Ethnomedicinal documentation of polyherbal formulations and other folk medicines in Aurora, Zamboanga del Sur, Philippines

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Abstract. Pucot JR, Demayo CG. 2021. Ethnomedicinal documentation of polyherbal formulations and other folk medicines in Aurora, Zamboanga del Sur, Philippines. Biodiversitas 22: 5331-5343. In Aurora—a rural municipality in western Mindanao, Philippines, wide patronization of folk medicines has been observed, and polyherbal formulations are one of the treatments used. However, knowledge of these formulations has not been documented, imposing a threat that might lead to its eventual loss. The lack of baseline information on these formulations also stagnates its development, and the danger of possible herb-herb interactions might remain high. Therefore, this study aims to compile polyherbal formulations and other folk medicine used by the healers and locals of Aurora and assess the utilization and knowledge of these indigenous practices with implications for its conservation and strengthening localized folk medicine pharmacovigilance. Through purposive and snowball sampling, a total of 23 key informants volunteered and were interviewed using semi-structured questionnaires. Knowledge and practices about medicinal plants were analyzed using descriptive statistics. A total of 34 polyherbal formulations and ten other folk medicines were recorded. Most of the plant species used belonged to the Poaceae family (14 species), Arecaceae, and Musaceae families (10 species each) and were mainly utilized for bughat, pasmo, and kabuhi-illnesses linked with cultural beliefs. The concept of synergism was also observed when it comes to folk medicine usage. It is recommended that more surveys of polyherbal medicines be conducted along with chemical profiling and pharmacological investigations, especially in the rural areas where these folk medicines are still widely utilized.

Keywords: Ethnopharmacology, herbal medicines, medicinal plants, Mindanao, rural health, survey

INTRODUCTION

In the absence of modern therapeutics, people used herbal medicines to treat and prevent diseases (Yaniv 2014). The naturally occurring compounds found in these plants have been essential for discovering novel medicine candidates even to this day (Sintar 2020). Although western medicines are now widely available, the use of medicinal plants is still increasing because of numerous reasons, including a broad spectrum of cultural and socioeconomic factors (Rondilla et al. 2021). Many studies have already shown that plants, from Abelmoschus esculentus (L.) Moench to Zingiber officinale Roscoe have various biological activities that are widely beneficial to human health (Alima and Demayo 2018; Pucot et al. 2021). Many laboratory-based assessments were conducted as a result of different ethnobotanical surveys in various local communities and indigenous groups (Prastiyananto et al. 2020; Vo et al. 2015), reiterating the importance of bioprospecting folk medicine in the drug discovery and development processes.

In the Philippines, especially in the rural areas of Mindanao, herbal medicines are still widely used for the prevention and treatment of diseases (Alduhisa and Demayo 2019; Olowa and Demayo 2015; Pucot and Demayo 2021a; Pucot et al. 2019). A recent survey in Aurora—a rural municipality in western Mindanao, showed wide patronization of folk medicines (Pucot and Demayo 2021b). These have been attributed to many factors, including rich cultural diversity and a long history of using folk medicine (https://aurorazdgs.gov.ph). Traditional healers are often consulted when locals have health concerns and commonly prescribe plants either individually or in polyherbal formulations. These formulations, however, have not been documented, and the lack of information on this indigenous knowledge might result in its eventual loss. The development of the country’s polyherbal formulations might also stagnate because of the lack of baseline data. The threat of possible herb-herb interaction and adverse effects might remain high without this baseline information.

Therefore, this study aims to compile polyherbal and other folk medicines used by the healers and locals of Aurora, Zamboanga del Sur, and assess their utilization and knowledge of this valuable indigenous knowledge with implications for its conservation and strengthening localized folk medicine pharmacovigilance.

MATERIALS AND METHODS

Study area

The research was conducted in Aurora, Zamboanga del Sur—a rural municipality in western Mindanao, Philippines

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The municipality encompasses 18,095 hectares that are distributed unevenly among its 44 barangays. The geography of the municipality is exceedingly variable, ranging from highly plain along the coastlines and lowlands to extremely steep mountains with peaks of 1000 feet above sea level. Because of its high elevation, the municipality has a cooler climate, ranging from 22 to 35 degrees Celsius (Municipality of Aurora 2014). The municipality’s vegetation is dominated by perennial trees and vine crops, followed by grazing pastures or grassland. The initial sampling was done in 14 barangays of Aurora. However, the availability of key informants was only recorded in eight barangays: (1) Acad, (2) Alegria, (3) Cabilinan, (4) Campo Uno, (5) Kahayagan East, (6) Inasagan, (7) Romarate, (8) San Jose (Figure 1).

