



# Traditional healing of Lio People in Flores, Indonesia: The source of knowledge

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## Correspondence

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## Research

### Abstract

*Background:* Ethnomedicine research employing the positivist paradigm has documented the types and benefits of flora and fauna used in traditional medicine. However, it has failed to explain the production of ethnomedical knowledge. A multidisciplinary approach provides opportunities for ethnomedicine research to explore the role of traditional knowledge sources in producing ethnomedical knowledge and analyze the impact of modern knowledge dominance on the existence of ethnomedicine. This study aims to document Lio's traditional healing practices and investigate the sources of their knowledge and transmission methods.

*Methods:* Lio's people ethnomedicinal data and traditional healing practices were gathered from seven Lio's traditional healers through semi-structured questionnaires. Ethnomedicinal data were quantitatively analyzed using Use Value (UV) and Family Importance Value (FIV). Qualitative data obtained from semi-structured interviews were analyzed using thematic analysis techniques.

*Results:* This study concludes that the Lio people possess significant potential in terms of knowledge and raw materials for traditional medicine. Dreams serve as a medium for Lio herbalists to obtain and pass on ethnomedical knowledge to the next generation. The younger generation's interest in pursuing a career as herbalists has declined due to the modernization of the healthcare system in rural areas.

*Conclusions:* The communities of the Rwenzori region depend a lot on herbal medicine to treat various diseases irrespective of the availability of modern health care.

*Keywords:* Dreams; Ethnomedicine; Traditional knowledge; Traditional healing practices

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## Background

Rural communities around the world still rely on traditional ethnomedicine, which is based on unique cultural knowledge (Pucot and Demayo 2021; Manqele, Selier, and Downs 2023). Ethnomedicine encompasses ethnographic studies of health, diagnostic techniques, and treatment practices within various community settings (Bhasin 2007). Beliefs about the causes of illnesses and decisions regarding when and from whom to seek treatment are influenced by the prevailing social norms within communities (Quinlan 2011). Ethnomedicine studies play an important role in the discovery of medicinal remedies and serve as an initial source of information for drug discovery (Adeleye et al. 2021). Most plants with active compounds have been recognized for their traditional healing properties (Süntar 2020).

Indonesia is home to numerous ethnic minorities. This has attracted the attention of researchers exploring ethnomedicine. Several studies have successfully documented various species of flora and fauna used as the materials for ethnomedicine (Silalahi et al. 2015; Wildayati, Lovadi, and Linda 2016). These ethnomedicine studies indicate that the closer indigenous communities live to conservation areas, such as national parks, the greater the diversity of species utilized and the range of diseases treated (Susianti, Purwanto, and Walujo 2008; Setyowati and Wardah 2007; Rahayu, Siagian, and Wiradinata 2000; Ningsih 2016; Raharjaa 2018). However, the studies have predominantly focused on documenting the types and usage of flora and fauna; they do not delve into the sources of the ethnomedical knowledge. This limitation is commonly observed in ethnomedicine studies employing positivist paradigm and has drawn criticism regarding the use of the paradigm (Adekannbi, Olatokun, and Ajiferuke 2014; Fabrega and Beveridge 1992; Pool 1994; Sreedevi et al. 2013).

Scientific discussions in ethnomedicine studies no longer exclusively follow a positivist perspective. A multidisciplinary approach involving collaborative analysis, combining biological sciences with social sciences such as anthropology, sociology, history, and ethnology, has been widely employed in ethnomedicine research (Pala et al. 2019; Pieroni 2006). This multidisciplinary approach provides opportunities for ethnomedicine studies to explore the role of traditional knowledge sources in shaping ethnomedicine and the impact of modern knowledge on its existence (Adnan et al. 2014). For instance, one study indicates that deities, ancestors, dreams, nature, animals, and mystical experiences serve as sources of ethnomedical knowledge (Xaba 2007). However, other studies identify dreams as the most commonly found source of ethnomedical knowledge in traditional communities (Hirst 2005). Nevertheless, some studies position dreams not as knowledge sources but merely as a medium for transmitting knowledge (Taek et al. 2019). Therefore, a detailed investigation into the role of dreams in constructing ethnomedical knowledge is needed, whether as knowledge sources or merely as a medium for transmitting knowledge.

The Lio people of Ende, Flores, Indonesia, are known for their rich traditional knowledge of ethnomedicine. The Lio population is dispersed across traditional villages surrounding the Kelimutu National Park, with the Kelimutu Three-Color Lake as the epicenter for their annual ritual called "*patika*" (Winarto 2019). Their intensive interaction with the surrounding environment has equipped the Lio people with ethnomedical knowledge to prevent and treat various diseases afflicting the community (Genua et al. 2017). Despite the continued practice of various traditional treatments, none have been documented in writing (Genua 2018). This situation has attracted the attention of researchers to explore the traditional health practices of the Lio people, including documenting the types of flora and fauna used and the traditional healing techniques employed by the Lio community.

Studies on traditional healing practices within the Lio community have encompassed the documentation of *Nijo* healing (Genua et al. 2017) and the compilation of a lexicon related to Lio healing practices (Genua 2018). Other folk medicine studies within the Lio community have focused on documenting *Sua Soza*, a healing mantra in the Ende language (Bala and Hua 2020), and the documentation of the *Tu Gelu* healing ritual, which involves the treatment of mystical ailments through the mediation of a traditional healer, involving the exchange of items representing livestock (Wula and Mboka 2021). Additionally, ethnobotanical studies recording the plant species utilized by the Lio people for traditional healing have shown that there are 47 plant species in the village of Waturaka and 52 plant species in the village of Detuwulu in Ende Regency used for traditional healing (Wae, Gago, and Ngapa 2022; Deda 2019).

Based on this literature, it is apparent that studies on traditional healing practices among the Lio community have been approached from two distinct perspectives: folk medicine perspective which employs a phenomenological paradigm, and a positivist paradigm. Both approaches offer valuable insights into understanding traditional health systems within the Lio Tribe. However, a multidisciplinary perspective is necessary not only for documenting the use of plants in traditional healing but also for comprehending the underlying reasons to produce such knowledge. The findings of these studies also raise questions about the role of dreams. Are dreams the source of ethnomedicinal knowledge, or do they merely serve as a

medium for transmitting messages containing traditional healing knowledge? Consequently, this study aims to document Lio's traditional healing practices, including their sources of knowledge and transmission methods.

## Materials and Methods

### Study area

The majority of the Lio community resides in the Ende Regency, with some also living in the Sikka Regency, in the East Nusa Tenggara province (Astuti 2021). A large number of languages in East Nusa Tenggara and Maluku are members of the Central Polynesian Malay (CMP) language subgroup (Fernandez, 2007). The Lio language is closely related to Ngada Language. Meanwhile, these two languages are also related to the Palu'e language (Raharja & Yuwana, 2023). The Palu'e language is found on Palu'e Island, north of Ende Regency, and administratively belongs to the Sikka Regency area. This study was conducted in four villages: Niowula, Wolotopo, and Saga in the Ende Regency, and Mbengu Village in the Sikka Regency (see Figure 1). The Ende Regency has a population of 270,763 people with a population density of 139.12/km<sup>2</sup>. It covers an area of 1946.29 km<sup>2</sup>, divided into 21 sub-districts, 23 urban villages, and 255 rural villages (BPS Kab. Ende 2021). Niowula and Saga Villages are located in the Detusoko sub-district. Niowula Village is 675 meters above sea level, covering an area of 6.24 km<sup>2</sup> with a population of 498. Saga Village is located at an altitude of 757 meters above sea level, spanning 8.37 km<sup>2</sup> and hosting 765 residents (Badan Pusat Statistik Kabupaten Ende 2022a). Wolotopo Village is located in the Ndonga District at an altitude of 191 meters above sea level, covering an area of 10.92 km<sup>2</sup> and housing 958 inhabitants (Badan Pusat Statistik Kabupaten Ende 2022b). Mbengu Village is situated in the Paga District, Sikka Regency, with a population of 2617 people. The village covers an area of 5.82 km<sup>2</sup> at an elevation of 11 meters above sea level (Badan Pusat Statistik Kabupaten Ende 2022c). In these three villages, the majority of the population practices the Catholic faith. The average annual rainfall in the Ende Regency is 1226.55 mm.

