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RESEARCH ARTICLE

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Ethnobotanical documentation of medicinal plants used by the *Ati* tribe in Malay, Aklan, Philippines

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ABSTRACT

Aim: The aim of this study was to document the ethnobotanical knowledge of the indigenous *Ati* tribe in Brgy. Cubay Sur, Malay, Aklan, Philippines.

Methods: Semi-structured interviews were conducted in March 2019 to 31 purposively selected key informants to determine the therapeutic use of medicinal plants in their traditional medicine. Different indices such as Use Value (UV), Informant Consensus Factor (ICF), and Fidelity level (FL) were used to determine the plant importance.

Results: A total of 106 medicinal plant species in 48 families and 95 genera were used by the *Ati* to treat 62 diseases across 14 categories. The family Asteraceae was best represented with 10 species, followed by Lamiaceae with 8, and Apocynaceae and Poaceae with 6 species each. The most frequently used plant parts were leaves and roots while the most common mode of preparation was decoction. Plants with the highest UV were *Musa paradisiaca* for treating fever and headache, *Blumea balsamifera* for cough, and *Plectranthus scutellarioides* also for fever and headache. The highest ICF value was cited in the category 9, diseases of the visual system with *Euphorbia hirta* (90% FL) as frequently used species for treating sore eyes.

Conclusion: This documentation of ethnobotanical plants used by the *Ati* showed their rich and diverse traditional practices in addressing their primary health care needs. This also serves as a basis for further pharmacological research in drug discovery and formulation.

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Aklan, *Ati*, ethnobotany, medicinal plants, indigenous knowledge, Philippines

INTRODUCTION

About 80% of the of World Health Organization (WHO) member states and 91% of the countries in South-east Asia used traditional and complementary medicine for primary health care services. The use of herbal medicines is one of the most common forms of practice after acupuncture. In the Philippines, there are 16,690 medicinal plants and 66 healing practices and rituals documented across the country [1]. The use of medicinal plants by the Filipinos started in the pre-colonial period [2] and the customary practice is significantly important especially in geographically isolated areas where prescribed medicines are limited and expensive, and primary health care services is inaccessible [3].

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The Negritos are believed to be the earliest inhabitants of the Philippines, scattered in every major islands and are known in different names. In Western Visayas, the Negritos are called "*Ati*". They build simple houses and [4] live in wandering bands [5]. They settled in the mountainous areas of the region. Hunting and trapping is the major form of their livelihood. But in the recent years, they adopted a semi-sedentary life and worked as farmers or laborers in the lowlands. Gathering and selling of medicinal plants also play a significant role in their source of income. They sell their medicinal plants to the Christian community in towns and the herb doctor "*arbularyo*(male)/*arbularya*(female)" sometimes travel to nearby islands. The chieftain or the headman is responsible for the peacekeeping while the council of elders is consulted in important decision-making in their tribe [6]. Gathering, selling, and trading of medicinal plants are part of the *Ati* tradition in the Visayas region [7-8]. However, there are only limited studies or documentation conducted on the medicinal plants used by the *Ati* in Western Visayas [6,8-12] and no ethnobotanical study has been conducted in the *Ati* tribe in mainland Malay, Aklan.

The province of Aklan is one of the six provinces in Western Visayas. It has a total land area of 181,789 hectares (ha) and 41% (74,994 ha) of which is classified as a forestland. It has 46,650 ha of protection forest and 8,344 ha production forest [13]. The province has a relative dry season from the months of November to April and wet season for the rest of the year. It is famous for the "*Ati-Atihan*" festival and the Boracay Island which is a prime tourist destination. The town of Malay is situated in the northwestern part of the province and considered as a first class municipality and the tourism capital of the province [14]. The *Ati* communities in Aklan comprised a small percentage of the total population of the province. Their communities can be found in the towns of Buruanga, Nabas, and Malay [15].

Indigenous peoples have diverse knowledge about the traditional medicine and one of the bases is the use of the medicinal plants. They have rich cultural heritage regarding the use of medicinal plants in treating various sickness and diseases. Most of this knowledge handed to the next generation verbally and therefore it is urgent to document the information before they are forgotten. It is also important to properly document this traditional knowledge because of environmental crisis and disappearance of the cultures. This present study documents the ethnobotanical knowledge and practices used by the *Ati* tribe in Brgy. Cubay Sur, Malay, Aklan.

