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ETHNOBOTANY OF MEDICINAL PLANTS USED BY THE LOCAL COMMUNITY AT THE FOOT OF THE MOUNT UYELEWUN, EAST NUSA TENGGARA

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ABSTRACT

This study aims to explore and identify the medicinal plants used by the Uyelewun local community. It encompasses plant species, multi-aspect utilization, processing methods and how to use, and their medical benefits to heal diseases. This descriptive exploratory study was conducted in May 2019 in six villages, namely Panama Village, Meluwiting Village, Loyobohor Village, Leudanung Village, Balauring Village, and Wairiang Village. These six villages were categorized into three groups: 1) modern village, 2) developing village, and 3) traditional village. Seventy-eight respondents, comprising local villagers, traditional healers, and custom leaders/elders, were selected using purposive and snowball sampling techniques. This study was performed in four stages, viz. 1) survey of research locations and selection of respondents, 2) semi-structured interviews, 3) plant documentation, and 4) plant inventory. The data obtained were then analyzed descriptively using percentages, averages, and content analysis. The results showed that 1) the local community used 82 plant species from 40 families as medicinal plants; 2) the traditional villages had the highest number of medicinal plants (43%), and the modern villages had the highest number of plant species (64%); 3) most plant habit was trees (43%); 4) the majority of plant was from uncultivated/wild plant (55%), obtained mostly from the surrounding environment (55%) and rarely from the beach (2%); and 5) the most consumed part of the medicinal plants was fruits (70%).

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1. INTRODUCTION

The use of plants as medicinal materials to overcome health problems has been long known by Indonesians, proven by the existence of ancient heritage written in lontar manuscripts (Sari, 2006). Such associated knowledge has been passed down from generation to generation, blending with the local habits and therefore created local wisdom highly related to ancient beliefs. Other factors contributing to the preservation of this knowledge include the abundance of natural resources easing people to get such plants and their safer use than that of modern medicines (Suharmiati & Handayani, 2006).

The local community at the foot of Mount Uyelewun is one of the community groups in eastern Indonesia that still upholds ancestral customs and beliefs (Dahlan, 2011) and still makes use of abundant plant diversity nearby. Their tendency to cultivate plant species that function as staple foods than ones functioning as medicine is feared reducing the existence of medicinal plants. Sutedjo (2004) stated that the decreasing number of medicinal plant species along with their diversity is due to the increasing use of the plants by the community without any balancing efforts to preserve them. Plants should not only play a role in the health and food sectors; their existence should also be of concern in conservation efforts (Pei, 2013).

Conservation of medicinal plants by a community can provide numerous benefits, one of which is an increase in economic value. Cultivation of medicinal plants can reduce expenditure and increase public knowledge of using or processing medicinal plants to improve their sale value (Sari *et al*., 2015). The Uyelewun community's knowledge of using medicinal plants based on their respective customs and beliefs creates a diversity of uses. Such diversity among community groups can occur at the level of family and village. It distinguishes their culture

from other cultures outside the groups. Praningrum (2007) conveyed that ethnic diversity creates similarities as well as dissimilarities in the use of plants in various sectors, including economic, spiritual or religious, cultural, beauty, and health.

The distinctive use of medicinal plants also occurs in the Uyelewun community. It creates distinctive characteristics that may not necessarily be found in other cultures. Alas, it is feared that such characteristics are gradually fading away due to cultural shifts. The technological development and limited knowledge of how to accommodate the flow of modernization in the local community are feared causing adverse impacts, such as the gradual decrease in natural resources and knowledge of local customs. Rahayu *et al*. (2006) suggest that modernization has easily shifted a set of ethnic groups' indigenous knowledge outside Java. Bearing this in mind, it is of importance to explore and identify the use of medicinal plants by the Uyelewun local community. Obtaining information and identifying the use of medicinal plants can be performed by collecting a number of data related to several facets, including plant species, multi-aspect utilization, processing methods and how to use, and their medical benefits to heal diseases.

The ethnobotanical identification of medicinal plants in the Uyeluwun local community has not been carried out optimally; therefore, their number and species are still unknown. The plant documentation and inventory are highly necessary as an attempt to preserve those plants as well as the knowledge associated therewith. This study expectedly contributes to 1) increasing the information, documentation, and inventory of the diversity and the use of medicinal plants in Indonesia, 2) providing benefits, especially for the Uyelewun local community, of how to use medicinal plants optimally, and 3) preserving both the local culture and the medicinal plant species.

2. RESEARCH METHOD

This descriptive exploratory study was conducted in June 2019 in six villages of two subdistricts, namely Buyasuri Subdistrict and Omesuri Subdistrict. The six villages include Wairiang Village, Panama Village, Loyobohor Village, Balauring Village, Meluwiting Village, and Leudaung Village. These villages were selected based on several considerations found at the research location. The population of this study was the entire local community at the foot of Mount Uyelewun in Omesuri and Buyasuri Subdistricts, Lembata District, East Nusa Tenggara. The map of the research location is presented in Figure 1.

Seventy-eight respondents were selected using purposive and snowball sampling techniques, consisting of 36 respondents with knowledge of medicinal plants, 18 adat leaders/elders, and 24 traditional healers (Ata Molan). There were 13 respondents in each village, comprising six villagers, three custom leaders/elders, and four traditional healers.

This study was performed in four stages, viz. 1) survey of research locations and selection of respondents, 2) semi-structured interviews, 3) plant documentation, and 4) plant inventory. The data were collected by means of observation, survey, interviews, and documentation, and then analysed descriptively and qualitatively using percentages, averages, and content analysis.