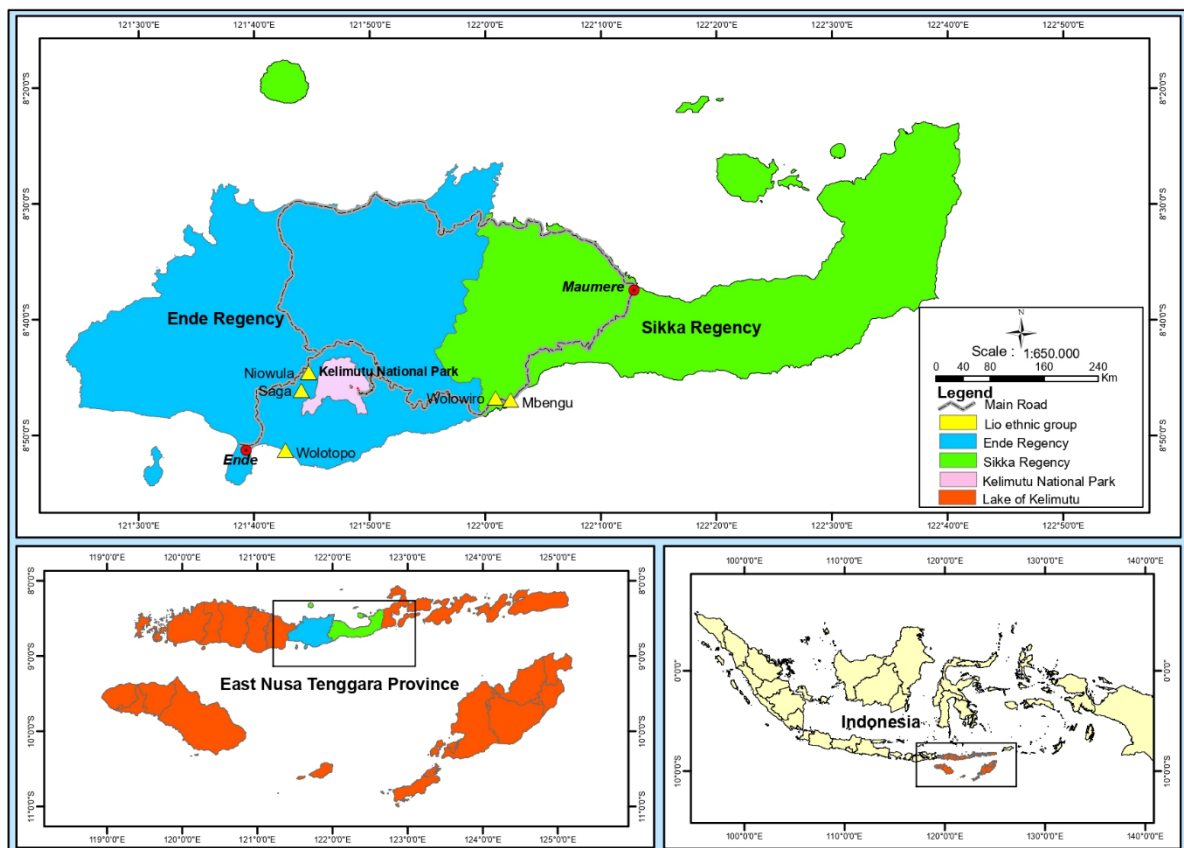


Figure 1. Research locations in the Ende and Sikka Regency

### Data Collection

Respondent selection was carried out purposefully, targeting traditional healers from the indigenous Lio ethnic community. The data collection method employed was snowball sampling. The stages involved preliminary interviews with the Kelimutu National Park authorities, followed by interviews with the village heads and Lio traditional leaders or *masalaki*. These initial stages were necessary because the villages inhabited by the Lio community are adjacent to the National Park, and research

activities required permission from both the village government and the *mosalaki*. The village head represents formal governance, while the *mosalaki* represents informal leadership.

The study focused on traditional healers who treat patients, limiting the sources of documented data on Lio traditional medicinal plants and practices to these healers. Quantitative data collected included information on age, gender, education, knowledge of traditional medicine, such as the types of medicinal plants used, parts of plants utilized, processing methods, and treatable diseases. Qualitative data delved into aspects such as sources of medical knowledge, knowledge transfer methods, and the challenges posed by modernization to the existence of ethnomedicine. Quantitative data were gathered through semi-structured interviews using questionnaires, while qualitative data were obtained through in-depth interviews.

In addition to interview techniques, guided field walks were conducted (Belayneh and Bussa 2014). Traditional healers and the research team collected medicinal plants together. Herbarium specimens of these medicinal plants were collected, documented, and subsequently identified at the Herbarium Bogoriense, Directorate of Scientific Collection Management, National Research and Innovation Agency.

### **Data Analysis**

Data related to medicinal plants were analyzed using Microsoft Excel 2013. Ethnomedicinal data were quantitatively analyzed using two indices:

Use Value (UV) to determine the ranking of the usage of each type of plant or medicinal material (Randriamiharisoa et al. 2015; Sadeghia and Mahmood 2014). It is calculated using the formula:

$$\text{Use Value (UV)} = \sum U/N$$

U = the number of different uses for each species by each respondent

N = the total number of respondents

$$\text{FIV} = \text{FC family} / N_s$$

Family Importance Value (FIV) is used to assess the importance of plant families in traditional medicinal culture (Mouchane et al. 2023).

FC family = the number of informants mentioning plants in a particular family

N<sub>s</sub> = the number of species in each family

From the identification of plants used for medicine, information regarding the compound content and health benefits of each of these plants was collected from the literature. Qualitative data obtained from semi-structured interviews were analyzed using thematic analysis techniques (Laalobang, Mudita, and Mau 2021). This involved identifying themes emerging from the interview results, determining the interconnections between themes, and organizing the themes sequentially into a narrative with causality and significance. Qualitative data from interviews were presented in the form of descriptive narratives, tables, and photos.

## **Results**

### **Respondent Demographics**

During the collection of data from traditional healers in the four customary regions, 36 individuals were interviewed. These respondents included national park staff, village heads, *mosalaki*, and village residents. From these interviews, information was obtained regarding seven Lio traditional healers. All the traditional healer respondents were aged over 50 and had completed primary education (Table 1).

### **Ethnomedicine Knowledge**

Information on 45 plant species used in traditional medicine was gathered from interviews with traditional healers (Table 2). The plants with the highest Use Value were ginger and red ginger (0.714). These two plants are used as ingredients for massage oils and *Muru Esi* oil, known for their various benefits. In the healing practice, some plants are mixed and processed into oils, while others are used individually. The most frequently utilized plant family was Zingiberaceae (Figure 2), and the dominant habit was trees and root plants (Figure 3). Many medicinal plants can be found in the vicinity of the traditional

healers' homes (Figures 4, 5, 6, 7). However, there are also plants that are only found in specific locations, quite far from human settlements. From the interviews, it was found that non-plant materials were not used in traditional healing practices.

