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1572 The **Medicinal Plants Used in** Anjir Pulang Pisau, Central Kalimantan-Indonesia Susi Novaryatiin*, Indah Indah INTRODUCTION Indonesia is a country with a mega biodiversity. Indonesia has 30,000 plant species, of which about 9,600 species are known to have medicinal properties and **only 200 species have been** utilized **as raw materials in** traditional medicine industries. This biodiversity richness needs to be explored, developed and utilized for the improvement of health and economic goals while maintaining its sustainability.

1 **Indonesia is not only rich in its biodiversity but it is also well known as a country with high diversity of ethnicities. Each ethnic group has extensive experienced in the utilization and conservation of biological and ecological diversity. This biocultural richness provided ethnobotanical researchers with endless research opportunities.**2 Kalimantan is the largest island in Indonesia that **is famous for its biodiversity. Beside that, there are knowledge of traditional medicine using plants that are passed on orally from generation to generation** on indigenous ethnic in Kalimantan.

These biodiversity are scattered all **over Kalimantan island, one of which is in Central Kalimantan Province. Central Kalimantan with an area of 15,380,410 hectares where about 70% is considered as forested area** is the home of medicinal plant biodiversity.^{3,4} People in Anjir Pulang Pisau Village still use plants as a traditional medicine to cure diseases. Usefulness they know from the narrative of the parents, exchange ideas with other members of the community and the results of his own experience. This knowledge is hereditary delivered orally and generally passed down to family members. The advancement of science and technology was not able to simply eliminate the meaning of traditional medicine.

Treatment in traditional ways is increasingly popular both domestically and abroad. The use of medicinal plants has traditionally been favored because it is believed to have no side effects as well as dangerous chemicals. The growing development of natural-made medicinal products by pharmaceutical companies, causing research is being conducted in many countries with the aim of increasing the use of traditional medicine for the welfare of the human populations.⁵ There is no ethnomedicinal study in Anjir Pulang Pisau Village. Hence, the present study was initiated to investigate the medicinal plants usage in Anjir Pulang Pisau Village, Central Kalimantan-Indonesia.

MATERIALS AND METHODS Study area The study of an ethnomedicinal survey for medicinal plants was conducted in Anjir Pulang Pisau Village which located in Kahayan Hilir District of Pulang Pisau Regency, Central Kalimantan-Indonesia (Figure 1). Pulang Pisau Regency is part of Central Kalimantan Province, ABSTRACT Background: The use of medicinal plants in Anjir Pulang Pisau Village has been carried out for a long time through knowledge that is passed down through generations to family members. But there is no documentation of local knowledge about medicinal plants. Objective: This study was aimed to investigate the use of medicinal plants in Anjir Pulang Pisau Village, Central Kalimantan-Indonesia.

Methods: The data were collected through individual interviews using semi—structured interviews. Information regarding the local names of the plant, medicinal uses, parts used, methods of preparation, and administration route were documented. Results: A total of 28 medicinal plants were identified. The family Anacardiaceae, Lamiaceae, Poaceae, and Myrtaceae had the highest proportion of medicinal plants used (7% each). The most frequently utilized medicinal plant parts were roots (47%). The plant species used to treat the high percentage of disease was Curcuma zedoaria (Christm.) Roscoe. (16%). In terms of frequency of medicinal plant uses, the highest percentage of plant species (21%) was used to treat wound.

Majority of the plant remedies in this study were prepared by decoction (40%), and most medicinal plant preparations were taken orally (75%). Conclusion: Further research is needed to identify unidentified family and plant species. Pharmacognostical and pharmacological studies are also needed for the identification of chemical compounds and proving the efficacy of medicinal plants used by local people. Key words: Ethnomedicine, Traditional Knowledge, Pulang Pisau, Kahayan Hilir, Curcuma zedoaria.

