



Ethnobotanical Study of Medicinal Plants by The Java-Tondano Tribe, Bolaang Mongondow District, Indonesia

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Abstract. The diversity of medicinal plant species in Indonesia has been shaped by ethnic cultures and traditions passed down through generations. Each ethnic group utilizes distinct medicinal plant species tailored for specific ailments. This research aims to explore the ethnobotany of medicinal plants used by the Java-Tondano community in Ikhwan Village, West Dumoga District, Bolaang Mongondow Regency. The study was conducted from August to November 2021. Data collection involved identifying medicinal plant species, conducting in-depth interviews with five traditional healers, and documenting field observations. The findings reveal the presence of 58 medicinal plant species, with various plant parts utilized, including leaves, fruits, flowers, seeds, stems, sap, roots, rhizomes, tubers, shoots, and bark. These plants are used either individually or in combination for medicinal treatments. The preparation of medicinal plants often involves the recitation of the *Shalawat* prayer. The application methods include oral consumption, topical application, and compressing. These plants provide remedies for a wide range of health conditions, including cholesterol, hypertension, diabetes, low hemoglobin levels, vaginal discharge, rheumatism, wounds, fever, toothaches, insomnia, constipation, dizziness, broken bones, malaria, stamina enhancement, and postpartum blood pressure regulation.

Keywords: ethnobotanical study, medicinal plants, java-tondano tribe

1 Introduction

Indonesia, as an archipelagic nation, boasts an extensive biodiversity of flora and fauna that spans across the country. This biological wealth in Indonesia has wide-ranging implications for food production, the economy, and the field of medicine. The utilization of these biological resources has been a practice known to our ancestors, particularly in the realm of medicine, where traditional remedies often centered around the use of plants [1].

The knowledge regarding the use of medicinal plants as alternative treatments has been passed down from one generation to the next, forming an integral part of our cultural heritage [2]. This inherited wisdom has been obtained through both experience and knowledge transfer. The use of natural ingredients for health maintenance represents a conscious choice for many, reflecting a movement towards reconnecting with nature.

The Java-Tondano tribe, residing in Ikhwan Village, Bolaang Mongondow Regency, North Sulawesi Province, presents a unique blend of traditional medicine practices. This tribe is the result of a fusion between the Javanese and Minahasa tribes, and their traditional medicine shares some commonalities with Javanese practices. However, as Rifai [3] noted, each ethnic group in Indonesia possesses distinct cultural characteristics and identities, which influence their perceptions and concepts of natural resources in their environment.

Traditional medicine in some Java-Tondano communities involves the use of medicinal plants found in their surroundings, whether in their gardens, forests, rice fields, or along rivers. These practices often include special rituals associated with the collection and preparation of medicinal plants. In Ikhwan Village, the Java-Tondano community typically seeks prescriptions from traditional healers they trust. Nevertheless, as time progresses and modern medical technology advances, the number of traditional healers in the village is dwindling, risking the loss of valuable knowledge about these traditional medicinal plants. Unfortunately, there is limited scientific research and documented data available regarding the ethnobotany of medicinal plant species and their processing by the Java-Tondano ethnic group. This research aims to uncover the ethnobotanical aspects of medicinal plants among the Java-Tondano ethnic community, including information about the plant species used, the parts of plants utilized, their medicinal benefits, the methods of processing, and the local wisdom associated with their use. It is hoped that the findings of this research will contribute to the preservation of traditional medicinal plants and the associated cultural practices.

2 Method

This research was conducted in Ikhwan Village, West Dumoga District, Bolaang Mongondow Regency, from August 2021 to November 2021. Ikhwan Village encompasses an area of 11.50 km² and is situated at an altitude of 143 meters above sea level, encompassing a variety of landscapes, including rice fields, rivers, mountains, and plantations. The research employed a survey methodology and utilized Snowball data collection techniques to gather information from traditional healers. Data collection involved a combination of observation, documentation, and in-depth interviews. Observations were made to understand the traditional medicine processing methods, document the various types of medicinal plants, and engage in in-depth interviews with five traditional healers from the Java-Tondano tribe residing in Ikhwan Village. The in-depth interviews targeted traditional health practitioners aged between 35 and 90 years. These interviews aimed to uncover the specific plants used as traditional medicine by the residents

of Ikhwan Village. To identify the medicinal plants, available identification books and lists of Indonesian medicinal plants were employed.