Table 1. Demographics of traditional healer respondents

No.	Respondent's Code	Village	Age	Gender	Level of Education
1	IF1	Niowula	54	F	Elementary
2	IF2	Wolotopo	71	M	Elementary
3	IF3	Mbengu	71	M	Elementary
4	IF4	Wolotopo	60	M	Elementary
5	IF5	Wolotopo	52	M	Elementary
6	IF6	Saga	54	M	Elementary
7	IF7	Saga	75	M	Elementary

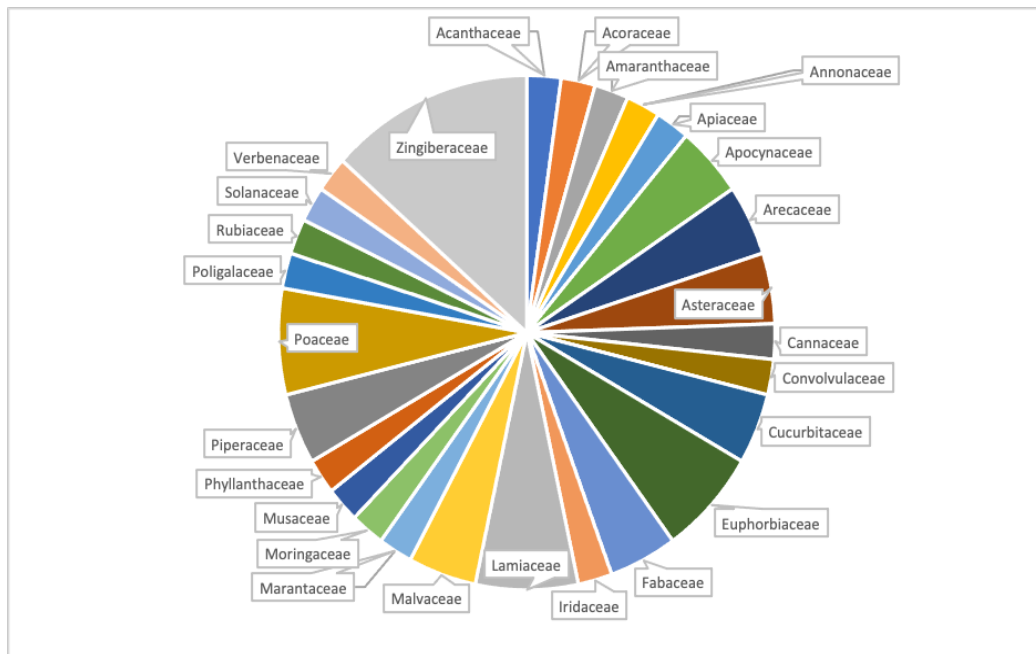


Figure 2. Plant families used in Lio's traditional healing practices.

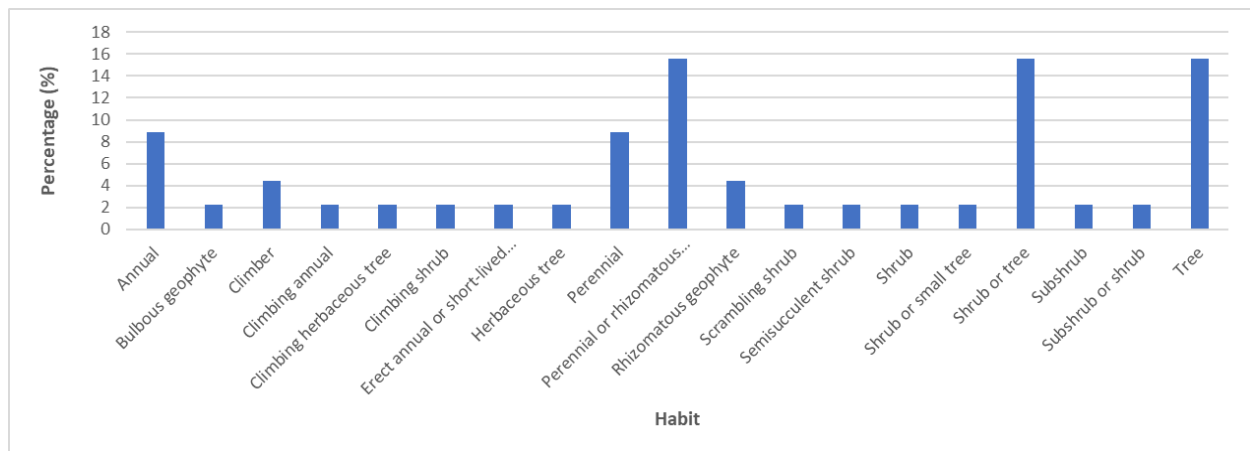
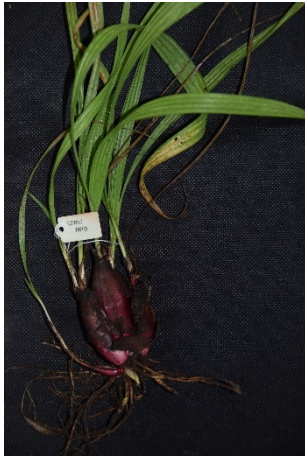


Figure 3. Plant habits used in Lio's traditional healing practices.

Figure 4. Mbonggi (*Camonea vitifolia*)Figure 5. Para (*Tabernaemontana sphaerocarpa*)Figure 6. Somu mera (*Eleutherine bulbosa*)Figure 7. Pombo (*Gymnanthemum amygdalinum*)

#### **Source of Knowledge and the Medium**

From this study, the sources of knowledge for Lio traditional medicine have been identified. It is believed that the knowledge of Lio traditional medicine is acquired by herbalists from their ancestors. However, not everyone is destined to become a herbalist. One cannot volunteer to become a herbalist nor decline when chosen to become one. Only those selected by the ancestors will become herbalists. These chosen herbalists have the role of treating sick members of the Lio community, and they are referred to as *atabhisa*, meaning those who can heal. According to a *mosalaki* of the Lio community in Wolotopo, "Atabhisa comes from the Lio language, where 'ata' means person and 'bhisa' means ability, so *atabhisa* means a person with the ability or expertise to cure diseases. Usually, there is an *atabhisa* in every village, but their numbers have decreased nowadays" (IF5).

"Atabhisa berasal dari Bahasa Lio, ata berarti orang, bhisa berarti punya kemampuan, jadi atabhisa artinya orang yang punya kemampuan atau keahlian menyembuhkan penyakit. Biasanya di setiap kampung ada atabhisa, tapi saat ini jumlahnya sudah berkurang" (IF5).

From the seven informants who are *atabhisa*, six of them acquired their knowledge of traditional medicine through dreams. In these dreams, they are visited by ancestral spirits who impart knowledge of traditional medicine, including prayers, mantras, and rituals. The prayers for healing each individual are unique. However, one informant mentioned that knowledge about the types of medicinal plants and their uses was obtained by studying the meaning of the plant names in the Lio language (Table 3). They believe that the Lio language is the language of nature, and everything has meaning, including for curing illnesses. "The Lio language is the language of nature; I believe that all the answers to the issues in nature are within nature itself; it's up to us to seek them." (IF3).

"Bahasa Lio itu bahasa alam, saya percaya segala persoalan yang ada di alam jawabannya ada di alam itu sendiri, tinggal kita pintar-pintar mencarinya." (IF3).