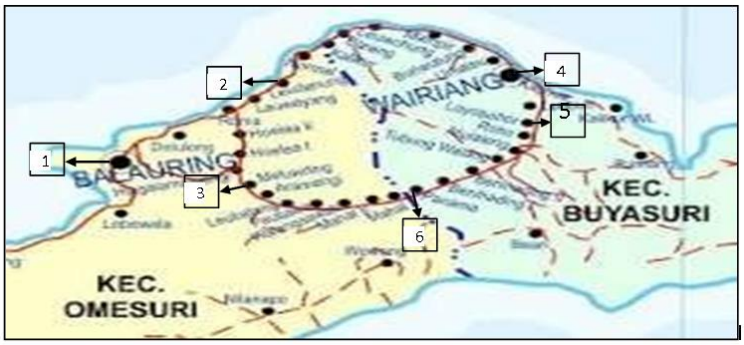

Figure 1.
Map of Buyasuri and Omesuri Subdistricts: 1) Balauring; 2) Leudanung; 3) Meluwiting; 4) Wairiang; 5) Loyobohor; 6) Panama (Source: Peta Tematik Indonesia - WordPress.com)

3. RESULTS AND DISCUSSION

1.Identification of Medicinal Plants

The results of the interview showed that there were 82 medicinal plants used by the Uyelewun local community. Several medicinal plants had the local name and many of which had more than one local name. The high number of mentions for the following plants indicate that the community often use them to overcome health problems: (1) turmeric (Curcuma domestica Val.) 47 times; (2) physic nut (Jatropha curcas L.) 34 times; (3) moringa (Moringan oleifera Lmk.) 30 times. Medicinal plant species used by the Uyelewun local community are presented in Table 1.

Table. 1 Medicinal Plant Species Used by the Uyelewun Local Community

No	Plant	Local Name	Scientific Name	Family	Total
1	Turmeric	Uma	*Curcuma domestica* Val.	Zingiberaceae	47
2	Aloe vera	Bapa Ebel	*Aloe vera* L.	Liliaceae	9
3	China rose	Bunga Sepatu	*Hibiscus rosa-sinensis* L.	Malvaceae	20
4	Key lime	Mude Mentolo	*Citrus aurantiifolia*	Rutaceae	9
5	Moringa	Motong/Marungge	*Moringan oleifera* Lmk.	Moringaceae	30
6	Papaya	Wayah	*Carica papaya* L.	Caricaceae	22
7	Periwinkle	Pecah Piring	*Catharanthus roseus G*	Apocynaceae	12
8	Sweetsop	Atanona/Nona	*Annona squamosa* L	Annonaceae	29
9	Amboyna wood	Sono	*Pterocarpus indicus* Willd.	Fabaceae	12
10	Guava	Qulsawa, kejawas	*Psidium guajava* L	Myrtaceae	27
11	Candlenut	Mire’	*Aleurites moluccana* (L.)	Euphorbiaceae	24
12	Physic nut	Padu Butu/Do'u	*Jatropha curcas* L.	Euporbiaceae	34
13	Kapok	Kepok	*Ceiba petandra* Gaertn	Bombacaceae	28
14	Stonebreaker	Lolong Weri	*Phyllanthus niruri* L.	Phyllanthaceae	6
15	Java tea	Kumis kucing	*Orthosiphon aristatus*	Lamiaceae	12
16	Avocado	Alpukat	*Persea Americana* Mill.	Lauraceae	7
17	Cucumber tree	Belimbing Sayur	*Averrhoa bilimbi* L.	Oxalidaceae	7
18	Saba banana	Mu'u	*Musa paradisiaca*	Musaceae	26
19	Lemongrass	Rotan	*Cymbopogon citratus*	Poaceae	8
20	Indian camphorweed	Beluntas	*Pluchea indica*	Asteraceae	10
21	Breadfruit	Paloka	*Artocarpus altilis* (Park.) F.	Moraceae	6
22	White frangipani	Kamboja	*Plumeria alba*	Apocynaceae	6
23	Bitter leaf	Daun afrika	*Vernonia amygdalina* Del.	Asteraceae	8
24	Noni	Lore	*Morinda citrifolia* L.	Rubiaceae	10
25	Coconut	Ta’	*Cocos nucifera*	Araceae	12
26	Tamarind	Tamal	*Tamarindus indica* L.	Fabaceae	10
27	Cotton	Kapas	*Gossypium obtusifolium R.*	Malvaceae	5
28	Thatch screwpine	Pandan Laut	*Pandanus terctorius*	Pandanaceae	6
29	Pandan	Pandan	*Pandanus Amaryllifolius R.*	Pandanaceae	3
30	Yellow bamboo	Bambu kuning	*Bambusa vulgaris* var.	Poaceae	6
31	Jamaican cherry	Gerseng	*Muntingia calabura* L	Muntingiaceae	8
32	Soursop	Nona Sarani	*Annona muricata* L.	Annonaceae	13
33	Betel	Mal	*Piper betle* L.	Piperaceae	11
34	Susu banana	Pisang susu	*Musa paradisiaca*	Musaceae	7
35	Green chiretta	Saburoto	*Andrographis paniculata N.*	Acanthaceae	6
36	Shield aralia	Daun mangkuk	*Polyscias scutellaria*	Araliaceae	8
37	Bitter gourd	Paria/aparia	*Momordica charantina* L.	Cucurbitaceae	13
38	Tobacco	Bako	*Nicotiana tabacum* L.	Solanaceae	8
39	Ash gourd	Kundur/ara	*Benincasa hispida*	Cucurbitaceae	8
40	Pumpkin	Kastela	*Cucurbita moschata* (Duch)	Cucurbitaceae	5
41	Love-vine	Benalu	*Cassytha filiformis* L.	Lauraceae	8
42	Onion	Bawang Putuq	*Allium cepa*	Alliaceae	5
43	Gebang palm	Tabu’	*Corypha Utan* Lmk	Araceae	5
44	Pomegranate	Delima	*Punica granatum* L.	Lythraceae	6
45	Katuk	Katuk	*Sauropus androgynus*	Euphorbiaceae	6
46	Ringworm bush	Gelenggang	*Cassia alata* L.	Vabaceae	15
47	Cassava	Ubi Kayu/Uleu	*Manihot esculenta* Crantz.	Euphorbiaceae	6
48	Hummingbird	Taluma	*Sesbania grandiflora* L.	Fabaceae	5
49	Beach hibiscus	Waru	*Hibiscus tiliaceus* L.	Malvaceae	5
51	Java plum	Jambulan	*Syzygium cumini* (L.)	Myrtaceae	8