**Ethical considerations**

The research was guided by the ISE codes of ethics (International Society of Ethnobiology 2006). The researcher also underwent a rapid COVID-19 antigen test before conducting the interviews with non-reactive results for both COVID-19 IgM and IgG tests (ACEH-RT: 2020-1533). All participants who volunteered for the study were assured that taking part or withdrawing would not affect them in any way, and their privacy and anonymity were maintained at all times, as reflected on the interview consent form. The interview was conducted in a location of the participant’s choosing, and those who could not read or write were granted an oral interview.

**Data and sample collection**

The sampling was conducted from August 2020 to March 2021, observing the health protocols laid down by the Municipal Inter-Agency Task Force for COVID-19 prevention. The study was conducted in coordination with the local government unit (LGU) under the mayor’s permit No. 3192179, the municipal Environment and Natural Resources Office (MENRO), and the Provincial Environment and Natural Resources Office (PENRO) of Zamboanga del Sur with gratuitous permit no. R9-04-2021. The sampling includes acquiring free prior informed consent, certifications, and permits, semi-structured interviews, focus group discussions, plant and field assessments, and medicinal plant identification.

*Figure 1. Sampling sites in Aurora (A), Zamboanga del Sur (B), Philippines (C)*
Polyherbal and other folk medicine data were collected through semi-structured interviews with key informants through purposive and snowball sampling. All data were encoded and analyzed using Microsoft Excel Spreadsheet Software. Key informants are identified as (i) Manambalay, a shamanistic or traditional healer; (ii) manghihilot, a masseur or masseuse; and (iii) community members who are knowledgeable about polyherbal formulations. The semi-structured questionnaire was modified and adapted from previous ethnobotany surveys (Abe and Ohtani 2013; Alduhisa and Demayo 2019; Okowa and Demayo 2015; Ong and Kim 2014) with modifications and Cebuano translations (the local language widely used in the area). Briefly, the questionnaire comprises demographic information such as name, age, sex, educational background, civil status, occupation, and contact information. Additional details such as the composition of the polyherbal formulations and local name of the plants’ used, purpose(s), the plant’s part(s) used, modes of application, quantities, frequency of administration, and the origins of herbal medicinal usage were also noted.

Plant collection and identification

Plant specimens were photographed during supervised field walks with the help of the respondents. Notes on the plants’ habits, habitat, vernacular names, and local names of their uses were also recorded. The samples were then processed for identification. The researchers initially identified the samples, and a botanist and taxonomist assisted in the final identification and validation. Plants were further validated by checking for spelling, synonyms, family classifications, and distribution using Co’s Digital Flora of the Philippines (CDFP; www.philippineplants.org) and Plants of the World Online (POWO; www.plantsoftheworldonline.org).

RESULTS AND DISCUSSION

Characteristics and polyherbal knowledge of the locals

Twenty-three respondents from Aurora, Zamboanga del Sur, were interviewed about their polyherbal and other folk medicinal practices. Of these respondents, there were more females (60.87%) than males (39.13%) and were mainly on the primary education level (56.52%). Based on these results, it can be argued that females and those with lower educational attainment are more aligned to using polyherbal formulations. Other closely related ethnobotanical studies in the country also showed that females have more knowledge of medicinal plants (Abe and Ohtani 2013; Balinado and Chan 2017; Tantengco et al. 2018). Some have also correlated higher educational attainment with lesser folk medicine knowledge (Morilla et al. 2014; Ong and Kim 2014), while others have reported otherwise (Abe and Ohtani 2013; Tantengco et al. 2018). It is crucial that more research on the differences in sociodemographic factors be conducted to further understand factors affecting indigenous knowledge transmission. On the other hand, most of the informants are farmers (43.48%), while the rest are manambalay (healers) (30.43%), manghihilot (masseur or masseuse) (8.70%), and unemployed (13.04%). The complete demographic profile of the respondents is presented in Table 1.

Knowledge of polyherbal formulations and other folk medicine amongst informants mainly came from their parents (39%), while others acquired this knowledge from their community (22%), learned it themselves (17%), learned it through their relatives (9%), or through tuga (13%)-a healing or mystical power bestowed by gods or spirits. Alarmingly, most of the folk medicines were administered internally (i.e., through drinking) (74%). The prolonged oral consumption of some herbal medicines is often correlated with toxicity and poisoning (de Oliveira et al. 2011; Ghorani et al. 2018; Ozyigit et al. 2018; Pavlova and Karadjova 2013); thus, it is recommended that local consumers observe caution when orally administering herbal products.