Table 2. List of medicinal plants used by Lio's traditional healers.

Family	Scientific name	Lionese Vernacular name	Phonetic Transcription	Habit	Part used	Mode of application	Uses	UV	FIV
Acoraceae	<i>Acorus calamus</i> L.	Kala raga	[kala raga]	rhizomatous geophyte	Root	Oral	cold, cough	0.286	0.286
Amaranthaceae	<i>Amaranthus tricolor</i> L.	Uta boti mera	[,ʔuta boti 'mera]	annual	Leave	Oral	anemia	0.143	0.143
Annonaceae	<i>Annona muricata</i> L.	Serekaya	[sere'kaja]	tree	Leave	Oral	wound healing	0.143	0.143
Apiaceae	<i>Centella asiatica</i> (L.) Urb.	Mbiji kojo	[mbiji 'koʒo]	perennial	Leave	Oral, Topical	wound healing, amenorrhoea	0.286	0.143
Apocynaceae	<i>Alstonia scholaris</i> (L.) R.Br.	Jita	[ 'jita]	shrub or tree	Leave	Oral	constipation	0.143	0.143
Apocynaceae	<i>Tabernaemontana sphaerocarpa</i> Blume	Para	[para]	Tree	Leave	Oral	deoxygenated blood, stomach disorder	0.286	0.143
Arecaceae	<i>Cocos nucifera</i> L.	Nio	[ 'nio]	tree	Fruit	Topical	carrier oil	0.286	0.429
Arecaceae	<i>Areca catechu</i> L.	Keu	[ 'ke'u]	tree	Fruit	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.429
Asteraceae	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	Pombo	[ 'pombo]	shrub or small tree	Leave	Oral	breast cancer	0.143	0.143
Asteraceae	<i>Gynura procumbens</i> (Lour.) Merr.	Pombo ria	[pombo 'ria]	scrambling shrub	Leave	Oral	genital diseases	0.143	0.143
Cannaceae	<i>Canna indica</i> L.	Kokowoso	[,koko'wɔsɔ]	rhizomatous geophyte	Leave	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.143
Convolvulaceae	<i>Camonea vitifolia</i> (Burm.f.) A.R.Simões & Staples	Mbonggi	[ 'mbonggi]	climbing herbaceous tree	aerial part	Oral	sore muscles	0.143	0.143
Cucurbitaceae	<i>Trichosanthes tricuspidata</i> Lour.	Kala	[ 'kala]	climber	Leave	Oral	prickly heat	0.143	0.286
Cucurbitaceae	<i>Momordica charantia</i> L.	Pare	[ 'pare]	climbing annual	Leave	Oral	cold, cough	0.286	0.286
Euphorbiaceae	<i>Jatropha curcas</i> L.	Ila	[ 'ʔila]	shrub or tree	Leave	Oral	hypertension	0.143	0.429

## Ethnobotany Research and Applications

Family	Scientific name	Lionese Vernacular name	Phonetic Transcription	Habit	Part used	Mode of application	Uses	UV	FIV
Euphorbiaceae	<i>Aleurites moluccanus</i> Willd.	Feo	['fɛɔ]	tree	Fruit	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.429
Euphorbiaceae	<i>Euphorbia tirucalli</i> L.	Toko po'i	[tɔkɔ 'pɔʔi]	semisucculent shrub	Leave	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.429
Fabaceae	<i>Tamarindus indica</i> L.	Mage	[ma'ge:]	tree	Leave	Oral, bath, topical	wound healing, postpartum recovery	0.286	0.429
Fabaceae	<i>Archidendron fagifolium</i> (Blume ex Miq.) I.C.Nielsen	Bara	['bara]	shrub or tree	Leave	Oral	itchy skin	0.143	0.429
Iridaceae	<i>Eleutherine bulbosa</i> (Mill.) Urb.	Somu mera	[somu mera]	bulbous geophyte	Bulb	Oral	sprain, sore muscles	0.286	0.143
Lamiaceae	<i>Mesosphaerum suaveolens</i> (L.) Kuntze	Bubore	['bubɔrɛ]	Erect annual or short-lived perennial herb	Leave	Oral	cold	0.143	0.429
Lamiaceae	<i>Orthosiphon aristatus</i> (Blume) Miq.	Fate Ora	[,fate 'ʔora]	subshrub or shrub	Leave	Oral	gastroenteritis	0.143	0.429
Lamiaceae	<i>Vitex trifolia</i> L.	Langga	['langga]	shrub or tree	Leave	Oral	postpartum recovery	0.286	0.429
Malvaceae	<i>Grewia</i> sp.	Tapi	[tapi]	shrub or tree	Leave	Oral	sprain, sore muscles	0.286	0.429
Malvaceae	<i>Hibiscus tiliaceus</i> L.	Waru	[waru]	shrub or tree	Bark	Topical	wound healing	0.286	0.429
Marantaceae	<i>Maranta arundinacea</i> L.	Ana muku api	[,ʔana muku 'api]	Perennial	Leave	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.143
Moringaceae	<i>Moringa oleifera</i> Lam.	Uta wona	[,ʔuta 'wona]	tree	Leave	Oral	dysuria	0.143	0.143
Musaceae	<i>Musa</i> sp.	Muku mera	[muku mera]	herbaceous tree	Seedling	Oral	wound healing, fracture	0.286	0.143
Phyllanthaceae	<i>Phyllanthus niruri</i> L.	Mboko longgo	[,mboko 'longo]	Annual	Leave	Oral, Topical	wound healing,	0.286	0.286



## Ethnobotany Research and Applications

Family	Scientific name	Lionese Vernacular name	Phonetic Transcription	Habit	Part used	Mode of application	Uses	UV	FIV
							sprain, itchy skin, diarrhea		
Piperaceae	<i>Piper nigrum</i> L.	Merica	[me'rica]	Climber	Fruit	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.143
Piperaceae	<i>Piper</i> sp.	Koro joro	[kɔɾɔ ko ʝɔɾɔ]	climbing shrub	Leave	Oral	wound healing, sprain, itchy skin, diarrhea	0.571	0.143
Poaceae	<i>Imperata cylindrica</i> (L.) Raeusch.	Ki'i	['ki:]	perennial	Root	Oral	hepatitis	0.143	0.286
Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf	Nawe	['nawɛ]	perennial	Leave	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.286
Poaceae	<i>Cymbopogon winterianus</i> Jowitt ex Bor	Nawe munge	[nawɛ 'mɔŋɛ:]	perennial	Leave	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.286
Poligalaceae	<i>Poligala</i> sp	Kamu munge	[.kamu mɔ'ŋɛ:]	annual	Root	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.143
Rubiaceae	<i>Morinda citrifolia</i> L.	Kembo	[kə'mbo:]	shrub or tree	Leave	Oral	wound healing	0.143	0.143
Solanaceae	<i>Capsicum frutescens</i> L.	Koro	['kɔɾɔ]	shrub	Leave	Oral	high fever in children	0.143	0.143
Verbenaceae	<i>Stachytarpheta jamaicensis</i> L. Vahl.	Wonga te'a	[.wɔŋa 'teʔa]	Subshrub	Leave	Oral	Inflamed or sore mouth and throat	0.143	0.143
Zingiberaceae	<i>Zingiber officinale</i> Roscoe	Lea	['lea]	rhizomatous geophyte	Rhizome	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.714	0.571
Zingiberaceae	<i>Zingiber officinale</i> var. <i>rubrum</i> Theilade	Lea Mera	[le'a 'mera]	rhizomatous geophyte	Rhizome	Oral	wound healing,	0.714	0.571