52	Jujube	Buer/Alabua	*Ziziphus mauritiana*	Rhamnaceae	8
53	Leucaena	Lamtoro	*Leucaena glauca* Auct	Fabaceae	5
54	Malabar spinach	Kandola	*Basella rubra* L.	Basselaceae	6
55	Stinking	Anggur Hutan	*Passiflora foetida* L.	Passifloraceae	6
56	Devil tree	Rita/ite	*Alstonia scholaris* L.	Apocynaceae	31
57	Canna lily	Senggiri/Sanggelang	*Canna indica*	Cannaceae	9
58	Siamese Cassia	Johar	*Cassia siamea* Lam.	Fabaceae	13
59	Henna	Laka	*Lawsonia inermis* L.	Lythraceae	7
60	Billy goat weed	Lahuna	*Ageratum conyzoides*	Asteraceae	10
61	Skunk-vine	Buruq Lolon	*Paederia foetida*	Rubiaceae	10
62	Crown flower	Lela'/ai	*Calotropis gigantea* L.	Asclepiadaceae	11
63	Arrowleaf sida	Kanaruq	*Sida rhombifolia* L.	Malvaceae	7
64	Indian tree	Patah tulang	*Euphorbia tirucali* L.	Euphorbiaceae	3
65	Septic fig	Mular/melu	*Ficus septica* Burm.	Moraceae	16
66	Sulfur cosmos	Kenikir	*Cosmos sulfureus* Cav.	Asteraceae	3
67	Cogongrass	Wuru	*Imperata cylindrica*	Poaceae	11
68	Bayhops	Lara	*Ipoema pes-caprae* (L.) R.	Convolvulaceae	6
69	Sweet flag	Nuang	*Acorus calamus*	Acoraceae	8
70	Mahkota dewa	Mahkota dewa	*Phaleria macrocarpa*	Thymelaeaceae	5
71	Cotton tree	Kapok hutan, puhu	*Bombax ceiba* Linn	Bombacaceae	8
72	Neem	Mimba	*Azadirachta indica* A.Juss	Meliaceae	17
73	Ginger	Lie	*Zingiber officinale* Roxb.	Zingiberaceae	6
74	Garlic	Bawang Buyaq	*Allium sativum*	Alliaceae	9
75	Cucumber	Timu	*Cucumis sativus* L	Cucurbitaceae	6
76	Palmyra palm	Koli	*Borassus flabellifer* L.	Arecaceae	8
77	Erythrina	leaq	*Erythrina subumbrans*	Fabaceae	6
78	Chayote	Labu jepang	*Sechium edule* (Jacq.) S.	Cucurbitaceae	5
79	Star fruit	Belimbing manis	*Averrhoa carambola* L	Oxalidaceae	6
80	Kencur	Heur	*Kaempferia galanga* L.	Zingiberaceae	7
81	Zedoary	Uma Buya	*Curcuma zedoaria* Rosc	Zingiberaceae	7
82	Areca palm	Uwe	*Areca catechu*	Arecaceae	15
		Total		**40 families**	**882**

The percentage order of the number of medicinal plant species (from the highest to the lowest) in each village group is as follows: 1) traditional villages (43%); 2) developing villages (32%); and 3) modern villages (25%). The distribution is illustrated in Figure 1.

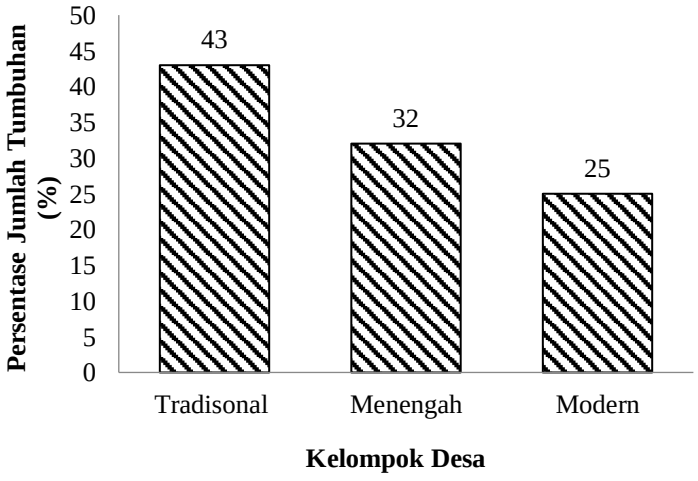

Figure 1.
Distribution of Medicinal Plant Species (in percentage)

The precise number of plant species in each village group is as follows: 1) 64 species in traditional villages; 2) 61 species in developing villages; and 3) 53 species in modern villages. The distribution is illustrated in Figure 2.

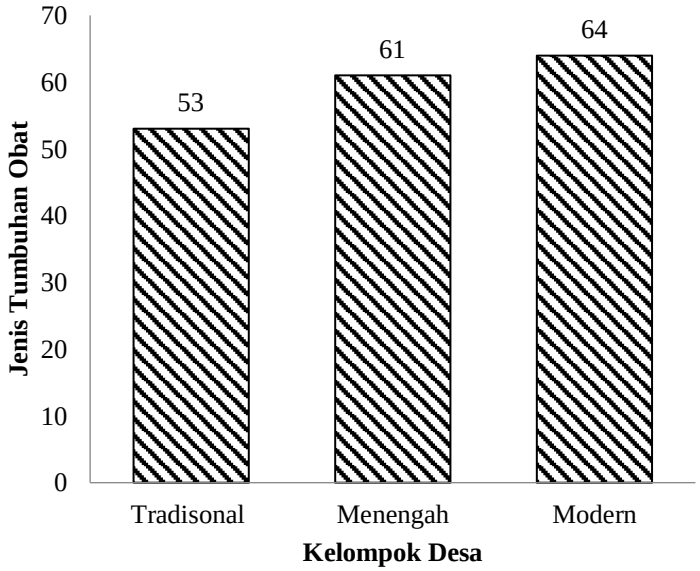

Figure 2.
Distribution of Medicinal Plant Species Used by the Uyelewun Local Community (in number)