MATERIALS AND METHODS

Study site and permits

The study was conducted in the Malaynon *Ati* Tribe in Brgy. Cubay Sur, Malay, Aklan, in Western Visayas which lies between $11^0$54'9" N and $121^0$55'53'E (Figure 1). The barangay is situated in the northern part of the town of Malay. The chosen site was officially recommended by the National Commission on Indigenous Peoples (NCIP), Antique/Aklan Community Service Center (ACSC) as a community that still uses medicinal plants as a primary therapeutic resource. There are 179 families with 304 individuals living harmoniously in the tribe as of December, 2018 [16]. Certification Precondition (CP) Control No. R6-2019-04-028 was issued by the NCIP-Region VI/VII in compliance with Section 59 of the Philippine Constitution Republic Act No. 8371, otherwise known as "The Indigenous Peoples Rights Act (IPRA) of 1997", and NCIP Administration Order 1, Series of 2012 also known as the "The Indigenous Knowledge Systems and Practices (IKSPs) and Customary Laws (CLs) Research Documentation Guidelines of 2012". The study was satisfactorily complied with the requirements based on the validation report by the ACSC. Several meetings were conducted such as: pre-free and prior informed consent (FPIC) conference; disclosure conference with the indigenous peoples community and presentation of application; community decision meeting; and memorandum of agreement (MOA) preparation and signing prior for the issuance of the CP. Wildlife gratuitous permit no. R6-2019-006 was also issued by the Department of Environment and Natural Resources (DENR) Region-VI in the course of the study.

DATA COLLECTION

Informant's questionnaire and sampling

A semi-structured questionnaire was prepared for the interview of the informants. It was reviewed and ethically approved by the University of Santo Tomas Graduate School Ethics Review Committee (GS-2017-PN 146). The questionnaire was prepared in *Kiniray-a*, an Ilonggo/Hiligaynon dialect which the informants can understand and with English translation. A purposive sampling was used to survey the sample informants. The informants were identified by the tribal chieftain and by the council of elders. They were composed of *arbularyo, arbularya*, chieftain, council of elders, and other members of the community who have the knowledge and experience of the use of traditional medicinal plants. The list of informants was finalized during the MOA preparation and signing. A total of 31 informants, about 10% of the *Ati* population in the tribe were interviewed at their own convenience. The interviews were conducted in March 1-24, 2019. The informants were asked

about their personal information and the medicinal plants they used when they experienced any health related problems or conditions. Information about the plant parts used, the mode of preparation, the form of administration, and side effect if there is any were also documented. All mathematical analyses were conducted using Microsoft Excel 2010 software package.

Plant collection, preparation of voucher specimens, and identification

Collections of plant samples were conducted with the aid of the informants when possible or with the *albularyo, albularya*, or other members of the tribe knowledgeable on the identification of medicinal plants. For collecting medicinal plants, 2-3 branches preferably with reproductive parts were obtained. Each branch was inserted inside a newspaper and positioned in a way that best represent the plant in the wild. The pressed plant specimens were then placed in a polyethylene bags and added with denatured alcohol to preserve the plants for further processing. The specimens were then transferred in another newspaper and placed in a plant presser for drying. Pressed and dried plants were later mounted on herbarium sheets along with documentation labels. The herbarium specimens were deposited at the University of Santo Tomas Herbarium-(USTH). The identification of the collected specimens were done using different online databases such as PhytoImages [17], Stuartxchange [18], Plants of the World online [19], Co's Digital Flora of the Philippines [20], and verified by Danilo Tandang, a botanist at the Philippine National Herbarium. For the validation of scientific and family names, The Plant List [21], World Flora Online [22], and Tropicos [23] were used.

Medicinal plants data analyses

Use categories

The information of the medicinal plants used by the *Ati* was grouped into 23 categories adapted from the International Classification of Diseases (ICD-11-Mortality and Morbidity Statistics) by the World Health Organization [24]. The categories are the following: 1.) Certain infectious or parasitic diseases; 2.) Neoplasms; 3.) Diseases of the blood or blood-forming organs; 4.) Diseases of the immune system; 5.) Endocrine, nutritional or metabolic diseases; 6.) Mental, behavioural or neurodevelopmental disorders; 7.) Sleep-wake disorders; 8.) Diseases of the nervous system; 9.) Diseases of the visual system; 10.) Diseases of the ear or mastoid process; 11.) Diseases of the circulatory system; 12.) Diseases of the respiratory system; 13.) Diseases of the digestive system; 14.) Diseases of the skin; 15.) Diseases of the musculoskeletal system or connective tissue; 16.) Diseases of the genitourinary system; 17.) Conditions related to sexual health; 18.) Pregnancy, childbirth or the puerperium; 19.) Certain conditions originating in the perinatal period; 20.) Developmental anomalies; 21.) Symptoms, signs or clinical findings, not elsewhere classified; 22.) Injury, poisoning or certain other consequences of external causes; and 23.) External causes of morbidity or mortality.