The medicinal plant species used in the polyherbal formulation were mainly gathered from lasang (52.17%) (forest or woods where dense plants and trees are present), while others collect them from their vicinity (30.43%) and their community (17.39%). The collection of plant materials was primarily done when the need arises (48%); however, some collect them daily (22%), weekly (9%), monthly (4%), and annually (17%). A strict specific schedule is followed in the collection of plant materials (e.g., when plant materials are used for healing purposes, the collection should always be done early in the morning when the sun has not risen yet).

| Table 1. Sociodemographic characteristics of key informants in Aurora, Zamboanga del Sur |
| --- |
| Category | Subcategory | No. of informants | % of informants |
| Location | Acad | 2 | 8.70 |
| | Alegría | 3 | 13.04 |
| | Cabilinan | 2 | 8.70 |
| | Campo Uno | 5 | 21.74 |
| | Kahayagan East | 2 | 8.70 |
| | Inasagan | 2 | 8.70 |
| | Romarate | 4 | 17.39 |
| | San Jose | 3 | 13.04 |
| Education level | No formal education | 2 | 8.70 |
| | Primary | 13 | 56.52 |
| | Secondary | 8 | 34.78 |
| Gender | Male | 9 | 39.13 |
| | Female | 14 | 60.87 |
| Occupation | Employed | 1 | 4.35 |
| | Farming | 10 | 43.48 |
| | Manambalay (healer) | 7 | 30.43 |
| | Manghihilot (masseur or masseuse) | 2 | 8.70 |
| | None | 3 | 13.04 |
| Civil Status | Married | 20 | 86.96 |
| | Single | 2 | 8.70 |
| | Widowed | 1 | 4.35 |
| Age | 35-49 years old | 4 | 17.39 |
| | 50-65 years old | 11 | 47.83 |
| | > 65 years old | 8 | 34.78 |
Moreover, the weekly collection must be done on Tuesdays and Fridays because these days are believed to have added powers to any act of shamanism and sorcery, medicinal practices, and materials used thereof. This practice was also observed in other parts of the country (Aparece 2006; Rebuya et al. 2020) and other cultures worldwide (Napoli 2008; Ugent 2000).

Furthermore, the annual collection of medicinal plants and other healing materials is usually done during the holy week. This practice is attributed to the belief that humans and gods or any spiritual entities can communicate with each other during this period; thus, prayers, healing practices, and materials conducted and collected during the holy week will be more efficacious. This practice is also heavily influenced by Christianity and its syncretism with elements of the Philippine precolonial beliefs and practices. The same practice was observed with the Lunas of Bohol (Aparece 2006), the power acquisition of local traditional healers (Necesito and Gaspan III 2019), the pangalapal of Siqijor (Bucol 2008), and even in the making of Holy anointing oil or Holy Chrism in other countries (Toma et al. 2014).

Noticably, the concept of synergism when it comes to using folk medicine was observed. This is attributed to their claims that one can combine all folk medicines as long as they are used for the same purpose. For example, a plant used as an antibacterial can be mixed with any other antibacterial plant, making it more effective and efficient in treating diseases. Further investigation should be conducted as there are possibilities of synergistic and antagonistic effects resulting from herb-herb interaction as observed in other studies (Guardo et al. 2017; Moussaoui and Alaoui 2016). Also, the concomitant use of herbal medicines with that of pharmaceutical drugs should also be investigated as it was also noted in rare cases, including the possible reactions of chemicals involved in making the herbal formulations.

Illnesses, polyherbal formulations, and other folk medicine

A total of 34 polyherbal formulations were collected in this study, as shown in Table 2. Most of the plant species used belong to the Poaceae family (14 species), followed by the Arecaceae and Musaceae families with ten species (Figure 2). Most formulations (45%) were made to treat relapse, fatigue, headache, body pain, fever, and migraine. These often simultaneously occurring illnesses are the symptoms of bughat (Unilab Incorporated 2019) and pasmo (Del Fierro and Nolasco 2013). Although bughat is usually experienced by females who have given birth (Unilab Incorporated 2019), according to the respondents, males can also experience the same, especially when they engage in highly physically demanding work shortly after or during the sickness recovery period. The same symptoms are experienced when someone is napasmo (from the root word pasmo). In the Bisaya-speaking areas, including Aurora, pasmo could have different causes and manifestations. For this study, pasmo is parallel to (Del Fierro and Nolasco 2013) definition, which is when one’s eating habits are irregular. However, according to the locals, pasmo can also be experienced when one consumes cold food and beverages or eats food considered makapasmo (can cause pasmo) when hungry, e.g., eating young coconut meat while experiencing hunger. Most of the polyherbal formulations for these illnesses are consumed internally and usually warm to attain a balance between hot and cold elements-roughly the same concept as pasma (Tan and Tan 2008). Another frequently mentioned illness is kabulti. Kabulti is described as having burning chest discomfort, bloating, burping, and sudden weakness that sometimes leads to syncope. Early reports have defined it as a pulsation that is found in the navel or hidden in the ribs and could indicate one’s body state (Rubel et al. 1975), while others describe it as gastroesophageal reflux disease (GERD) (Abatayo 2015). Nevertheless, more research into these symptoms’ clinical basis should be done to understand their causes and treatments.