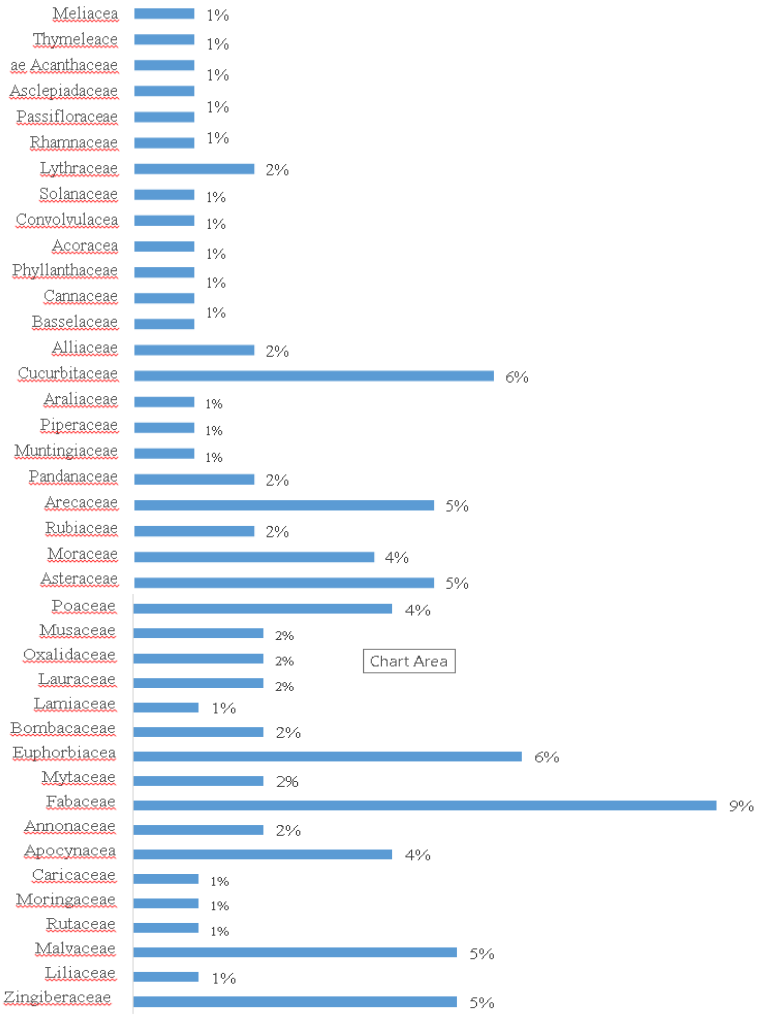

Figure 3. Distribution of Plant Families (in Percentage)

The results showed there were forty plant families. The highest percentage was Fabaceae (9%), comprising seven species, namely tamarind (Tamarindus indica L.), ringworm bush (Cassia alata L.), hummingbird tree (Sesbania glandiflora L.), leucaena (Leucanea glauca.), siamese cassia (Cassia siamea.), erythrina (Erythrina subumbran) and amboyna wood (Pterocarpus indicus.). The lowest one (1%) includes Liliaceae, aloe vera (Aloe vera L.); Rutaceae, key lime (Citrus aurantiifolia); Moringaceae, moringa (Moringan oleifera.); Caricaceae, papaya (Carica papaya L.); Lamiaceae, Java tea (Orthosiphon aristatus.); Piperaceae, betel (Piper betle L.); Muntingiaceae, Jamaican cherry (Muntingia calabura L.); Araliaceae, shield aralia (Polycias scutellaria); Basselaceae, malabar spinach (Basella rubra L.); Cannaceae, canna lily (Canna indica); Phyllanthaceae, stonebreaker (Phyllanthus niruri L); Acoraceae, sweet flag (Acorus calamus); Convolvulaceae, bayhops (Ipoema pescaprae.); Solanaceae, tobacco (Nicotiana tabacum L.); Rhamnaceae, jujube (Ziziphus mauritiana); Passifloraceae, stinking passionflower (Passiflora foetida L.); Asclepiadaceae, crown flower (Calotropis gigantean L.); Acanthaceae, green chiretta (Andrographis paniculata.); Thymeleaceae, mahkota dewa (Phaleria macrocarpa); and Meliaceae, neem (Azadirachta indica) (Figure 3).

Based on the identification results, there were 82 medicinal plant species from 40 families used by the Uyelewun local community. Three plant families with the highest percentage were 1) Zingiberaceae consisting of turmeric (Curcuma domestica Val.), ginger (Zingiber officinale Roxb.), kencur (Kaempferia galangal L.), and zedoary (Curcuma zedoaria Rosc); 2) Euphorbiaceae consisting of candlenut (Aleurites moluccana (L.) Willd.), physic nut (Jatropha curcas L.), katuk (Sauropus androgynous Merr.), cassava (Manihot esculenta Crantz.), and Indian tree spurge (Euphorbia tirucali L.); 3) Fabaceae consisting of amboyna wood (Pterocarpus indicus Willd.), tamarind (Tamarindus indica L.), ringworm bush (Cassia alata L.), hummingbird tree (Sesbania glandiflora L.), leucaena (Leucanea glauca Auct.non Bth.), siamese cassia (Cassia siamea Lam.), and erythrina (Erythrina subumbrans (Hassk.) Merr.).

The high percentage of Zingiberaceae was due to the well-shared knowledge in the local community, its ease of cultivation, and its popular efficacy to treat various diseases. It is in line with the Andesmora, Muhadiono, & Hilwan's results (2017), revealing that the most widely used medicinal plants are from Zingiberaceae. Research conducted by S. Hidayat, Hikmat, & Zuhud (2010) also figured out that Fabaceae has more medicinal plant species than other families. Another factor contributing to the highest percentage of Zingiberaceae, Euphorbiaceae, and Fabaceae was due to their functions other than being used in medicine, i.e., as kitchen spices, cooking ingredients, building materials, and environment or home decoration.

Based on the benefits to treat various diseases, each medicinal plant had distinct usability value. Three medicinal plants with the highest usability value were turmeric (1.71), moringa (1.21), and physic nut (1.19). The high usability value in certain plants indicates that they have benefits to treat various medical problems and are often used by the community. In addition to having high usability value, turmeric also became the most mentioned plant by 47 respondents. Other factors contributing to turmeric's high usability include its function as one of the cooking ingredients, its ease of cultivation and harvest (including in the nearby environment), and the well-shared knowledge among the local community, especially those working as farmers who often encounter cuts as a result of work accidents.