Use report

Use report was used when a medicinal plant species was mentioned by the informant during the interview. The use of single use report was considered even an informant cited the medicinal plant to treat various diseases in the same category [24]. When two or more informants mentioned a specific plant for a specific treatment, it was considered a multiple use-report [12,26].

Use value

Use value (UV) was used to evaluate the relative importance of the medicinal plant species using the formula: $UV=U/N$, where U is the number of use report/s mentioned by each informant for a particular species, and N is the total number of informants. High value indicates a potential high importance of the medicinal plant species [27]. It does not confer if a plant is used for single or multiple treatments [26].

Fidelity Level

Fidelity level (FL) was used to determine the percentage of the most frequently used medicinal plant species for treating a specific illness [28]. It is computed using the formula: $FL=(Np/N)x100$, where Np is the number of informant/s that cited a medicinal plant species to treat for a specific illness, and N is the total number of informants claiming the use of medicinal plants to treat any given illness.

Informant Consensus Factor

Medicinal plants that are frequently used by indigenous peoples are culturally important plants, while those plants that are mentioned by two or less informants are known to be less important cultural plants [29]. To identify the potentially effective medicinal plants, an "informant consensus" method based on the study of Trotter and Logan [30] and modified by Heinrich *et al.,* [29] was used. The informant consensus factor (ICF) was calculated using the formula: $ICF=Nur-Nt/(Nur-1)$, where Nur is the number of use-reports in each category, and Nt is the number of taxa or species used. The product ranges from 0 to 1 and the higher the value indicates that few medicinal plant species are being used by the informants and low value indicates high number of informants used many different species for the treatment of a given ailments.

Table 1. Sociodemographic profile of the informants in Malay, Aklan

Social Group	Variables	No. of Informants (*n*=31)	Percentage
Sex	Female	26	84
	Male	5	16
Age	25 - 40	3	10
	41 - 55	9	29
	56 - 70	10	32
	≥71	9	29
Education	No formal education	10	32
	Elementary	14	45
	Secondary	2	6
	Tertiary	5	16
Civil Status	Single	2	6
	Married	21	68
	Widowed	8	26
Occupation	*Albularyo/Albularya*	3	10
	Farmer	3	10
	Housewife	13	42
	Employed	4	13
	Self-employed	8	26

Figure 1. Map of the study site (star indicates the location of the tribe) (Google Maps, 2020).

Table 2. Medicinal plants used by the *Ati* in Brgy. Cubay Sur, Malay, Aklan, Philippines

Plant No.	Scientific Name	Family Name	Local Name	Use Report	Use Value[a]	Plant Part/s Used[b]	Disease or Purpose	Preparation and Administration[c]
1	*Andrographis paniculata* (Burm.f.) Nees	Acanthaceae	Marabilos	7	0.23	Lf, Rt	Urinary tract infection, stomachache, abortifacient, muscle pain	I Drink leaf or root decoction
2	*Justicia gendarussa* Burm.f.	Acanthaceae	Bunlaw	4	0.13	Lf	Headache	E Apply on the forehead
						Lf	Postpartum care and recovery	E Boil with #26, #36, #82, #83 or #61 and use for bathing
3	*Pseuderanthemum carruthersii* (Seem.) Guillaumin	Acanthaceae	Pasaw	9	0.29	Lf	Headache, fever	E Apply on the forehead and on chest or stomach
4	*Pseuderanthemum* sp.	Acanthaceae	Panit-panit it manok	1		Lf	Skin eruptions, skin allergy	E Apply as poultice
5	*Sanchezia speciosa* Leonard	Acanthaceae	Pasaw-pasaw	5	0.16	Lf	Headache, fever	E Apply on the forehead
6	*Allium sativum* L.	Amaryllidaceae	Ahos/ Bawang	4	0.13	Bl	Dizziness	I Add in hot water and drink
						Bl	Anti-rabies	E Apply as poultice with #86
						Bl	Hypertension	I Put inside the mouth
7	*Anacardium occidentale* L.	Anacardiaceae	Kasoy	3	0.1	Fr, Bk	Diarrhea	I Eat fresh fruit; Scrape inner bark and drink extract
8	*Mangifera indica* L.	Anacardiaceae	Mangga	2	0.06	Lf	Postpartum care and recovery	E Boil with #83, #95 for body steaming
9	*Anaxagorea luzonensis* A.Gray	Annonaceae	Balikaskasa	2	0.06	Bk	Epilepsy, nervousness	I Infuse dried bark in gin with #13, #14, #69, #82, #100 and drink
						Bk	Asthma, stomach ulcer	I Drink decoction
10	*Annona muricata* L.	Annonaceae	Bana-bana	7	0.23	Lf	Kidney problems, urinary tract infection, goiter, anthelmintic	I Drink decoction
						Lf	Muscle pain	E Apply as poultice

