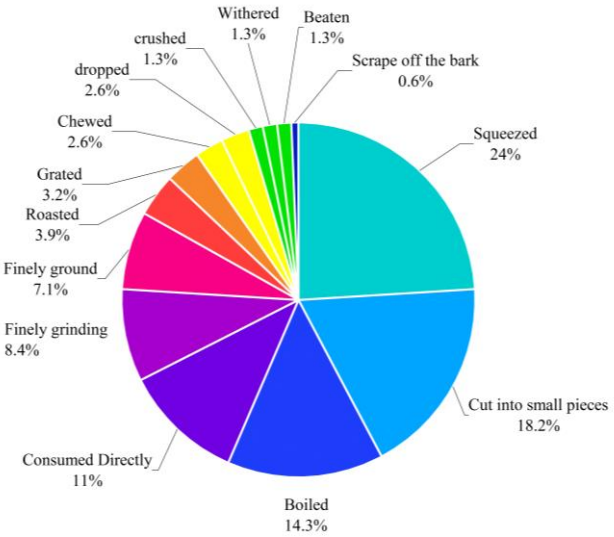

Figure 6. Mode of use

Table 3. Categories of disease in the study area and the Informant Consensus Factor (ICF)

Classification of diseases	Species diseases name	Number use-report	Number of species	ICF
Certain infectious and parasitic diseases (CID)	Dysentery, diarrhea, ringworm, scabies, anthelmintic, leprosy, head louse	67	17	0.755
Diseases of liver (LD)	Hepatitis, malaria, dengue, Liver	71	22	0.7
Diseases of the circulatory system (CSD)	Hemorrhoid, hypertension, anemia	41	14	0.675
Diseases of the digestive system (DSD)	Gastritis, hernia, gastric ulcer, stomachache, toothache, sprue, malnutrition, constipation	123	34	0.729
Diseases of the eye and adnexa (EAD)	Eye inflammation, photopia	52	12	0.784
Diseases of the genitourinary system (GD)	Dysmenorrhea, bladder stone, give birth to	37	12	0.694
Diseases of the musculoskeletal system and connective tissue (MCD)	Rheumatism, low back pain, gout,	18	5	0.764
Diseases of the respiratory system (RSD)	Cough, asthma, sore throat, cough with phlegm, itch, throat, pneumothorax	63	15	0.774
Diseases of the skin and subcutaneous tissue (DS)	Itch, boil, smallpox, measles	82	14	0.839
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (DBF)	Cancer	4	1	1
Endocrine, nutritional and metabolic diseases (ENM)	Diabetes, cholesterol	33	8	0.781
Injury, poisoning, and certain other consequences of external causes (IPD)	Wound, sprain, impaled by a rusty nail, bee sting, fracture	44	11	0.767
Symptoms and signs involving the circulatory and respiratory systems (DCR)	Hemoptisis, nosebleed	29	5	0.857
Symptoms and signs involving the skin and subcutaneous tissue (SCT)	Hair growth	4	1	1
Symptoms, signs, and abnormal clinical and laboratory (SSA)	Fever, flatulence, headache, deep heat	261	41	0.846

The habitat loss and biodiversity decline threaten the ability of local communities to sustain, utilize, and pass on traditional knowledge to future generations (Karaköse 2022). The shift of communities from traditional herbal medicine to modern medicine will undoubtedly affect knowledge about plant-based medicine (Mesfin et al. 2009; Tefera and Kim 2019). Traditional knowledge about medicinal plants among the Aneuk Jamee tribe has been passed down through generations. However, this traditional knowledge has not been well documented. In contrast to China, where the traditional medicine practices of the Mien tribe are highly valued and preserved, and extensively documented (Jin et al. 2018; Luo et al. 2018; Li et al. 2019; Shi et al. 2021; Hu et al. 2022; Lu et al. 2022). This factor is attributed to lack of education (Tongdhamachart and Alwi 2023) and lack of awareness and concern among local communities in reproducing and cultivating medicinal plants (Ticktin 2004).

These behavioral changes can successively determine the sustainability of ecosystem balance and affect population structure or even worse conditions, pushing medicinal plant species to the brink of extinction (El-Shabasy 2017; Ouarghidi et al. 2017). The transfer of knowledge is still done orally and passed down through generations, taught by parents to their children. This certainly requires further study and government support to ensure that knowledge and sustainability of medicinal plants are preserved and serve as a reference in future medical science and the development of new treatments (Porras et al. 2021; Suwardi et al. 2021). In addition to the government's role, the involvement of local communities is crucial in monitoring natural resources as the key to success (Staddon 2014; Ticktin 2015).

Discussion

This study highlights approximately 152 plant taxa belonging to 59 medicinal plant families utilized by the Aneuk Jamee tribe for treating various ailments in South Aceh, Indonesia. It is noteworthy that the species identification observed is relatively higher compared to previous research conducted by Suwardi et al. (2021), indicating that the Aneuk Jamee tribe in South Aceh possesses profound knowledge of medicinal plants, employing 96 taxa for various traditional treatments. *Piper betle* and *Cocos nucifera* are the two most commonly used species for traditional treatment there. The Poaceae family (13 taxa) stands out as the dominant medicinal plant family, possibly due to its prevalent geographic structure in paddy fields and plantations. In the study area, 77 types of wild plants and 75 types of cultivated plants were identified. The highest UV values were calculated for *Acalypha australis*, *Alpinia galanga*, *Areca catechu*, and *Trema orientale* (UV: 0.36). The high UV values are influenced by the abundance of information regarding the usefulness of the medicinal plants themselves. As for the Relative Frequency Citation (RFC) values, the highest values were obtained for *Piper betle* and *Cocos nucifera*. Regarding plant parts utilized, leaves (46.1%) were predominantly utilized due to their high content of bioactive compounds. Squeezing (24%) was the primary preparation method, and oral consumption (60.4%) was the commonly used method in traditional Aneuk Jamee

medicine. In terms of disease categories, a total of 59 diseases across 16 categories were documented in the study area, with Symptoms, signs, and clinical and laboratory abnormalities being the most commonly reported category (273 usage reports, 41 species). The Informant Consensus Factor (ICF) values ranged from 1 to 0.675. High ICF values indicate significant agreement among informants regarding symptoms and signs affecting the Skin and Subcutaneous Tissue (SCT), as well as diseases related to blood and blood-forming organs, including specific disorders involving the Body's Immune Mechanisms (DBF), demonstrating a significant level of consensus among informants. Local practitioners play a crucial role in providing valuable information about medicinal plants. This survey is a continuation of previous research and highlights the importance of documentation to update knowledge about medicinal plants, as well as the need for government support in preserving knowledge and medicinal plants to ensure their well-being and preservation. Isolation of chemical compounds and pharmacological testing are necessary for widely used species, while public awareness of the importance of sustainable management is also required to preserve medicinal plant resources.

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