Based on the distribution of the number of medicinal plants obtained in each village group, it was found that the traditional villages had the highest number, i.e., 382 medicinal plants consisting of 64 species. Such high number indicates its high usability among the community driven by the following factors, namely 1) non-optimal health facilities (there is only one village polyclinic); 2) fertile environmental conditions suitable for the growth of those plants; 3) strongly held beliefs and hereditary customs of using those plants. Takoy, Linda, & Lovadi (2013) stated that the use of traditional medicines in Indonesia is often found in villages with the following conditions: 1) having no access to health facilities and modern medicines due to high price or lack of availability; and 2) having strongly held beliefs that traditional medicines are safer than modern ones.

Modern villages became the village group with the lowest number, i.e., 219 medicinal plants consisting of 53 species. Such low number was due to several factors, including 1) optimal health facilities encouraging the community to shift to modern medicines; 2) the large number of immigrants shifting both local customs and associated knowledge of traditional medicinal plants; 3) modernity fading ancestral beliefs and practices in using traditional medicinal plants to treat various diseases.

There were 281 medicinal plants consisting of 61 species found in developing villages. Developing villages are considered transitional villages between modern and traditional ones. The number of medicinal plants found in the developing villages was moderate–it did not exceed the number found in modern villages and was not lower than that of traditional villages. This was due to better development than the traditional villages, e.g., regarding public infrastructures and road access. Because of such development, it was easier for the community in the developing villages to access health facilities and shift gradually to modern medicines.

2. Growth Habits of Medicinal Plants

The results showed that the growth habits of medicinal plants used by the Uyelewun local community include trees, shrubs, herbs, bushes, lianas, and epiphytes. The highest percentage was trees by 34% (28 plants), while the lowest was epiphytes by 1% (one plant). The distribution is presented in Figure 4.

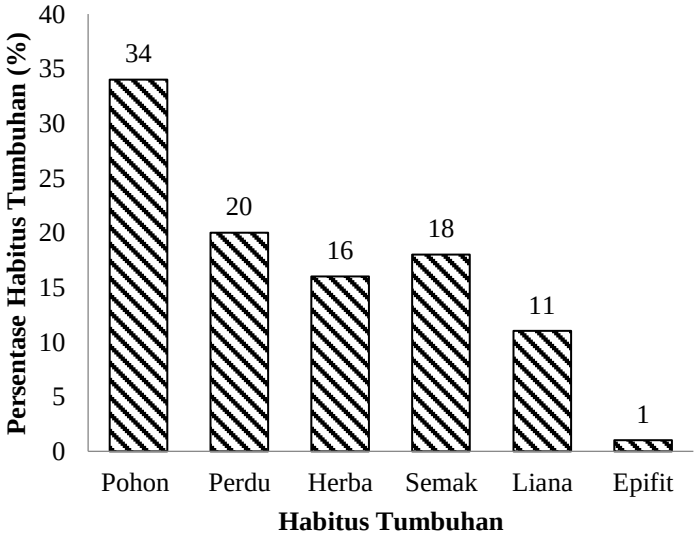

Figure 4.
Distribution of Medicinal Plants Growth Habits (in Percentage)

Plants with the growth habit of trees had the highest percentage compared to other habits. These plants include devil tree (Alstonia scholaris L.), candlenut (Aleurites moluccana (L.) Willd.), and tamarind (Tamarindus indica L.). I'ismi, Herawatiningsih, & Muflihati (2018) in their study also revealed that the most commonly found growth habit of medicinal plants was trees. It was due to several factors, including 1) diverse functions many parts of the tree provide–not only for medicinal purposes but also for other ones, one of which is building materials; 2) abundant plant resources they can provide; 3) their ease of discovery; and 4) their longer life cycle increasing their longer usability. Gunadi, Oramahi, & Tavita (2017) also asserted that the dominant factor behind such high usability was the fact that many of their parts, especially the bark, sap, flowers, roots, stems, fruits, and leaves, can be of use for various purposes. Meanwhile, the low percentage of medicinal plants with the growth habit of epiphytes was due to a lack of associated knowledge of these plants in the local community and limitations of plant parts that can be used as medicinal ingredients.

3. Sources of Medicinal Plants

This study found out that there were three sources to obtain medicinal plants in the Uyelewun local community, i.e., wild plants, cultivated plants, and plants sold at the local markets.

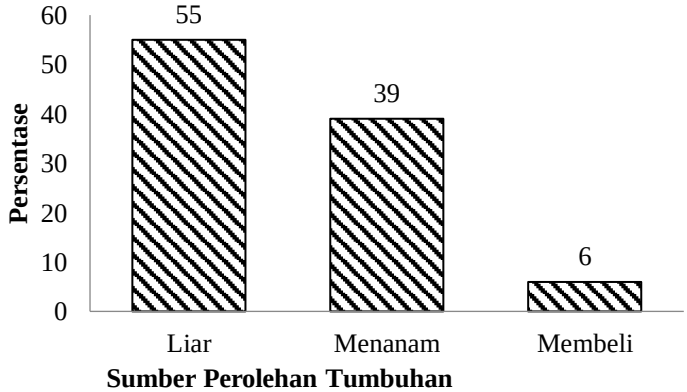

Figure 5. Distribution of Sources of Medicinal Plants (in Percentage)

The distribution of sources in each village group is generally similar from one group to another. Wild plants contributed to the highest percentage, followed by cultivated plants and plants sold at the local market.

Nevertheless, the percentage of each source varied in every village group. The precise distribution is as follows: 1) modern villages: wild plants (54%), cultivated plants (38%), and sold plants (8%); 2) developing villages: wild plants (56%), cultivated plants (35%), and sold plants (9%); and 3) traditional villages: wild plants (55%), cultivated plants (42%), and sold plants (3%).

Based on the results, there was a similarity in order of sources of medicinal plants in three village categories. The highest percentage was wild plants, followed by cultivated plants and plants sold at the local markets.

The high percentage of wild plants (55%) was due to the location on which the community resided, mostly surrounded by various wild plants from either the nearby environment or the forests. It eased the community to use those plants as means of medicinal purposes. Handayani (2015) stated that most communities did not stock medicinal plants in the form of simplicia as they could directly use them when needed.