Aside from polyherbal formulations, another folk medicine was also recorded in this survey, as shown in Table 3. Notably, eggs were used for treating dengue fever and symptoms of pasmo and bughat. Eggs have been considered both nutritional and functional foods with several active components, including the carotenoids lutein and zeaxanthin, which could act as antioxidants and various biological activities such as immunomodulatory and antihypertensive activities (Réhault-Godbert et al. 2019). These compounds might have caused the perceived alleviation of symptoms. The use of eggs for treatment was also recorded in other folk healers in the world, including the curanderos of the Mexican American people (Lopez 2005).

Moreover, roasting was also a popular method for preparing folk medicine, including the roasting of corn, coconut shells, and rice. Corn offers excellent health benefits, promoting postprandial glycemic or insulinemic responses, lipid metabolism, colon health, and mineral absorption (Ai and Jane 2016). Hot water with roasted corn or rice was also widely popular amongst locals as an alternative to coffee and was often promoted as a functional beverage. Compared to other belief systems, lixiviated ashes of coconut shells were also used during parem baba and after giving birth in Indonesia (Niehof 1988). It was also part of the healing practices of the Malavedan tribe (Rajasekharan 2013).
Table 2. Polyherbal medicines used by the healers and locals of Aurora, Zamboanga del Sur, Philippines