11	*Uvaria* sp.	Annonaceae	Banawak	3	0.1	St	Muscle pain	I	Drink decoction
12	*Centella asiatica* (L.) Urb.	Apiaceae	Yahong-yahong	2	0.06	Wp	Fever, measles	I	Boil alone or with #51 and #85 and drink decoction
13	*Alstonia scholaris* (L.)R. Br.	Apocynaceae	Bita	4	0.13	Bk	Epilepsy, nervousness	I	Infuse dried bark in gin with #9, #14, #69, #82, #83, #100 and drink
						Bk	Postpartum care and recovery, diarrhea	I	Drink decoction
14	*Alstonia* sp.	Apocynaceae	Ugayan	1		Bk	Epilepsy, nervousness	I	Infuse dried bark in gin with #9, #13, #69, #82, #100 and drink
15	*Catharanthus roseus* (L.) G.Don	Apocynaceae	Rosas pinggan	7	0.23	Fl, Rt	Contraceptive, menstrual problems, uterine cancer, cyst, goiter	I	Add flower in hot water and drink; Drink root decoction
16	*Parameria laevigata* (Juss.) Moldenke	Apocynaceae	Tagulaway	2	0.06	St	Skin eruptions, cuts, wounds	E	Apply stem latex; Infuse in #21 oil and apply
17	*Tabernaemontana pandacaqui* Lam.	Apocynaceae	Alibotbot	13	0.42	Lf	Headache, dizziness	E	Apply on the forehead or temple
						Lf	Postpartum care and recovery	E	Apply heated leaves on the stomach area
						Lf, Rt	Diarrhea, stomach problems, vomiting	E / I	Crush leaves with #26 or #99, #102 and rub extract on the stomach; Drink root decoction
						St, Lf	Cuts, wounds, abscess	E	Apply stem or leaf latex
18	*Voacanga globosa (Blanco) Merr.*	Apocynaceae	Alibotbot (baye)	1		St, Lf	Cuts, wounds	E	Apply stem or leaf latex
19	*Aglaonema commutatum* Schott	Araceae	Saging-saging	1		Lf	Thrush	E	Rub with salt and apply on the stomach
20	*Homalomena philippinensis* Engl.	Araceae	Payaw	4	0.13	Lf	Fever, dizziness	E	Apply on the forehead
						Pt	Running nose	E	Slice petiole and use as a necklace for infants
21	*Cocos nucifera* L.	Arecaceae	Niyog	13	0.42	Fr	Spasm, cough	I	Grill young fruit at night and drink its water in the morning
						Fr	Headache, fever	E	Scrape young shell and burn as incense; Process into vinegar and rub in the whole body
						Fr	Urinary tract infection	I	Drink coconut water