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This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International license. 1573 located between 10° to 0° South Longitude and 110° to 120° East longitude. East border of Pulang Pisau Regency is Kapuas Regency, the west bordered by Katingan Regency and Palangka Raya City. At north is bordered by Gunung Mas Regency meanwhile at south is bordered by Java Sea. Total area of Pulang Pisau Regency is 8.997 km² or 899.700 Ha (5,85 % from total area of Kalimantan Tengah Province), while total area of Kahayan Hilir District is 360 km² (4 % from total area of Pulang Pisau Regency).

Selection of informant A total of 54 local peoples of different ages (18-65 years) were selected, and interviewed as key informants. The selected local peoples used medicinal plants for traditional health care in their daily activities. Data collection Ethnomedicinal data was collected through individual interviews using semi—structured interviews. Information regarding the plant's local name, medicinal uses, parts used, methods of preparation, and administration route were documented. Descriptive statistics were used to analyze the collected ethnomedicinal data. RESULTS AND DISCUSSION During the field survey in the study area, informant reported ethnomedicinal data of 28 species of medicinal plants.

The 19 medicinal plant species distributed across 17 families, while families of 9 medicinal plant species unidentified. A total of 28 medicinal plants were recorded as being used to treat 19 different types of diseases as shown in Table 1. The family Anacardiaceae, Poaceae, Lamicaeae and Myrtaceae had the highest proportion of medicinal plants used (7% each), followed by other families with only one plant species per family (4% each), and families of other unidentified plant species (21%) (Figure 2). Further research is needed to identify the families and species of unidentified medicinal plants.

The most frequently utilized medicinal plant parts were roots (47%), followed by bark (19%), leaves and stem (9% each), flowers (6%), and Figure 1: Location of the study area. 1574 Family and Scientific name Local name Medicinal uses Parts used Methods of preparation Administration route Anacardiaceae Bouea macrophylla Griff. Ramania Vomit, diarrhea Bark Decoction Oral Camnosperma sp. Terentang Wound, vomit Bark Decoction Oral Annonaceae Annona muricata L. Sirsak Stomach ache Hypertension Leaves Roots Crushed or pounded Decoction Topical Oral Asparagaceae Cordyline

fruticosa (L.) A.Chev.

Sawang Vaginal discharge Roots Concoction Oral Blechnaceae *Stenochlaena palustris* (Burm.f.) Bedd. Kelakai Wound Stem Crushed or pounded, concoction Topical Bromeliaceae *Ananas comosus* (L.) Merr. Nanas madu Cholesterol Fruits Crushed or pounded Oral Cannabaceae *Trema tomentosa* (Roxb.) H. Hara Kalanduyung Cough, respiratory tract infection Roots Infusion Oral Dilleniaceae *Dillenia indica* L. Simpung Eye ache Stem Infusion Ocular Euphorbiaceae *Jatropha multifida* L. Betadine Wound Bark Crushed or pounded Topical Lamiales *Orthosiphon aristatus* (Blume.) Miq. Kumis kucing Urinary tract infection Roots Decoction Oral *Plectranthus* sp.

Bungeh tandang Ear aches Leaves Crushed or pounded Otic Malvaceae *Hibiscus rosa-sinensis* L. Kembang sepatu Hemorrhoid Roots Decoction Oral Meliaceae *Sandoricum koetjape* (Burm.f.) Merr. Kecapi Stomach ache Bark Decoction Oral Menispermaceae *Arcangelisia flava* (L.) Merr. Akar kuning Liver Roots Decoction Oral Myrtaceae *Psidium guajava* L. Jambu biji Malaria Seeds Crushed or pounded Oral Rhodomyrtus *tomentosa* (Aiton) Hassk. Mesisin Diabetes Roots Decoction Oral Poaceae *Bambusa vulgaris* Schrad Bambu kuning Malaria Stem Decoction Oral Imperata *cylindrica* (L.) Raeusch. Alang-alang Diabetes Roots Decoction Oral Rubiaceae *Morinda citrifolia* L.