The second highest percentage was cultivated plants (39%). Generally, medicinal plants cultivated by the local community had multi-functions–i.e., as means of medicinal purposes, food needs, and others. Medicinal plants such as moringa (Moringan oleifera Lmk.), saba banana (Musa paradisiaca), ash gourd (Benincasa hispida), pumpkin (Cucurbita moschata (Duch) Poir.), and cassava (Manihot esculenta Crantz.) were also used as the daily staple foods. Likewise, areca palm (Areca catechu) and betel (Piper betle L.) were also used in customary activities, while coconut (Cocos nucifera) was used as building materials.

The lowest percentage was plants sold at the local markets (6%). Such a low percentage was due to the availability of the most commonly used medicinal plants in the nearby environment, which helps the community to obtain even without buying them. Medicinal plants which can only be obtained at the local markets were rarely be found in the nearby environment, for instance, onion (Allium cepa), garlic (Allium sativum), and candlenut (Aleurites moluccana (L.) Willd.).

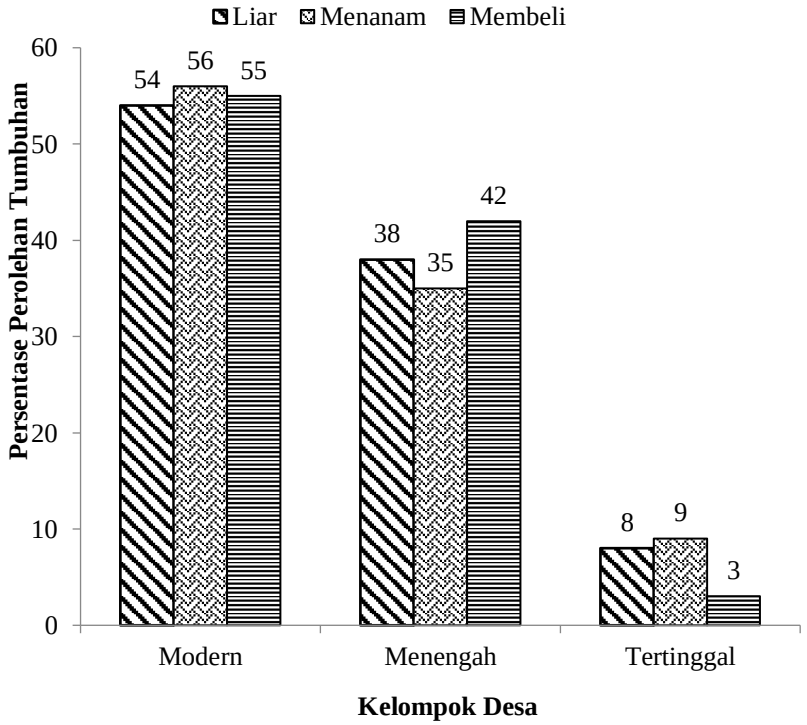

Figure 6.
Distribution of Sources of Medicinal Plants in Each Village Group (in Percentage)

4. Habitats of Medicinal Plants

The results of this study showed that there were five habitats of medicinal plants in the Uyelewun local community, namely forest, home garden, environment, market, and beach. Most medicinal plants were obtained from the nearby environment (51%) and rarely from the beach (2%). The distribution of medicinal plant habitats is presented in Figure 7.

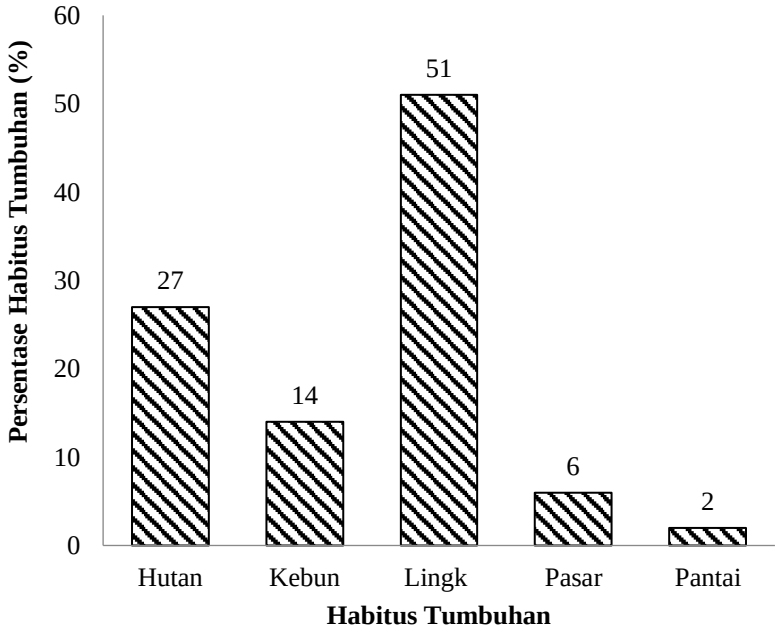

Figure 7.
Distribution of Habitats of Medicinal Plants (in Percentage)

The precise distribution of the most dominant habitat, which is the nearby environment, in each village group is presented as follows: modern villages (44%), developing villages (40%), and traditional villages (26%). For further details, see Figure 8.

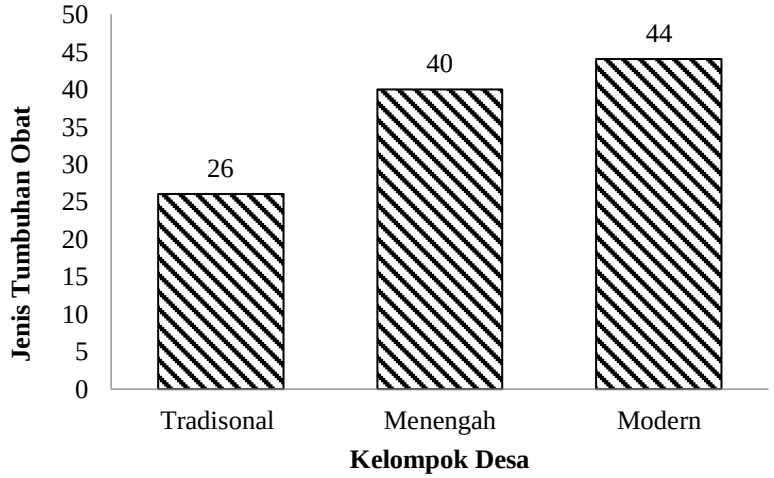

Figure 8. The Distribution of the Most Dominant Habitat in each Village Group (in Percentage)

The percentage of the plant habitat in each village group varied depending on their topography: 1) in the habitat of forest, modern villages had the highest percentage; 2) in the habitat of home garden, traditional and modern villages equally had the highest percentage; 3) in the habitat of nearby environment, modern villages had the highest percentage; 4) in the habitat of market, developing villages had the highest percentage; and 5) in the habitat of beach, traditional villages had the highest percentage. The distribution of habitats according to each category is presented in Figure 9.