3 Result and Discussion

3.1 Result

This research identified 58 types of medicinal plants, their respective plant parts used for medicinal purposes, benefits, processing methods, and the local ethnic wisdom associated with the utilization of these medicinal plants. The findings are as follows:

Clerodendrum bungee (Sesewanua): The leaves of this plant are utilized for treating fever, back pain, and swelling. To address swelling, an odd number of leaves are taken, washed with water, mashed, and then applied to the affected area. A local wisdom practice involves reciting the Prophet's prayers. To alleviate fever, three to five leaves are taken, and their upper parts are rubbed with coconut oil before being placed on the chest.

Vernonia amygdalina (African leaf): The leaves of this plant are employed for managing hypertension and cholesterol. For individuals with hypertension, five to seven bay leaves are boiled in clean water until the volume reduces to one glass, and this mixture is consumed once a day. Another approach involves washing five to nine African leaves until they are clean, mashing them to extract the juice, and drinking it once a day until recovery.

Musa balbisiana (forest banana): The fruit of this plant serves as a remedy for hypertension, diabetes, and cholesterol. To address hypertension, three old bananas are boiled in two glasses of water, and the resulting boiled water is consumed once a day until recovery. For diabetes and cholesterol, the banana stem is cut, and the water from the stem is collected and consumed once a day until healing is achieved.

Senna alata (Ketapang): The leaves are used as a remedy for tinea versicolor and constipation. To address tinea versicolor, take five to seven leaves, clean them, then crush them into a smooth paste and apply it to the affected area. For constipation, use three to five leaves, boil them in two glasses of clean water, and consume the boiled water once a day until cured. *Musa acuminata*, sp (Goro banana): The banana fruit is employed as a treatment for diabetes. Boil the bananas until they are cooked, then consume them.

Garcinia mangostana (mangosteen): The skin of the fruit is utilized for treating hemorrhoids, vaginal discharge, and cholesterol, as well as for postpartum mothers. To address hemorrhoids, vaginal discharge, and cholesterol issues, take one tablespoon of mashed mangosteen peel, brew it with hot water, and consume the infusion once a day until healed. For the postpartum mother's concoction mixture, use an adequate amount of ginger (*Zingiber officinale*) in an odd quantity, mix it with mayana, ginger, cloves, pepper, mangosteen peel, nutmeg, and add brown sugar. The processing involves boiling with two liters of water until it reduces to one liter, using a specialized clay pot.

Jatropha curcas (jarak pagar): The sap and leaves are used for treating itching, canker sores, fever, hypertension, and itching. To treat toothache and canker sores, apply the sap from the young stem to the affected tooth and mouth area, repeating twice a day until healed. For fever, use three, five to seven leaves, rub the top of the leaves with oil, then affix them to the chest and forehead. To manage hypertension, use three to five leaves, boil them in two glasses of water until it becomes one glass, and consume it once a day until cured. To alleviate itching, use five to seven leaves, boil them in two glasses of water until it becomes one glass, and apply the infusion to the itchy body part two to three times a day until healed.

Coleus scutellarioides (L) Benth (Mayana): The leaves are used to treat internal wounds and as a decoction for postpartum mothers. To address internal wounds, use 9, 11, or 13 leaves, pound and squeeze them to extract the juice, mix with a small amount of brown sugar, then consume it once a day until healed. To prepare a decoction for postpartum mothers, use ginger in an appropriate odd quantity, combine it with other medicinal plants like mayana, ginger, cloves, pepper, mangosteen peel, and nutmeg, and add a small amount of brown sugar. Boil the mixture with two liters of water using a clay pot. Consume one to two glasses a day until healed.

Annona muricata (Soursop): The leaves are employed to manage cholesterol and hypertension. The processing method involves boiling seven leaves in two glasses of water until it reduces to one glass, and consuming it once a day until cured.

Tinospora cordifolia (Brotowali): The stem is used for treating diabetes. To address diabetes, take a two to three-inch length of the stem, clean it, and boil it in two glasses of water until it reduces to one glass. Consume it once a day until healed. For cholesterol and gout, take a one-finger length of the stem, clean it, and boil it in two glasses of water until it reduces to one glass. Drink it once a day until healed.