Mengkudu Hypertension Fruits Crushed or pounded, infusion Oral Table 1: Medicinal plants used for treating human disease in Anjir Pulang Pisau Village. 1575 Solanaceae *Solanum torvum* Sw. Terung pipit Diabetes Roots Decoction Oral Thymelaeaceae *Phaleria macrocarpa* (Scheff.) Boerl. Mahkota dewa Hypertension Rheumatism Roots Bark Decoction Decoction Oral Oral Zingiberaceae *Curcuma zedoaria* (Christm.) Roscoe. Kunyit putih Respiratory tract infection, rheumatism, wound Rhizome Crushed or pounded, infusion Oral Unidentified Hantangan Diarrhea Bark Decoction Oral Lalangatan Breast cancer Wound Roots Leaves Infusion Crushed or pounded Oral Topical Kitui Bunu Wound Roots Infusion Oral Unidentified Pukul jampa Breast cancer Roots Crushed or pounded Topical Telayar Heart disease Breast cancer Flowers Roots Infusion Crushed or pounded Oral Topical Umar Vaginal discharge Roots Concoction Oral 7 % 4 % 4 % 4 % 4 % 4 % 4 % 4 % 7 % 4 % 4 % 4 % 4 % 7 % 7 % 4 % 4 % 4 % 4 % 2 1 % Anacardiaceae Annonaceae Blechnaceae Bromeliaceae Cannabaceae Dilleniaceae Euphorbiaceae Lamiales Laxmanniaceae Malvaceae Meliaceae Menispermaceae Myrtaceae Poaceae Rubiaceae Solanaceae Thymelaeaceae Zingiberaceae Unidentified Figure 2: Percentage distribution in families for medicinal plants used treat different health problems. fruits, seeds, rhizome (3% each) as shown in Figure 3.

Most of the plant species were used to treat one disease, while some were used to treat

two or more diseases. The most frequent plant species used to cure disease was *Curcuma zedoaria* (Christm.) Roscoe. (16%), while *Annona muricata* L., *Bouea macrophylla* Griff., *Camptosperma* sp., *Phaleria macrocarpa* (Scheff.) Boerl., and *Trema tomentosa* (Roxb.) H. Hara were each reported to treat 11% of the diseases (Figure 4). In terms of frequency of medicinal plant uses, the highest percentage of plant species (21%) was used to treat wound, followed by breast cancer, diabetes, and hypertension (11% each).

Other diseases were treated with less than 10% of the medicinal plants recorded (Figure 5). According to the available literatures, some of the reported medicinal plant species were found to have some phytochemical and biological activities. *Bouea macrophylla* Griff. can be used to treat vomit and diarrhea. This plant has numerous contents and one of them is flavonoid that function as antibacterial and antioxidant. Previous studies indicates that the total content of flavonoids in *Bouea macrophylla* Griff. leaf is higher than in *Bouea macrophylla* Griff. bark.

Flavonoid are included in the largest group of phenol compounds that have very active properties to slow the growth of viruses, bacteria, and fungi. 6 The root part of *Cordyline fruticosa* (L.) A.Chev. used by local people for vaginal discharge treatment. The plant of the genus *Cordyline* are very well known as source of steroidal saponins and cholestane glycosides. 1576 Figure 3: Plant parts used for medicinal purposes. Figure 4: Medicinal plant species with highest percentage of total disease treated. Figure 5: Frequency of medicinal plants uses to cure disease. 1577 Steroidal saponins was known for their biological actions, particularly cytotoxic, antimicrobial, antifungal, and in vivo antitumoral activities.7 Previous study about *Ananas comosus* (L.)

Merr. revealed that ethanol extract of *Ananas comosus* (L.) Merr. leaves possess significant hypocholesterolemic activity. The acute toxicity also showed that the extract has a high safety profile as neither death nor symptoms associated with toxicity was observed at high dose level (5 gm/kg) in high cholesterol fed albino rats. 8 Extract ethanol of *Orthosiphon aristatus* (Blume.) Miq.

leaf produced the strong antimicrobial effect, inhibiting the growth of *Candida albicans*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Klebsiella pneumonia*, *Staphylococcus epidermidis*, *Proteus mirabilis*. Some of these microorganism are the cause of urinary tract infections.9-10 The local people used *Arcangelisia flava* (L.) Merr. to cure liver. Higher dose of *Arcangelisia flava* (L.) Merr. extract shows hepatoprotective activity by preventing the elevation of serum transaminases and transferase levels. Eventually, no damage in the acetaminophen-induced rat's liver was observed.