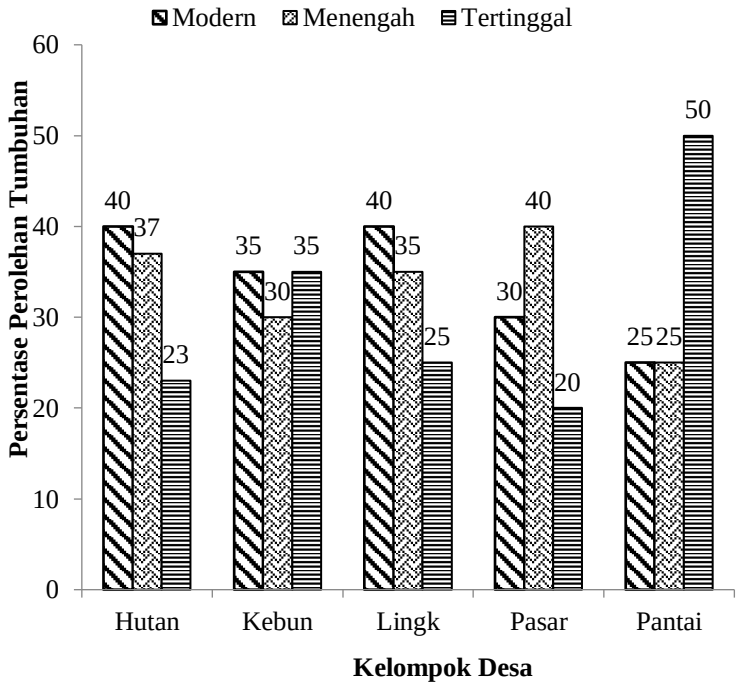

Figure 9. Distribution of Habitats in Each Category

The habitat with the highest percentage was the nearby environment, while the lowest was the beach. There were similarities in the distribution of habitats in the three village categories, namely the highest number of medicinal plants found in the nearby environment and the lowest number at the beach.

The Uyelewun local community mostly lives on land dominated by wild plants in the growth habit of trees, shrubs, and herbs. It seems plausible as it has fertile environmental conditions suitable for the growth of those plants. In addition, the high number of medicinal plants found in the nearby environment was reasonable due to numerous factors, viz. 1) the dominant plants found in this habitat were ones intentionally cultivated by the community to meet their daily needs; 2) they were easy to cultivate and harvest; and 3) they did not require certain environmental conditions (i.e., gardens) and therefore can be cultivated anywhere. The wild medicinal plants found in the nearby environment include devil tree (Alstonia scholaris L.), stonebreaker (Phyllanthus niruri L.), and septic fig (Ficus septica Burm.); the cultivated plants found in the nearby environment include papaya (Carica papaya L.), turmeric (Curcuma domestica Val.), pomegranate (Punica granatum L.), aloe vera (Aloe vera L.), sulfur cosmos (Cosmos sulfureus Cav.), and China rose (Hibiscus rosa-sinensis L.). The former three cultivated plants were planted to be consumed, while the latter three were planted as ornamental plants. Hadi, Widyastuti, & Wahyuono (2016) asserted that the nearby environment could be optimally used by planting both wild and cultivated plants. Planting those plants can contribute to the preservation of the ecosystem.

The second highest percentage was forests. Generally, medicinal plants found in the forest were wild plants. The wide forested area at the foot of Mount Uyelewun became the dominant factor behind the high number of medicinal plants found in the forest. Indonesia's forests estimatedly store 30,000 medicinal plant species, 940 of which have been declared medicinal, in which approximately 78% are extracted directly from the forest (Nisyapuri, Iskandar, & Partasasmita, 2018). The Uyelewun local community commonly addresses the forest located at the foot of Mount Uyelewun using the term "forest or mountain". Medicinal plants obtained from the forest include kapok (Ceiba petandra Gaertn.), cotton tree (Bombax ceiba Linn.), and yellow bamboo (Bambusa vulgaris var. striata).

The fourth highest percentage was home gardens (14%). Medicinal plants mostly found in the home gardens were plants deliberately cultivated to meet the daily needs. They function mainly as staple foods. Those plants include cassava (Manihot esculenta Crantz.), palmyra palm (Borassus flabellifer L.), and coconut (Cocos nucifera).

Medicinal plants obtained at the local markets were those obtained by means of buying. The low percentage of this habitat was highly related to the low number of medicinal plants obtained through buying. Those plants include zedoary (Curcuma zedoaria Rosc), kencur (Kaempferia galangal L.), and ginger (Zingiber officinale Roxb.). The medicinal plants with the beach habitat can only grow on the beach whose condition tends to be sandy. The low percentage of this habitat seems plausible since the location of the villages were far from the beach. Among those three categories, only modern villages have access to the beach. Medicinal plants found at

the beach include bayhops (Ipoema pes-caprae (L.) R. Br.), beach hibiscus (Hibiscus tiliaceus L.), and thatch screwpine (Pandanus terctorius).

5. Medicinal Plants Consumed

Forty medicinal plants have the function of fulfilling the community's food needs. They include all plants that can be used as vegetables, kitchen spices or additional ingredients, and fruits (Table 2).