| No. | Scientific name | Family | Local name | Disease or purpose | Preparation and administration | Administration frequency/duration | Quantity or dosage |
|-----|----------------|--------|------------|-------------------|--------------------------------|----------------------------------|-------------------|
| 1   | *Eleusine indica* (L.) Gaertn. *Kyllinga nemoralis* (J.R.Forst. & G.Forst.) Dandy ex Hutch. & Dalziel *Vigna radiata* (L.) R.Wilczek | Poaceae Cyperaceae Leguminosae | Bila-bila Busikad Monggos | Relapse, fatigue, headache, body pain, fever; migraine | Drink infusion | Thrice a day before meal or as needed | ½ glass |
| 2   | *Persea americana* Mill. *Psidium guajava* L. *Chrysophyllum cainito* L. | Lauraceae Cyperaceae Sapotaceae | Abokado Bayabas Caymito | Diarrhea, stomachache, stomach problems, peptic ulcer, gas pain, flatulence, stomach acidity, burning chest, discomfort, nausea | Drink decoction | Twice a day or as needed | One glass |
| 3   | *Musa acuminata x balbisiana* *Cocos nucifera* L. | Musaceae Arecaeae | Saging kardaba Lubi (limbahon) | Relapse, fatigue, headache, body pain, fever; migraine | Drink the mixture of *Saging kardaba* petiole sap and Coconut liquid endosperm (Coconut water) with hot water. | Once a day until symptoms subside | All the sap from a palm-sized petiole and a coconut fruit |
| 4   | *Ficus septica* Burm.f *Mimosa pudica* L. *Zea mays* L. | Moraceae Fabaceae Poaceae | Lagnob kipi-kiipi Mais | Relapse, fatigue, headache, body pain, fever; migraine | Drink decoction of roots and/or shoots of *kiipi-kiipi*, *lagnob*, and roasted *mais* seeds. | Every morning before breakfast and every night before sleeping/ until symptoms subside | 1-2 glasses |
| 5   | *Gmelina arborea* Roxb. *Jatropha curcas* L. *Zingiber officinale* Roscoe | Lamiaceae Euphorbiaceae Zingiberaceae | Gemelina Tuba-tuba Luy-a | Gas pain, flatulence; arthritis, muscle pain, muscle knots, swellings, stomach acidity, burning chest discomfort, nausea | Apply heated crushed *Gmelina* leaves, *Tubata* tuba scraped bark, and pounded rhizomes of *luy-a* as poultice. | Every morning and every night before sleeping/ until symptoms subside | Entirely on the affected area |
| 6   | *Citrus maxima* (Burm.) Osbeck *Blumea balsamifera* (L.) DC. *Pseudelephantopus spinicus* (B.Juss. ex Aubl.) Rohr ex Gleason | Rutaceae Asteraceae Compositae | Buongon Gabon Dila dila sa iro | Relapse, fatigue, headache, body pain, fever; migraine | Drink decoction | Once a day or as needed | 1-2 glasses |
| 7   | *Psidium guajava* L. *Syzygium cumini* (L.) Skeels | Myrtaceae Myrtaceae | Bayabas Lumboy | Diarrhea and stomachache | Drink decoction | Twice a day or as needed | 1-2 glasses |
| No | Plant Name | Family | Part(s) Used | Condition(s) | Application | Frequency | Note |
|----|------------|--------|--------------|--------------|-------------|-----------|------|
| 8  | Musa textilis Née | Musaceae | Abaka | Relapse, fatigue, headache, body pain, fever; migraine | Drink sap from the heated center portion of three palm-sized petioles of each plant. | Once a day or as needed | All sap from one palm-sized petiole of each plant |
| 8  | Corypha utan Lam. | Arecaceae | Buli |  |  |  |  |
| 8  | Musa acuminata x balbisiana | Musaceae | Saging |  |  |  |  |
| 8  | Musa sp. | Musaceae | Saging bulongan |  |  |  |  |
| 9  | Momordica charantia L. | Cucurbitaceae | Ampalaya | Flatulence, fatigue, relapse, headache, body pain, fever, muscle knots, muscle spasm, muscle pain, swellings, stomach acidity. Burning chest discomfort, nausea | Mix *sili* fruit, *ampalaya* crushed and heated leaves, and coconut oil and apply as a massage oil | As needed | Entirely on the affected area |
| 9  | Capsicum annuum L. | Solanaceae | Sili |  |  |  |  |
| 9  | Cocos nucifera L. | Arecaceae | Lubi |  |  |  |  |
| 10 | Pseudelephantopus spicatus (B.Juss. ex Aubl.) Rohr ex Gleason | Compositae | Dila dila sario | Flatulence, stomachache, diarrhea, dysmenorrhea, stomach acidity | Apply heated and crushed roots and/or shoots of each plant as a poultice. | As needed | Entirely on the affected area |
| 10 | Chromalena odorata (L.) R.M. King & H.Rob. | Asteraceae | Hagonoy |  |  |  |  |
| 10 | Blumea balsamifera (L.) DC. | Asteraceae | Gabon |  |  |  |  |
| 11 | Eleusine indica (L.) Gaertn. | Poaceae | Bila bila | Fever, teething child | Drink warm water infused with the respective plant’s part | As needed | ½ glass |
| 11 | Vigna radiata (L.) R.Wilczek | Leguminosae | Monggos |  |  |  |  |
| 11 | Kyllinga nemoralis (J.R.Forst. & G.Forst.) Dandy ex Hutch. & Dalziel | Cyperaceae | Busikad |  |  |  |  |
| 11 | Blumea balsamifera (L.) DC. | Asteraceae | Gabon |  |  |  |  |
| 11 | Euphorbia hirta L. | Euphorbiaceae | Tawa-tawa, mangagaw |  |  |  |  |
| 12 | Jatropha curcas L. | Euphorbiaceae | Tuba-tuba | Maternal care, postpartum recovery, labor enhancer | Mix coconut oil with *tuba-tuba* scraped bark, *luy-a* crushed rhizome, and *tabako* pounded leaves, and apply as a poultice or as a massage oil. | As needed | Entirely on the affected area |
| 12 | Zingiber officinale Roscoe | Zingiberaceae | Luy-a |  |  |  |  |
| 12 | Nicotiana tabacum L. | Solanaceae | Tabako |  |  |  |  |
| 12 | Cocos nucifera L. | Arecaceae | Lubi |  |  |  |  |
| 13 | Myristica simiarum A. DC. | Myristicaceae | Duguan, dugusay | Relapse, fatigue, headache, body pain, fever; migraine | Drink the mixture of decocted *Duguan* bark (1-3 palm-sized bark), *Saging kardaba* roots, and *gaan-gaan* roots with coconut water | Once a day or as needed | 1-2 glasses |
| 13 | Musa acuminata x balbisiana | Musaceae | Saging |  |  |  |  |
| 13 | Cocos nucifera L. | Arecaceae | Lubi (limbahon) |  |  |  |  |
| 13 | Flemingia strobilifera (L.) W.T.Aiton | Leguminosae | gaan-gaan |  |  |  |  |
| No. | Plant Name | Family | Common Name | Part(s) Used | Use(s) |
|-----|------------|--------|-------------|-------------|--------|
| 14  | *Blumea balsamifera* (L.) DC. | Asteraceae | Gabon | Cough, fever, chills | Lf | E Apply as a poultice on the chest, forehead, and other parts of the body | As needed | Entirely on the affected area |