Family	Scientific name	Lionese Vernacular name	Phonetic Transcription	Habit	Part used	Mode of application	Uses	UV	FIV
Zingiberaceae	<i>Kaempferia galanga</i> L.	Seku	['səku:]	perennial or rhizomatous geophyte	Root	Oral	sprain, itchy skin, diarrhea stomache	0.143	0.571
Zingiberaceae	<i>Curcuma caesia</i> Roxb.	Kune mite	[ʔunε 'mitε]	rhizomatous geophyte	Rhizome	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.571
Zingiberaceae	<i>Curcuma domestica</i> L.	Kune	['kunε]	rhizomatous geophyte	Rhizome	Oral	deoxygenated blood, stomach disorder	0.286	0.571
Zingiberaceae	<i>Curcuma zedoaria</i> (Christm.) Roscoe	Kune bara	['kunε bara]	perennial or rhizomatous geophyte	Rhizome	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.571
Zingiberaceae	<i>Zingiber montanum</i> (J.Koenig) Link ex A.Dietr.	Lea ju	[lea 'ju:]	perennial or rhizomatous geophyte	Rhizome	Oral, Topical	wound healing, sprain, itchy skin, diarrhea	0.571	0.571

Table 3. The linguistic, anthropological meaning, and economics aspect of medicinal plants in Lio culture

Scientific name	Lionese vernacular name	Phonetic Transcription	Location to Collect the plants	Meaning	Economic Aspect	Anthropological Aspects	Linguistic Aspect
<i>Imperata cylindrica</i> (L.) Raeusch.	Ki'i	['ki:]	Growing wildly in clumps and found in surroundings	immobile flower	- Used as a medicinal plant - Used as roof for traditional houses - Sold in a bunch	Believed as a symbol of unmoving and healing	The name was given because this plant is often found around the area where they live
<i>Mesosphaerum suaveolens</i> (L.) Kuntze	Bubore	['bubɔrɛ]	Growing individually and found in surroundings	flower that can relief cold	Used as a medicinal plant	A symbol of "refreshing". The leaves are used to relief cold due to their fragrant	The name was given in relation to the function of the leaves. It is widely used to cure colds
<i>Stachytarpheta jamaicensis</i> L. Vahl.	Wonga Te'a	[,wɔŋa 'teʔa]	Growing individually and found in surroundings	A flower used to cure fever	Used as a medicinal plant	The leave used to cure diseases	The name is given due to its purple color
<i>Zingiber officinale</i> Roscoe	Lea	['lea]	Growing in clumps and found in surroundings	symbolizes strength	The rhizome used as cooking spice/food mixture/medicine. Around the Kelimutu National Park area, the rhizome is widely traded and provide benefits to farmers.	A symbol of "strength" because the rhizome is widely used to enhance stamina	The name is related to its function which are widely used as a mixture to enhance stamina
<i>Zingiber officinale var. rubrum</i> Theilade	Lea mera	[lea 'mera]	Growing in clumps and found in surroundings	symbolizes warmth	The rhizome used as cooking spice/food mixture/medicine	A symbol of "warmness". Its rhizome is widely used to warm the body	The name was given because the plant is used to warm the body. The rhizome is red.
<i>Jatropha curcas</i> L.	Ila	['ʔila]	Growing in clumps and found in surroundings	symbolizes feed	The seeds can be used as biofuel		The name is given because it is widely used as goat feed
<i>Alstonia scholaris</i> (L.) R.Br.	Jita	['jita]	Growing individually and found in surroundings	symbolizes smooth or loose (improve digestion)	The stems have economic value. It is the raw material for making pencils, used as firewood,	A symbol of smooth or "curing" diseases	The name is associated with its function to aid digestion

Scientific name	Lionese vernacular name	Phonetic Transcription	Location to Collect the plants	Meaning	Economic Aspect	Anthropological Aspects	Linguistic Aspect
					and they are also used as shade trees in city parks.		
<i>Trichosanthes tricuspidata</i> Lour.	Kala	['kala]	Growing individually and found in surroundings	symbolizes fast	Used as a medicinal plant	Believed as a symbol of 'smoothness', or obstacles free	The name is related to its function to cure prickly heat
<i>Aleurites moluccanus</i> Willd.	Feo	['fɛə]	Growing individually and found in surroundings	symbolizes sacredness	Candlenut seed is traded and an important commodity from Flores	Believed as a symbol of "sacred"	The plant is used for traditional/religious ceremonies/activities
<i>Camonea vitifolia</i> (Burm.f.) A.R.Simões & Staples	Mbonggi	['mbonggi]	Growing individually and found in surroundings	symbolizes the unity of veins/straight veins	Used as a medicinal plant	Believed as a symbol of 'healing'.	The name is related to the function of this plant, which can "straighten sore veins".
<i>Phyllanthus niruri</i> L.	Mboko longgo	[,mboko 'longgo]	Growing individually and found in surroundings	symbolizes lower back	Used as a medicinal plant	Believed as a symbol of "healing the lower back"	The name is related to the function of the roots and other parts of the plant to cure "lower back" diseases and kidney problems
<i>Tabernaemontana sphaerocarpa</i> Blume	Para	[para]	Growing individually and found in surroundings	relieves stomach disorder	Used as a medicinal plant	Believed as a symbol of "relieved" because it is often used to treat disease	The name is related to the function of the leaves to normalize/improve blood circulation. "pa" means normal and "ra" means blood
<i>Momordica charantia</i> L.	Leba	[ləba]	Growing individually and found in surroundings	symbolizes congregate	Used as a medicinal plant. Sold as vegetable	Believed to has medicinal properties	The name is related to the function of the leaves to cure urinary tract infections
<i>Musa</i> sp.	Muku Mera	[muku mera]	Growing in clumps and found in surroundings	Symbolizes "the face of fire"	The red banana is sold	The plant sapling is believed as a symbol of "striking"	The name is given due to the red color of the banana fruit

Scientific name	Lionese vernacular name	Phonetic Transcription	Location to Collect the plants	Meaning	Economic Aspect	Anthropological Aspects	Linguistic Aspect
<i>Cymbopogon winterianus</i> Jowitt ex Bor	Nawe	['nawɛ]	Growing wildly in clumps and found in surroundings	symbolizes warmth	The tuber is sold	Believed as a symbol of warmth to those who consume it	The name is given because it is used in the traditional mixture to keep body warm
<i>Annona muricata</i> L.	Serekaya	[sere'kaja]	Growing individually and found in surroundings	Cure high blood pressure	The fruit is sold	Believed to has medicinal properties	The name is related to the fruit which can be used to reduce high blood pressure
<i>Spermacoce</i> sp	Wonga bara	[woŋa bara]	Growing individually and found in surroundings	symbolizes neutral/white	Used as a medicinal plant	Believes as a symbol of "white" or neutralization	The name is related to the function of the root, which means "white/neutral". It can be used as a medicine to relieve pain during urination
<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	Kawo	['kəwɔ]	Growing individually and found in surroundings	means to relieve nausea/vomiting	Used as a medicinal plant	Believed to has medicinal properties	The name is related to the function of the leaves which used to relieve nausea

They connect the Lio language names of plants with the types of illnesses that can be cured using those plants. For example, the *Bubore* plant, in the Lio language, "*Bu*" means drunk, and "*Bore*" means a runny nose. Therefore, the *Bubore* plant is used to treat a cough and cold. The results of plant identification based on the Lio language names of the plants can be seen in Table 3.