Myristica fragrans (Nutmeg): The seed is used as a scar remover and in a decoction for postpartum mothers. To treat scars, grate the nutmeg into a fine powder, mix it with a small amount of coconut oil or olive oil, and then apply it to the scarred area. For the postpartum mothers' decoction, use an adequate amount of ginger in odd quantities, combine it with various medicinal plants like mayana, ginger, cloves, pepper, mangosteen peel, and add brown sugar. Boil this mixture with two liters of water until it reduces to one liter using a clay pot.

Lantana camara (Tamblekan): The leaves are used for treating wounds and stomach acid issues. To treat wounds, mash an odd number of leaves into a smooth paste, then squeeze to extract the juice, and apply the leaf juice to the wound. For stomach acid, an odd number of *Lantana camara* leaves are boiled in 2 glasses of water until it reduces to 1 glass of water using a clay pot.

Orthosiphon aristatus (Kumis kucing): The leaves, stems, and flowers are employed for managing bone fractures and malaria. To address broken bones, crush the leaves and stems along with several lemongrass stalks, and then apply this mixture to the affected body part. To treat malaria, use three Dayak onion

bulbs, mix them with five pieces of keci beling leaves, and an odd amount of kumis kucing. Boil this mixture with two glasses of water until it reduces to one glass, and consume it warm.

Plantago major (Spoon leaf): The leaves, stems, and flowers are used for treating bone fractures and malaria. To address broken bones, use an odd number of leaves and mix them with lemongrass stems, ginger, and kecibung leaves. Blend all these medicinal plants until smooth, then apply the mixture to the affected body part with a broken bone or sprain. Another method is to crush seven leaves and stems of the vein plant along with kumis kucing, trongoat, and lemongrass, and then apply it to the affected body part with a broken bone. To treat malaria, use an odd number of Trongoat leaves, mix them with lempuyang, yellow, and benggele, grind them all together, squeeze the juice, mix it with a little honey, and it's ready to drink.

Cymbopogon nardus (Sereh): The stem is used for treating broken bones. The processing method for treating bone fractures is the same as that for *Plantago major*.

Zingiber officinale (Ginger): The rhizome is used for managing broken bones and as a decoction for postpartum mothers. To prepare a post-natal concoction, use an odd amount of ginger root, combine it with various medicinal plants like Mayana, ginger, cloves, pepper, mangosteen peel, nutmeg, and add a small amount of brown sugar. Boil this mixture in two liters of water until it reduces to one liter. It can be consumed in one to two glasses per day. For a broken bones concoction, mix Trongoat leaves in a generous amount with lemongrass stems, ginger, and kecubung leaves, crush them until smooth, and then apply it to the body part with a broken bone or sprain.

3.2 Discussion

The results of in-depth interviews with five Java-Tondano traditional healers in Ikhwan Village revealed 58 plant species with traditional medicinal properties. These medicinal plant species are both cultivated and found in the wild, with 33 species being intentionally cultivated and 27 species growing in their natural habitat. According to Susanti [4], cultivated plants are those intentionally grown to meet specific needs and for conservation purposes, even though the origins of cultivated medicinal plants are wild plants. In the process of selecting plant species for use in traditional medicine, traditional healers acquire knowledge based on their experiences, which are often passed down through generations, or from dreams, which are believed to assist in the selection process of medicinal plant species. This knowledge about the use of medicinal plants is part of the nation's cultural heritage and has been passed down from generation to generation, resulting in the development of a wide range of high-quality medicinal herbs [5].

In their use of plants as medicine, Javanese-Tondano traditional healers employ one or more parts of the plant, depending on the type of disease being treated. Among the 58 plant species, various plant organs are utilized for traditional medicine, including 35 species of leaves, 11 species of stems, five species

of flowers, four species of fruit, five species of tubers, three species of roots, and three species of sap. This distribution suggests that leaves are the most commonly used plant organ in traditional medicine. From a chemical perspective, leaves contain secondary metabolite compounds like terpenoids, alkaloids, polyphenols, flavonoids, and saponins. These chemical compounds have various therapeutic properties for treating different types of diseases [6]. The use of plant organs such as roots, stems, bark, and tubers should be limited in traditional medicine, as their excessive use can harm plant populations. According to Setiawan [7], traditional healing methods often stem from the interpretation of a shaman's dream, leading to the discovery of antidotes or solutions for various diseases.