| 15  | *Corypha utan* Lam. | Arecaceae | Buli | Relapse, fatigue, headache, body pain, fever; migraine | Sp | I Drink the sap from the heated center portion of three palm-sized petioles of each plant. | Once a day or as needed | All extracted sap |
| 16  | *Musa acuminata* Colla | Zingiberaceae | Luy-a | Diabetes | Lf | I Drink water infusion | Once a day or as needed | ½-1 glass |
| 17  | *Bidens pilosa* L. | Asteraceae | Tuway-tuway, Tulay-tulay | Relapse, fatigue, headache, body pain, fever; migraine | Rt | I Drink decoction | Once a day or as needed | One glass |
| 18  | *Heliotropium indicum* L. | Boraginaceae | Elepanteng puti | | | | |
| 19  | *Corchorus olitorius* L. | Malvaceae | Saluyot Okra | | | | |
| 20  | *Persea americana* Mill. | Lauraceae | Abokado buongon | Relapse, fatigue, headache, body pain, fever; migraine | Lf | I Drink decoction | Once a day or as needed | 1-2 glasses |
| No. | Plant Name (Family) | Local Name | Medicinal Use | Part Used | Method | Dosage |
|-----|---------------------|------------|---------------|-----------|--------|--------|
| 21  | Pterocarpus indicus Willd. | Leguminosae | Nara | Leukemia | Brk | Drink decoction | Every morning and every night before sleeping/ until symptoms subside |
| 21  | Vitex parviflora A.Juss. | Lamiaceae | Tugas | | | |
| 21  | Lagerstroemia speciosa (L.) Pers. | Lythraceae | Banaba | | | |
| 22  | Cordia dichotoma G. Forst. | Boraginaceae | Anonang | Diarrhea, gastrointestinal problems, stomach acidity, burning chest discomfort, nausea | Brk | Drink decoction | Twice a day or as needed |
| 22  | Ficus septica Burm.f | Moraceae | Lagnob | | | 1-2 glasses |
| 23  | Cordia dichotoma G. Forst. | Boraginaceae | Anonang | Relapse, fatigue, headache, body pain, fever; migraine | Brk | Drink decoction | Twice a day or as needed |
| 23  | Ficus septica Burm.f | Moraceae | Lagnob | | | One glass |
| 23  | Dendrocnide meyeniana (Walp.) Chew | Urticaceae | Alingatong kahoy | | | |
| 23  | Leucozyke capitellata (Poir.) Wedd. | Urticaceae | Lagasi | | | |
| 23  | Sonneratia caseolaris (L.) Engl. | Lythraceae | Pagatpat | | | |
| 24  | Chrysopogon aciculatus (Retz.) Trin. | Poaceae | Amorsiko | Hypertension | Wh | Drink decoction | Once a day or as needed |
| 24  | Bambusa bambos (L.) Voss | Poaceae | Kawayan | | | One glass |
| 24  | Mimosa pudica L. | Fabaceae | Kipi-kipi, hibi-hibi, makahiya | | | |
| 25  | Sida acuta Burm.f. | Malvaceae | Iskobang mayawis | Muscle knots, muscle spasm; bruise, sprains, strains, fracture, and dislocation | Rt | Apply crushed and heated plant parts as a poultice | As needed |
| 25  | Justicia gendarussa Burm.f | Acanthaceae | Mandalusa | | | Entirely on the affected area |
| 25  | Blumea balsamifera (L.) DC. | Asteraceae | Gabon | | | |
| 25  | Nicotiana tabacum L. | Solanaceae | Tabako | | | |
| 26  | Imperata cylindrica (L.) R. Raesch. | Poaceae | Kugon | Relapse, fatigue, headache, body pain, fever; migraine | Lf | Drink infusion | Once a day or as needed |
| 26  | Kyllinga nemoralis (J.R.Forst. & G.Forst.) Dandy ex Hutch. & Dalziel | Cyperaceae | Busikad | | | 1-2 glasses |
| 26  | Corypha utan Lam. | Areceae | Buni | | | |
| 26  | Eleusine indica (L.) Gaertn. | Poaceae | Bila-bila | | | |
| 27  | Cordia dichotoma G. Forst. | Boraginaceae | Anonang | Relapse, fatigue, headache, body pain, fever; migraine | Rt | Drink decoction | Once a day or as needed |
| 27  | Cordia dichotoma G. Forst. | Areceae | Buni | | | 1-2 glasses |
| 27  | Lygodium circinatum (Burm. f.) Sw. | Lygodiaceae | Nito | | | |
| No. | Plant Name | Family | Part(s) Used | Condition(s) | Directions | Frequency/Duration | Notes |
|-----|------------|--------|--------------|--------------|------------|-------------------|-------|
| 28  | *Blumea balsamifera* (L.) DC. | Asteraceae | Lf | Cough, chills, fever | Drink decoction | Every morning or as needed | 1-2 glasses |
|     | *Vitex negundo* L. | Lamiaceae | Lf | | | | |
|     | *Coleus amboinicus* Lour. | Lamiaceae | Lf | | | | |
| 29  | *Ficus minahassae* (Teijm. & Vriese) Miq. | Moraceae | Rt | Relapse, fatigue, headache, body pain, fever; migraine | Drink decoction | Twice a day or as needed | 1/2 glass |
|     | *Ficus septica* Burm.f | Moraceae | Lf | | | | |
| 30  | *Musa acuminata* Colla | Musaceae | Pt | Scabby lesion, scabies, skin diseases, itchiness, eczema, ringworms, dermatitis, | Mix extracts and apply to the affected area | Thrice a day or as needed | Entirely on the affected area |
|     | *Plectranthus scutellarioides* (L.) R.Br. | Lamiaceae | Lf | | | | |
| 31  | *Zea mays* L. | Poaceae | Se | Relapse, fatigue, headache, body pain, fever; migraine | Drink decoction of *buongon, gabon,* and *hilbas leaves* together with whole *bila-bila* plant and roasted *mais* seeds. | Once a day or as needed | One glass |
|     | *Citrus maxima* (Burm.) Osbeck | Rutaceae | Lf | | | | |
|     | *Blumea balsamifera* (L.) DC. | Asteraceae | Lf | | | | |
|     | *Psidium guajava* L. | Myrtaceae | Lf | | | | |
|     | *Artemisia vulgaris* L. | Compositae | Lf | | | | |
|     | *Eleusine indica* (L.) Gaertn. | Poaceae | Wh | | | | |
|     | *Cocos nucifera* L. | Areceae | Sh | | | | |
| 32  | *Musa acuminata* Colla | Musaceae | Pt | Teething baby, gum problems | Pound *saging murado* petiole, *salimbagat* leaves, and one teaspoon of salt and apply to affected gums | Every morning until symptoms subsides | Entirely on the affected area |
|     | *Thottea affinis* (Planch. ex Rolfe) med. | Aristolochiaceae | Lf | | | | |
|     | Sodium chloride or salt | | | | | | |
| 33  | *Corypha utan* Lam. | Areceae | Sp | Relapse, fatigue, headache, body pain, fever; migraine | Drink the sap from the heated center portion of three palm-sized petioles of each plant | Once a day or as needed | All extracted sap |
|     | *Musa spp.* | Musaceae | Sp | | | | |
|     | *Zea mays* L. | Poaceae | Sh | Relapse, fatigue, headache, body pain, fever; migraine | Drink water infused with roasted *lagnob* shoots, and starchy water from boiling rice | Every morning for three days/ until symptoms subsides | 1/2 glass |
|     | *Ficus septica* Burm.f | Moraceae | Lf | | | | |
|     | The starchy water from boiling or cooking rice | | | | | | |