The skills of *atabhisa* in treating the sick are obtained from their ancestors through dreams. In these dreams, an individual is visited by a figure believed to be their ancestor and is anointed as an *atabhisa*. They receive the task of treating specific types of illnesses, along with the healing mantras, types of medicinal plants, how to prepare them, and the techniques for treating the sick. The obedience of the Lio people to customs and traditions means that the chosen *atabhisa* must accept this responsibility and cannot refuse. As an *atabhisa* in Wolotopo shared, "I received the knowledge of *ru'u* healing through a dream when I was in my thirties. On the ninth day of my grandmother's passing, I dreamed that she visited me. This knowledge is inherited from our ancestors, from our lineage. I am the eldest child, and I have a strong character. Before that dream came, I didn't believe in traditional healing with mantras. But it turned out that I was the one who was given that knowledge to continue. Even though it could have been passed on to my younger siblings." (IF4)

*"Saya dapat mimpi diwariskan pengobatan ru'u saat umur 30an. Pada hari ke sembilan kematian nenek, saya bermimpi didatangi beliau. Ilmu ini dari nenek moyang, dari keturunan. Saya ini anak sulung, berwatak keras. Sebelum mimpi itu datang, saya tidak percaya dengan pengobatan tradisional dengan mantra-mantra. Tapi ternyata, malah saya yang dikasih ilmu itu untuk diteruskan. Padahal bisa saja diwariskan ke adik saya."* (IF4)

This study identifies that *atabhisa* claim not to know how to treat illnesses, including reciting mantras and healing rituals, before receiving this knowledge through dreams. Conversely, after having these dreams, *atabhisa* know what to do when someone is sick. Some *atabhisa* describe their experiences as follows: "Before the dream, I didn't know anything about traditional healing, let alone the mantras. But after the dream, everything about healing illnesses, including postnatal care, became clear to me. I also automatically memorized the mantras without having to learn them." (IF2)

*"Sebelum mimpi, saya tidak tahu apa itu pengobatan tradisional, apalagi mantra-mantranya. Tapi setelah mimpi, semua hal tentang pengobatan penyakit dalam dan penanganan pasca melahirkan jadi jelas di mata saya. Saya juga otomatis hafal mantra tanpa belajar."* (IF2)

Another *atabhisa* mentions: "Mantras and the methods of treating illnesses don't need to be memorized or learned. After having the dream, I know automatically." (IF4)

*"Mantra dan cara mengobati penyakit tidak perlu dihafal atau dipelajari. Setelah dikasih mimpi, saya tau dengan sendirinya."* (IF4)

A female *atabhisa* in Niowula acknowledges that after having dreams multiple times, she became an *atabhisa*: "I had several dreams. The first time, when I was 12 years old, I dreamed about the type of tree whose fruit is used to make medicinal oil. Then, when I was an adult, I had a dream where I was told about the ingredients to prepare it. However, I didn't dare to make the oil at that time. After I got married, I had another dream where I was shown the location of the tree with the medicinal ingredient. I woke up, and that very night I went guided by ancestral spirits to the tree's location, where I collected the medicinal ingredient." (IF1)

*"Saya mimpi beberapa kali. Pertama umur 12 tahun saya mimpi dikasih tahu jenis pohon yang buahnya dipakai membuat minyak obat. Lalu saat dewasa saya mimpi dan dikasih tahu bahan ramuannya. Saat itu saya belum berani buat minyaknya. Setelah menikah, saya mimpi lagi, dia kasih tahu lokasi pohon itu, lalu saya terbangun, malam itu juga saya berjalan dituntun roh leluhur ke lokasi pohon bahan obat."* (IF1)

The knowledge about traditional healing acquired through these dreams includes the ability to diagnose illnesses, determine the types of plants and how to prepare them as medicine, perform healing techniques, and recite Lio-language mantras during healing rituals. An *atabhisa* from Wolotopo explains: "All prayers conducted during the ritual begin with them first offering them to the creator god and the ancestors. They seek blessings. Then, the core prayer is a secret; they don't reveal it, except to their descendants. This is what the ancestors mandated in the dream." (IF5)

*"Semua Doa yang dilakukan saat ritual, terlebih dulu mereka sampaikan kepada tuhan sang pencipta dan para leluhur. Mereka minta restu. Lalu doa inti, itu rahasia, mereka tidak kasih tahu, kecuali kepada keturunan mereka. Itu yang diamanatkan leluhur dalam mimpi."* (IF5)

The Lio people believe that in every indigenous community, there is usually one or more individuals who serve as *atabhisa*. This belief arises because, within the Lio culture, health is an essential component for the survival of their indigenous community. Therefore, *atabhisa* pass on their roles to the next generation to ensure there are individuals who continue to treat the sick. The knowledge of traditional medicine is passed from *atabhisa* to the next generation after the *atabhisa* has passed away. *Atabhisa* who have passed away will visit a chosen individual through dreams to continue their role as the successor *atabhisa*. Two *atabhisa* from Wolotopo expressed this as follows: "When I was 40 years old, my grandmother, who was a traditional birth attendant and had already passed away, came to me in a dream. She taught me how to treat internal illnesses and postnatal care." (IF2) "I received the knowledge of *ru'u* healing when I was in my thirties. I got it from my father, who had already passed away. He taught me through a dream." (IF5)

*"Saat saya berusia 40 tahun, nenek saya yang dulu adalah TBA dan sudah wafat datang dalam mimpi. Dia mengajari saya mengobati penyakit dalam dan pasca melahirkan"* (IF2). *"Saya dapat ilmu mengobati ru'u, saat umur 30an. Saya dapat dari bapak saya yang sudah meninggal. Dia mengajari saya lewat mimpi"* (IF5)

Each member of the Lio Tribe does not know who will be chosen as the next *atabhisa*. They also do not know what specific healing abilities or knowledge the deceased *atabhisa* will pass on to their successor. However, from the interviews with the *atabhisa*, it is identified that the successors of *atabhisa* are typically chosen from individuals close to the deceased *atabhisa*, such as children, grandchildren, cousins, or nieces/nephews. For example, the *atabhisa* in Niowula states that he was visited by his aunt in a dream: "The person who came to me in my dream was my aunt who had committed suicide at the Muru Esi waterfall due to a failed love affair. She came and guided me to the location of the Pelangi tree. I then named the medicinal oil Muru Esi." (IF1)

*"Orang yang datang di mimpi saya adalah tante saya yang sudah meninggal bunuh diri di Air terjun Muru Esi akibat putus cinta. Dia datang dan menuntun saya berjalan ke air terjun Muru Esi untuk kasih tahu lokasi pohon Pelangi. Minyak obat lalu saya kasih nama minyak Muru Esi."* (IF1)

A similar story is found in Saga, where the *atabhisa* was visited by his uncle in a dream. He says, "My uncle was also a traditional healer. He was a massage therapist, and I once asked him to teach me massage, but he refused. He taught me after his passing; he came to me through a dream." (IF7)

*"Om saya dulu juga pengobat tradisional. Dia juga tukang urut, saya pernah minta belajar urut tapi dia tidak kasih. Dia ajari saya urut setelah wafat, dia datang lewat mimpi."* (IF7)

This study identifies that after acquiring knowledge of traditional healing through dreams, *atabhisa* discover that they possess specialized skills in treating specific illnesses, types of medicinal plants to use, the technique of preparing herbal remedies, and how to treat their patients. This study identifies one such herbal remedy called Muru Esi oil. The *atabhisa* who prepares Muru Esi oil explains: "I gave this oil the name Muru Esi to remember my aunt and as a reminder of the location of the Pelangi tree near the Muru Esi waterfall." (IF1).