Table 2. Plant Part Used in Medicine

No	Plant Species	Local Name	Part
1	Turmeric	Uma	Rhizome
2	Key lime	Mude Mentolor	Fruit
3	Moringa	Motong/Marungge	Leaf
4	Papaya	Wayah	Leaf
5	Sweetsop	Atanona/Nona/Nona Rani	Fruit
6	Guava	Jambu Batu, Qulsawa, kejawas	Fruit
7	Candlenut	Mire'	Fruit
8	Avocado	Alpukat	Fruit
9	Cucumber tree	Belimbing Sayur	Fruit
10	Saba banana	Mu'u	Fruit
11	Lemongrass	Rotan	Stem
12	Breadfruit	Paloka	Fruit
13	Coconut	Ta'	Fruit
14	Tamarind	Tamal	Fruit
15	Pandan	Pandan	Fruit
16	Jamaican cherry	Kersen/Gerseng	Fruit
17	Soursop	Nona Sarani	Fruit
18	Betel	Mal	Leaf
19	Susu banana	Pisang susu	Fruit
20	Bitter gourd	Paria/Aparia	Fruit
21	Tobacco	Bako	Leaf
22	Ash gourd	Kundur/ara	Fruit
23	Pumpkin	Kastela	Fruit
24	Onion	Bawang Putuq	Bulb
25	Pomegranate	Delima	Fruit
26	Katuk	Katuk	Leaf
27	Cassava	Ubi Kayu/Uleu Uaq	Tuber
28	Jackfruit	Kawera	Fruit
29	Java plum	Jambulan, buah rompo	Fruit
30	Jujube	Buer/Alabua	Fruit
31	Stinking passionflower	Anggur Hutan	Fruit
32	Ginger	Lie	Rhizome
33	Garlic	Bawang Buyaq	Bulb
34	Cucumber	Timu	Fruit
35	Palmyra palm	Koli	Fruit
36	Chayote	Labu Jepang	Fruit
37	Star fruit	Belimbing Manis	Fruit
38	Kencur	Heur	Rhizome
39	Zedoary	Uma Buya	Rhizome
40	Areca palm	Uwe	Fruit

Parts of medicinal plants that can be consumed comprise rhizome, tuber, stem, leaf, and fruit. The highest percentage of plant parts that can be consumed was fruits (66%), followed by leaves (16%), rhizomes (12%), tubers (5%), and stems (1%). Fruits were the most dominant plant part consumed (66%). Such a high percentage was highly related to the fact that fruits are often used as additional foods. Medicinal plants whose fruits are often consumed include cucumber (Cucumis sativus L), jackfruit (Artocarpus heterophyllus Lam.), and java plum (Syzygium cumini (L.) Skeels). The high percentage of fruits was also highly related to the high percentage of plants consumed through direct processing (42%)–fruits can be consumed directly without any prior processing.The distribution can be seen in Figure 10.

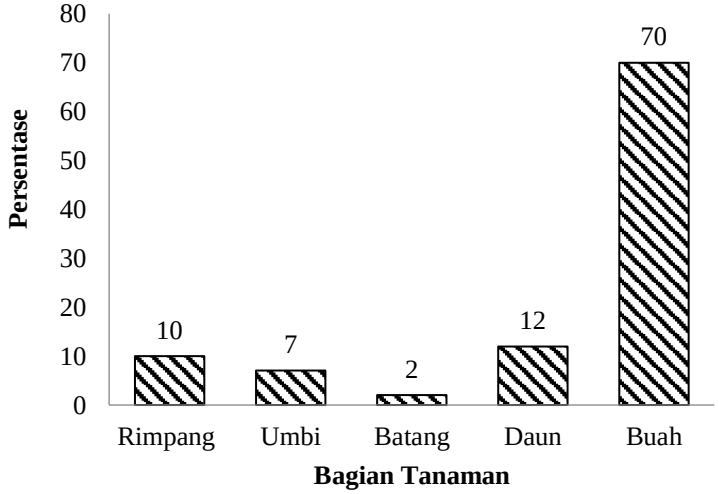

Figure 10. Distribution of Plant Parts Consumed

Irsyad, Murningsih, & Jumari (2013) also asserted a similar statement that fruits are widely used as they do not require any prior processing. Medicinal plants that can be consumed directly comprise susu banana (Musa paradisiaca), papaya (Carica papaya L.), and avocado (Persea Americana Mill.). Nevertheless, several fruits must be processed first, including breadfruit (Artocarpus altilis (Park.) Fosberg), bitter gourd (Momordica charantina L.) and chayote (Sechium edule (Jacq.) Swartz).

Leaves were the second highest percentage of plant parts consumed (16%). Most medicinal plants whose leaves are used often require prior processing, e.g., as vegetables in the cooking process. It was also related to the percentage of plants consumed as vegetables through the cooking process (26%). Those plants are often used as a side dish complementing staple foods. Vegetables are an important part of human consumption due to their function as a source of vitamins, minerals, dietary fibers, and antioxidants beneficial to health (Susanti, 2015). Antioxidants contained in the vegetables also play a role in preventing free radicals. Medicinal plants whose leaves are consumed as vegetables through the cooking process include moringa (Moringan oleifera Lmk) and katuk (Sauropus androgynous Merr.).

Medicinal plants whose stems, tubers, and rhizomes are consumed also require prior processing. Such processing mainly aims to process them into kitchen spices or cooking ingredients. It contributed to the high percentage of plants consumed as kitchen spices or cooking ingredients (28%)–second highest percentage. The Medicinal plant whose stems are used as kitchen spices or cooking ingredients was lemongrass (Cymbopogon citratus); medicinal plants whose bulbs are used were garlic (Allium sativum) and onion (Allium cepa); and medicinal plants whose rhizomes are used were turmeric (Curcuma domestica Val.), ginger (Zingiber officinale Roxb.), and kencur (Kaempferia galan).

6. CONCLUSSION

There were 82 medicinal plant species from 40 families used by the Uyelewun local community. The most frequently used medicinal plant was turmeric (Curcuma domestica Val), while the plant family with the highest number of plant members was Fabaceae. Growth habits, sources, and habitats of medicinal plants varied in each village group. The nearby environment was the most dominant habitat of medicinal plants (55%), whereas the beach was the most insignificant one (2%). The highest percentage of plant parts consumed was fruits (70%).

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