In Ikhwan village, the processing of medicinal plants still relies on traditional methods, including pounding, boiling, drying, burning, and withering. The process of collecting and processing medicinal plants, from gathering them to the actual processing, often involves odd quantities and the recitation of prayers. According to Yunaini and Sholeh [8], recitations are a part of the oral tradition and cultural treasure of the Malay people. They are closely linked to the thoughts, beliefs, and way of life of the people who practice them. However, there has been a decrease in the interaction with nature, causing these recitations to become marginalized in their lifestyle. The quantity of medicinal plants taken, whether odd or specific, impacts the efficacy of the medicinal plant. The amount is determined by the severity of the patient's condition. The processing of medicinal plants is categorized into single processing and preparation of concoctions.

In the usage of medicines and concoctions made from medicinal plants, the Java-Tondano ethnic group employs methods such as drinking, applying, and compressing. For treating internal diseases, it is recommended to consume boiled water infused with medicinal plants. In the case of external treatments for conditions like fever, itching, swelling, broken bones, and rheumatism, a paste or compress is used while prayers are recited.

In general, the local wisdom of the Javanese-Tondano ethnic group in Ikhwan Village lies in the collection and processing of medicinal plants. It is customary that when gathering these plants, an odd number is used, and the blessings of the Prophet are recited. Besides being a form of prayer and supplication to Allah SWT, the recitation of Shalawat also serves as a medium for instilling cultural values in the development of Muslims in the Javanese-Tondano village. For instance, in the process of taking papaya plants as a remedy for constipation, the middle part of the stem is grated from top to bottom in one direction to extract the juice, which is believed to treat constipation. Another method involves grating the stem from bottom to top, and using it to take the juice, which is also believed to address vomiting.

The medicinal plants used by the Java-Tondano tribe in traditional health practices possess diverse properties that can treat a wide range of ailments. These include cholesterol issues, hypertension, diabetes, vomiting, low hemoglobin levels, vaginal discharge, lumbago, rheumatism, hemorrhoids, swelling, wounds, fever, canker sores, toothaches, immune system deficiencies, urinary stones, gout,

infections, lymphatic disorders, boils, coughs, itching, insomnia, tinea versicolor, constipation, dizziness, broken bones, malaria, stamina enhancement, and postpartum blood level improvement. For certain treatments, traditional healers use a combination of medicinal plants, blending them into herbal remedies for conditions such as malaria, broken bones, urinary stones, and postpartum recovery.

Based on the in-depth interviews, the plant species most frequently used in traditional medicine include *Clerodendrum bungei*, *Vernonia amygdalina*, *Musa balbisiana*, *Senna alata*, *Musa acuminata* sp., *Garcinia mangostana*, *Jatropha curcas*, *Coleus scutellarioides* (L.), *Annona muricata*, *Tinospora cordifolia*, *Myrsine fragrans*, *Lantana camara*, *Orthosiphon aristatus*, *Plantago major*, *Cymbopogon nardus*, and *Zingiber officinale*. Some of these species contain terpene compounds (α -curcumen, β -sesquiphellandrene, zingiberen, and α -farnesene), phenols (gingerol and paradol), organic acids, polysaccharides, and lipids, which have beneficial effects in maintaining the health of children and aiding mothers after childbirth [9]. *Curcuma xanthorrhiza* (Temulawak), for instance, contains flavonoids that can reduce inflammation and essential oils with antimicrobial properties. It can be used in a single or mixed form to treat various conditions such as digestive disorders, constipation, bile issues, gonorrhoea, uterine inflammation, loss of appetite, stomach inflammation, hemorrhoids, flatulence, and postpartum recovery [10].

4 Conclusion

The traditional Java-Tondano ethnic healers in Ikhwan Village utilize 58 species of medicinal plants. These plants are employed in various ways, with 35 species utilizing their leaves, six species using their fruits, five species relying on their flowers, two species harnessing their seeds, 10 species utilizing their stems, two species extracting sap, two species using their roots, five species making use of their rhizomes/tubers, three species utilizing shoots, and one species incorporating parts of the stem skin. The local tradition surrounding the use of these medicinal plants involves an adherence to odd numbers of plant parts and reciting blessings from the Prophet.

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