Note: 1PP: Plant-parts used: Brk: bark; Fr: fruit; Lf: leaves; Pt: petiole; Rt: roots; Rz: rhizome; Se: seeds; Sh: shoots; Sp: sap; St: stem; Wh: whole plant. 1I: internal; E: external
| No. | Scientific name/ English name or translation | Local name | Disease or purpose | Preparation and administration | Frequency/duration | Quantity/dosage |
|-----|---------------------------------------------|------------|--------------------|---------------------------------|--------------------|-----------------|
| 1   | Philippine native chicken undercooked egg | Malasadong itlog sa manok | Relapse, fatigue, headache, body pain, fever; migraine | Eat undercooked egg directly | Every morning before meal for three days/ until symptoms subside | One whole egg |
| 2   | Uncooked quail egg | Itlog sa pugo | Dengue fever | Ear raw egg directly | Every morning before meal for three days/ until symptoms subside | One whole egg |
| 3   | Roasted coconut shell | Bagol paigon | Relapse, fatigue, headache, body pain, fever; migraine | Drink water infused with roasted coconut shell | Every morning before a meal until symptoms subside | $\frac{1}{2}$-1 glass |
| 4   | Earthworm feces | Tae sa wati paigon | Relapse, fatigue, headache, body pain, fever; migraine | Drink water infused with earthworm feces | Only once or as needed | $\frac{1}{2}$ glass |
| 5   | Softdrinks | Softdrinks | Relapse, fatigue, headache, body pain, fever; migraine | I; Mix ice into a boiling hot mixture of soft drinks and roasted rice and inhale the steam; Apply the moisture from the boiling mixture of soft drinks and roasted rice on the patient’s back | Every night before sleeping for three days; As needed | Entirely on the affected area |
|     | Ice | Ice | | | | |
|     | Roasted rice | Pinaig na bugas humay | | | | |
| 6   | Brown sugar | Sentral | Nausea, Diarrhea | Drink a mixture of 1-3 tablespoons of caramelized brown sugar and a cup of water. | As needed | One glass |
| 7   | Soil | Yuta | Goiter | Apply on the neck a handful of soil collected a foot deep from the ground. | Every morning thrice a week or as needed | The process is done to prevent goiter from developing, so it is a life-long treatment. |
| 8   | Three strands of human hair | Tulo ka grano sa buhok Mais pinaig | Relapse, fatigue, headache, body pain, fever; migraine | Drink water infused with three strands of human hair and roasted corn | Every morning for three days or as symptoms subside | 1/2 glass |
| 9   | Artemisia vulgaris L. | Hilbas Mais pinaig | Relapse, fatigue, headache, body pain, fever; migraine | Drink decoction of hilbas leaves and roasted corn mixed with egg | Every morning for three days or as symptoms subside | 1/2-1 glass |
| 10  | Philippine native chicken egg | Itlog bisaya | Mental disorder or distress | Tie the person on the doldol tree | A week or as needed | |