*"Minyak ini saya beri nama Muru Esi untuk mengenang tante saya sekaligus pengingat lokasi pohon Pelangi di sekitar air terjun Muru Esi."* (IF1).

Muru Esi oil is claimed to be able to treat various illnesses and can be consumed. However, pregnant women and people with hepatitis are not allowed to consume this oil. This oil is special because the collection of ingredients and its production must await specific signs received by the herbalist. Some of the plant ingredients for making this oil can only be obtained from specific locations and taken from specific trees. During the oil-making process, no person or animal should pass by. If the oil has run out, the *atabhisa* must wait for a sign, such as the position of the stars above the moon, before they can make the concoction again. Until such a sign appears, the available ingredients are used repeatedly. Each time someone purchases this oil, the proceeds from the sale are taken to the location of the medicinal plant collection, which is a key ingredient in the oil, along with offerings. At this location, the *atabhisa* recites mantras and prays for the patient's recovery and expresses gratitude for the blessings received.

This study identifies how *atabhisa* measure the efficacy of traditional healing. Some *atabhisa* say that the effectiveness of treatment can be determined by the type of medicinal plant ingredients, the method of preparing the medicine, and the technique of treatment, as well as the prayers and mantras recited during the ritual. All these elements must align with the guidance received in the dream. This is explained by the *atabhisa* from Niowula: "The requirement for making the oil is that it must adhere to the dream's guidance. Pelangi fruit, candlenut, and raga root must be from Muru Esi. Cooking candlenut into oil in a clay pot, reciting mantras and prayers when starting to make the medicinal oil, after the oil is done, and when pouring the oil into the bottle for the patient for their recovery." (IF1).

*"Syarat membuat minyak harus sesuai petunjuk mimpi. Buah pelangi, kemiri dan akar raga harus dari Muru Esi, memasak kemiri hingga jadi minyak di periuk tanah, membaca mantra dan doa di saat mulai membuat minyak obat, setelah minyak jadi, dan setelah menuangkan minyak ke botol untuk pasien supaya penyakitnya sembuh."* (IF1).

An *atabhisa* in Saga claims that in order for a disease to be cured, the remedy must be made from an odd number of ingredients. He states: "Massage oil must be made from medicinal plant ingredients in odd numbers. For example, the number of coconuts, candlenuts, and noni fruit must be one, or three, or five, and so on. I don't know the reason, but to ensure the patient recovers, I always follow this rule." (IF7).

*"Minyak urut harus dibuat dari bahan tumbuhan obat dengan jumlah ganjil. Misalnya jumlah kelapa, kemiri, dan mengkudu, harus berjumlah satu, atau tiga, atau lima dan seterusnya. Saya tidak tahu alasannya, tapi supaya pasien bisa sembuh saya selalu lakukan."* (IF7)

This study also reveals that traditional healing practices in the Lio Tribe of Ende Regency, East Nusa Tenggara, are facing pressure from the modernization of healthcare knowledge initiated by the government or the state. The establishment of hospitals in the regency capital and the construction of community health centers (*puskesmas*) with modern medical personnel in Lio-inhabited villages have led to a decline in the popularity of traditional healing practices conducted by *atabhisa*. On the other hand, the compromising attitude of *atabhisa* and their patients towards the increasing availability of modern medical services in their region has further contributed to the decline in the popularity of traditional healing. An *atabhisa* in Saga explains, "In our village, we already have community health centers, doctors, and midwives. Many people now seek treatment at the health centers, so traditional healing is becoming less popular." (IF6).

*"Di desa kami sudah ada puskesmas, dokter dan bidan. Orang sudah banyak berobat ke puskesmas sehingga pengobatan tradisional mulai kurang diminati."*(IF6).

#### **Current Challenges from Modern Knowledge**

The healthcare sector has received significant attention in Ende Regency. According to data from the Central Bureau of Statistics, by 2021, there were 2 hospitals, 20 community health centers (*puskesmas*), and 40 sub-district health centers spread across 17 districts in Ende Regency. Those two hospitals are managed by the different owners. The first is a public hospital owned by the government while the other is a private hospital belongs to the Catholic church namely St Antonius Jopu Hospital (Aran et al., 2023). The church also supports the government in providing modern health services in remote areas through its networks, such as *Komunitas Umat Basis* (Catholic based community), which is the lowest level of the Catholic church social structure (Mea, 2021). While the Lio people adopt a tripartite classification of socio-political life encompassing religion, government, and tradition (Allerton, 2009), their healthcare services are divided into modern and traditional categories, with government and church falling under the modern classification while other elements are considered traditional.

This study identifies two assumptions that have led *atabhisa* to adopt a compromising and somewhat apathetic stance towards this reality. First, there is the belief that the traditional healing provided by *atabhisa* serves as the first aid for sick members of the Lio Tribe. If a patient is immediately cured through *atabhisa's* treatment, they stop there. However, if the illness persists, the patient and their family will seek modern healthcare services, even if it involves significant expenses and considerable travel distances. As expressed by an *atabhisa* from Saga: "People come to *atabhisa* here usually because the *puskesmas* is still closed, and the patient is in an emergency. *Atabhisa* continues to assist them with their skills. But it ultimately depends on the patient; if they trust *atabhisa*, they will usually recover." (IF6)



"Orang di sini pergi ke atabhisa biasanya karena puskesmas masih tutup sedangkan pasien dalam keadaan darurat. Atabhisa tetap melayani mereka sesuai dengan keahliannya. Tapi kembali lagi ke pasien, jika yakin kepada atabhisa biasanya dia akan sembuh." (IF6)

Second, there is a prevailing notion that places traditional healing as a secondary healthcare resource after modern treatment. Traditional healing is considered an alternative solution for patients who do not recover through modern medical treatment. Furthermore, it is seen as an alternative for economically disadvantaged patients because it is cost-effective compared to expensive modern healthcare. An *atabhisa* from Niowula reveals that some of their patients had previously sought treatment in modern hospitals without improvement: "There was a son-in-law suffering from a stroke for months and undergoing treatment at the Ende hospital without improvement. He came to me, and I provided him with Muru Esi oil. Shortly after, he could walk. There was also a junior high school teacher suffering from diarrhea who went to the *puskesmas* but didn't recover for five days. He came to me, consumed Muru Esi oil, and recovered within a few hours." (IF1)

"Ada bapak mantu sakit stroke berbulan-bulan berobat ke rumah sakit di Ende tidak sembuh. Datang ke saya, lalu saya berikan minyak Muru Esi, tak lama dia bisa berjalan. Ada Juga guru SMP sakit diare dan berobat ke puskesmas tidak sembuh selama lima hari. Dia datang ke saya dan minum minyak Muru Esi langsung sembuh hanya beberapa jam saja." (IF1)

## Discussion

### Knowledge of Medicinal Plants

From the 45 species of medicinal plants, the most frequently mentioned therapeutic benefit was wound healing. One of the plants noted for its wound-healing properties is *Tamarindus indica*. The leaves, bark, and fruit of *T. indica* from the Fabaceae family are known for their wound-healing properties in various countries like Senegal, West Africa, and Burkina Faso (Bhadoriya et al. 2011). The antibacterial activity of tamarind leaves is one of the reasons for its use in accelerating wound healing (Abdallah and Muhammad 2018). Apart from *T. indica* leaves, the bark of *H. tiliaceus* also shows wound-healing properties (Sunilson et al. 2012). It has been found to be most effective in reducing wound surface area and speeding up wound healing when compared to water and chloroform extracts. *Centella asiatica* has also demonstrated positive effects on wound healing in both in vitro and in vivo studies (Bylka et al. 2013). Some commonly used plants in traditional medicine in other regions include *Morinda citrifolia*, *Zingiber officinale*, *Moringa oleifera*, *Kaempferia galanga*, and *Annona muricata*. In Karawang Regency, West Java, *Gymnanthemum amygdalinum* is used for treating diabetes (Gunarti, Fikayuniar, and Hidayat 2021).