This plant modulates the expression of caspase 3 protein in dose-dependent manner. 11 Ethnobotanical studies have recorded the use of *Psidium guajava* L. via infusion and decoction of leaves, roots, and seeds to treat malaria. The pharmacological effect of this plant has investigated, both its in vitro and in vivo potential. 12 The aqueous extract of the leaves of *Bambusa vulgaris* Schrad. Demonstrated important antiplasmodial activity against the *Plasmodium* parasites with the chloroquinesensitive 3D7 *P. falciparum* being more susceptible. However, the antiplasmodial activity of stem of *Bambusa vulgaris* Schrad. still not found. 13 *Rhodomyrtus tomentosa* (Aiton) Hassk. has been reported to contain various phytochemical compositions in many part of the plant, including steroids, flavonoids, and alkaloid compounds.

Flavonoid and alkaloids are widely used in the form of the drug to treat diabetes, skin disorders and anti-inflammation. 14 *Curcuma zedoaria* (Christm.) Roscoe. have been shown to contain bioactive molecules that possess pharmacological properties like antimicrobial, antiallergic, antihypertensive, antinociceptive and analgesic, hemagglutinating, antimutagenic and antioxidant, antiulcerogenic, antiproliferative, antifungal, larvicidal and pupicidal, cytotoxicity, anti-inflammatory, antiplatelet aggregation. 15 *Dillenia indica* L. was known to contain antioxidant and antibacterial compounds, so it can be efficacious as an eye sore. 16 *Annona muricata* L.

and *Sandoricum koetjape* (Burm.f.) Merr. were known to have antibacterial compound, 17,18 and both plant species were used to treat stomach ache by local people. Leaf part of *Annona muricata* L. also used by Ayta Communities in Dinalupihan, Bataan, for treat stomach ache. 19 *Jatropha multifida* L. and *Stenochlaena palustris* (Burm.f.) Bedd. were used by local people to cure wound. The antibacterial assay of *Jatropha multifida* L. showed an in vitro growth inhibition of *P. aeruginosa* and *S. aureus* in dose-dependent manner. 20 *Stenochlaena palustris* (Burm.f.) Bedd. was known as antioxidant and antimicrobial, so it can be efficacious to cure wound. 21-22 Various studies reported that *Annona muricata* L., *Morinda citrifolia* L., and *Phaleria macrocarpa* (Scheff.) Boerl. can lower blood sugar levels. 23-25 Majority of the plant remedies in this study were prepared by decoction (40%), then by crushed or pounded (31%), infusion (20%), and concoction (9%) (Figure 6). Some herbal preparations were taken by mixing with lime paste.

Most medicinal plant preparations were taken orally (75%), while 19% were used topically for disease such as wounds, breast cancers, and stomach ache (Figure 7). Various ethnomedicinal studies conducted elsewhere also reported that oral as the predominant route of administration. 26-28 9% 40% 31% 20% Concoction Decoction Crushed/pounded Infusion Figure 6: Medicinal plants preparation method. Figure 7:

Route of administration of medicinal plant. CONCLUSION With this ethnomedicinal study, 28 medicinal plants were determined to be used for different medicinal purposes by local people.

This study is the first on determination of medicinal plants used in Anjir Pulang Pisau Village. So, it is very important to preserve traditional culture on traditional medicine and survive for future generations. Further research is needed to identify unidentified family and plant species. Pharmacognostical and pharmacological studies are also needed for the identification of chemical compounds and proving the efficacy of medicinal plants used by local people. ACKNOWLEDGEMENT The authors would like to thank local people of Anjir Pulang Pisau Village who helped to collect information for this study. CONFLICTS OF INTEREST The authors declare no conflicts of interest. REFERENCES 1. Hapsoh H, Hasanah Y.

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