Note: I: internal; E: external
Bioprospecting and pharmacovigilance of polyherbal and other folk medicine

Previous studies have investigated individual plants’ bioactive compounds, including their in vitro and in vivo pharmacological activities (He et al. 2007; Alima and Demayo 2018; Pucot and Demayo 2021a; Pucot et al. 2021). Polyherbal formulations, however, were not emphasized because of their complex synergistic and antagonistic effects and structural diversity (Li and Lou 2017; Abdalla and Mühling 2019). Nevertheless, some were able to utilize the enormous potential of polyherbal medicines, which have shown promising health benefits. An example is the polyherbal formulation Diasulin that is used for its anti-diabetic efficacy. Diasulin is a polyherbal drug composed of ethanolic extracts from ten medicinal plants, which shows a significant decrease in blood glucose, tissue lipids, lipid peroxide formation, and increased plasma insulin (Ghorbani 2014).

In this study, the most frequently mentioned polyherbal formulations were the ABC or the Abokado (P. americana), Bayabas (P. guajava), and Caimito (C. caimito) formulations. It is primarily used for problems of the digestive system. Previous reports have shown that P. americana and P. guajava have anti diarrheal activities (Adeniyi et al. 2020; Santhoshkumar et al. 2014) while C. caimito had antialcuer effects (da Rosa et al. 2019). However, there is currently no data on the effects of these plants when combined, and the mechanisms of action are still unknown. Thus, it is recommended that this polyherbal formulation be investigated further along with other formulations reported in this study.

Studies concerning polyherbal formulations, including surveys and laboratory assays, should be done not only for bioprospecting but also for strengthening herbal medicines’ pharmacovigilance. With this, various parameters, including the pharmacokinetic (PK)-pharmacodynamics (PD) of the interaction between polyherbal medicines and pharmaceutical drugs, should also be conducted as there are instances where these medicines are used concomitantly (e.g., warfarin and herbal medicine (Choi et al. 2017)). Adverse drug reactions have become a significant global public health problem which comprises 6.7% of all hospitalizations in selected regions of the world, and the number is still rising (Gromek et al. 2015). This calls for a systematic and more detailed ADME/Tox and chemical profiling of herbal medicines along with surveys in many rural areas like Aurora and indigenous people-inhibited areas where these folk medicines are still widely utilized.

The study reported the first survey of polyherbal medicines in western Mindanao, Philippines. In conclusion, it recorded 34 polyherbal formulations and ten other folk medicines utilized by healers and locals to prevent and treat diseases. These medicines were commonly used to treat bughat, pasmo, and kabuhi, which might imply that these diseases are currently widespread in the area; thus, should be further investigated. Through this survey, a snippet of the country’s indigenous knowledge of plant utilization and knowledge of folk medicine has been documented, which offers vast opportunities for further pharmacological research and leads to discovering novel bioactive compounds with implications for its conservation. The survey’s output also reiterates the need to document folk medicines in rural-most areas and indigenous people-inhabited areas where pharmacovigilance should also be given importance to avoid detrimental effects of toxic components of some herbal medicines on human health.
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