Bubore (*Mesosphaerum suaveolens*) is traditionally reported for its usage in conditions like cough, nasal congestion, and inflammation (Almeida-Bezerra et al. 2022). Ginger is considered a symbol of "strength" because people widely use its rhizomes to boost stamina. This is related to its high antioxidant content (Mustafa and Chin 2023). Red ginger is valued for its medicinal properties due to its high levels of essential oils and oleoresin compared to other ginger varieties (Tsalissavrina, I., A. Murdiati, S. Raharjo 2022). *Phyllanthus niruri* L. exhibits anti-inflammatory, antioxidant, and anticancer activities (Navarro et al. 2017).

### Sources of Knowledge and Dream as the Medium

The identified source of knowledge for the Lio tribe regarding traditional medicine, as revealed in this study, is their ancestors, who communicate through dreams. Several studies have mentioned that dreams serve as a source of knowledge for traditional societies in acquiring expertise as herbalists (Sabran, Mohamed, and Abu Bakar 2016; Kamatenesi, Acipa, and Oryem-Origa 2011). However, some studies have also mentioned that dreams are not the sole source of knowledge. Many traditional societies have been found to gain knowledge from parents, in-laws, and ancestors (Kamatenesi, Acipa, and Oryem-Origa 2011). Interestingly, Mouchane et al. (2023) did not include dreams as a source of knowledge for the Karia Ba Mohamed community in Morocco. Nevertheless, these variations in knowledge sources do not diminish the significance of the expertise of the Lio's *atabhisa* for their community. On the contrary, this situation suggests that the Lio tribe are on par with other societies around the world that possess ethnobiological knowledge with specific local characteristics (Lenaerts 2006; Montalvo 2022).

This study reveals that dreams actually serve as a medium for conveying knowledge of traditional medicine from the ancestors of the Lio people. Ancestral herbalists or *atabhisa* who have passed away visit the individuals chosen to continue their role as successors of *atabhisa* to serve the indigenous Lio community. In this context, the concept of dreams is positioned solely as a medium and not as the primary source of knowledge. The knowledge comes from the deceased *atabhisa*. This finding differs from some studies that suggest that dreams are the direct source of knowledge for traditional medicine. Typically, the informants of a traditional healer inherit knowledge from their grandparents, ancestors, experiences,

and dreams (Lucky Zamzami 2013)(Berlowitz et al. 2023)(Yin, Jiang, and Chen 2023)(Leisegang et al. 2023)(Mwaka, Achan, and Orach 2023)(Courric et al. 2023). Through dreams, a person is guided, directed, and anointed to become a herbalist. However, the specific identity of the entity that imparts this knowledge within the dream is not elaborated on, often ahistorical and anonymous. If someone has ancestors and maintains a good relationship with them, "this person" will appear in your dream and reveal their remedies to you (Jimenez-Fernandez et al. 2023)(Horackova et al. 2023). In contrast, the findings of this research identify that *atabhisa* can recognize the ancestors who appear in their dreams because these ancestors are part of their extended family.

Some studies that explain the bestowed gifts upon herbalists align with the findings of this research. In the study of the Lio Ende community conducted by Genua et al. (Genua et al. 2017), it is explained that the knowledge of *nijo* (mantras) recited by *atabhisa* represents a "special charisma" known only to them and is linked to the effectiveness of their healing practices. However, the reception of these gifts originates from the power of God (Miller 2007); (Himmi, S.K., Humaedi, M.A., Astutik 2014) and also their line of descent (Langås-Larsen, A.; Salamonsen, A.; Kristoffersen, A.E.; Stub 2018); (Genua, V. ; Simpen, I.W. ; Mbete, A.M.; Yadnya 2017). In the research by Himmi et al. (Himmi, S.K., Humaedi, M.A., Astutik 2014), it is explained that "*mobolong*" (supernatural-based traditional healers) cannot be separated from their roots, which are *halaik* or the local indigenous religion (*Taa Wana*). They believe that the owner of the universe (*Pu'e*/God) will grant the prayers of these traditional healing practitioners to cure their patients. Similarly, when these traditional healers perform treatments but fail, they will communicate with their ancestors through rituals to obtain further guidance (Herrmans 2021).

The efficacy of traditional medicine is always an intriguing topic of discussion in the public domain. From the results of this research, it is identified that efficacy is only achieved if the entire process of traditional healing is conducted according to the instructions provided by the ancestors to *atabhisa* through dreams. This includes the identification of the type of illness, the rituals, the selection of medicinal plants, the preparation of remedies, and the treatment and care. Some studies have proposed a similar view. For example, in the Dayak community in West Kalimantan Province, specific conditions are set for the selection, harvesting, and use of medicinal plants for certain illnesses (Julung et al. 2018; Hariyadi and Ticktin 2012), or special rituals are conducted during the process of preparing remedies (Molina, Eder, and Gascon 2015; Fadilah, Lovadi, Irwan Linda 2015), and specific treatment methods are applied (Rahmawati and Sadiana 2023; Hariyadi and Ticktin 2012). This situation illustrates that traditional healing practices fundamentally adhere to operational procedures that refer to the knowledge sources they possess regarding traditional medicine.

#### ***Uncertain Future of Ethnomedicine***

The impact of modernization on healthcare services, as revealed by this study, is also experienced by traditional healers in various parts of the world. Government interventions involving the placement of modern healthcare professionals and the establishment of modern healthcare centers in remote villages have altered the preferences of indigenous communities when choosing healthcare options (Xaba 2007). Additionally, economic factors play a prominent role in diminishing the preference of indigenous communities to continue traditional healing practices (Essandoh, Dali, and Bryant 2023). Many of the younger generations are reluctant to become traditional medical healers in their villages because it is considered economically unprofitable, as they are seen as serving the health of their community based on traditional orders (Essandoh, Dali, and Bryant 2023).

#### **Conclusion**

The Lio community possesses significant potential both in terms of knowledge and sources of raw materials for traditional medicine. To this day, the Lio people continue to practice traditional healing. The primary source of knowledge for traditional medicine among the Lio community comes from their ancestors, who, while alive, worked as *atabhisa* or traditional healers. As for dreams, for the Lio, they are not a source of knowledge but merely a medium for conveying knowledge from their deceased ancestors. Dreams are also believed to be a medium for herbalists to pass on traditional medical knowledge to the next generation. However, the younger generation of the Lio community tends to have a low interest in pursuing a career as herbalists. The widespread construction of modern healthcare infrastructure, such as hospitals and health centers in Ende, the influx of modern medical professionals into Lio-inhabited villages, and modern healthy lifestyle campaigns have led to the abandonment of traditional medicine and have left herbalists pessimistic about the future of their profession.

## Declarations

### Ethics approval and consent to participate:

This research has obtained ethical clearance from the Social Humanities Ethical Commission of the National Research and Innovation Agency, Number: 087/KE.01/SK/04/2023 dated April 3, 2023.

**Consent for publication:** Not applicable

**Availability of data and materials:** Not applicable

**Competing interests:** Not applicable

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