						Fr	Cuts, wounds, skin eruptions, spasm	E	Process into oil then mix with #16 or #40, #47 or #52 or #105 and apply
						Fr	Hair growth enhancer	E	Process into oil then mix with #71 and apply after bath
22	*Areca catechu L.*	Arecaceae	Bunga	1		St	Anthelmintic	I	Eat cabbage with #35
23	*Sansevieria trifasciata* Prain	Asparagaceae	Tigre-tigre	1		Lf	Warts	E	Apply leaf latex
24	*Artemisia vulgaris* L.	Asteraceae	Helba singa-singa	12	0.39	Lf	Fever, headache, dizziness	E	Pound with #60, #81, #83, #89, #106 and rub extract on the body
						Lf	Stomachache, Bloated stomach	E	Apply or rub heated crushed leaves on the stomach
						Lf	Cough	E	Rub crushed leaves on the body or add sugar in extract and drink
25	*Ayapana triplinervis* (Vahl) R.M.King & H.Rob.	Asteraceae	Ayupana	3	0.1	Lf	Stomachache, fever, asthma	E	Apply crushed leaves on the stomach; Apply extract on the body
26	*Blumea balsamifera* (L.) DC	Asteraceae	Ililibhon/ Alibhon	24	0.77	Lf, Rt	Cough, urinary tract infection, stomach ulcer	I	Eat young leaves; Drink roots/leaves decoction
						Lf	Fever, headache	E	Pound with #33, #43, #48, #60, #81, #83 or #58, #79 or #106 and rub extract on the body
						Rt	Spasm	I	Boil alone or with #62, #72, #73, #83, #89, #93 and drink decoction
						Lf	Postpartum care and recovery	E	Boil with #2, #36, #82, #83 or #61 and use for bathing
						Lf	Stomachache, diarrhea, vomiting	E	Pound with #17 or #102 and rub extract on the stomach
						Lf	Cuts, wounds	E	Apply crushed leaves
27	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Kipot-kipot	1		Lf	Cuts, wounds	E	Apply heated crushed leaves
28	*Chromolaena odor ata* (L.) R.M.King & H.Rob.	Asteraceae	Hagonoy	6	0.19	Lf	Cuts, wounds	E	Apply crushed leaves or mix with #58 and #77
29	*Cyanthillium cinereum* (L.) H.Rob.	Asteraceae	Bitsin-bitsin	10	0.32	Lf	Cuts, wounds	E	Apply crushed leaves

30	*Elephantopus tomentosus* L.	Asteraceae	Dila-dila	2	0.06	Lf	Diarrhea, stomach ulcer	I	Drink decoction; Pound and rub extract on the stomach
31	*Gynura procumbens* (Lour.) Merr.	Asteraceae	Asintaba	2		Lf	Hypertension	I	Eat fresh leaves
32	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae	Silhig-silhig	4	0.13	Rt, Lf	Diarrhea, vomiting, fever	I	Drink decoction
33	*Wollastonia biflora* (L.) DC.	Asteraceae	Hagonoy sa baybay	3	0.1	Lf	Headache, fever, spasm	E	Pound alone or with #26, #43, #48, #60,#81, #83 or with #58 and rub extract on the body
34	*Heliotropium indicum* L.	Boraginaceae	Makabra/Kamra-kamra	3	0.1	Lf	Diarrhea, bloated stomach	E / I	Boil with #60, #99 and drink decoction; Crush with #99 and apply on the stomach
35	*Ananas comosus* (L.) Merr.	Bromeliaceae	Pinya	3	0.1	Fr	Anthelminthic	I	Eat fresh fruit with #22
						St	Spasm	I	Drink stem decoction; Pound fruit and apply extract
36	*Canarium* sp.	Burseraceae	Salong	3	0.1	St	Postpartum care and recovery	I / E	Wrap resin with #81, boil and drink decoction or heat resin with #81 and apply on the temple; Boil with #2, #26, #61, #82, 83 and use for bathing
37	*Garuga floribunda* Decne.	Burseraceae	Bugo	4	0.13	Bk	Fish poisoning	I	Scrape inner bark and drink extract
38	*Canna indica L.*	Cannaceae	Saging-saging	6	0.19	Lf	Fever, body chill	E / I	Apply on the forehead; Pound with #17, #99, #102 and rub extract on the whole body
						Rh	Spasm	I	Boil with #106 and drink decoction
39	*Carica papaya* L.	Caricaceae	Papaya	4	0.13	Lf	dengue	I	Drink extract of young leaves
						Fr	Anti-rabies	E	Rub fruit's latex on the bitten area
40	*Commelina diffusa* Burm.f.	Commelinacea e	Sabilaw	3	0.1	Wp	Spasm, arthritis	E	Apply as poultice; Infuse in #21 oil and apply; Pound with #83, #89 and rub extract
41	*Decalobanthus peltatus* (L.) A.R.Simões & Staples	Convolvulacea e	Anukol	1		St	Cuts, wounds	E	Apply latex

42	*Hellenia speciosa* (J. Koenig ex Retz.) Govaerts	Costaceae	Tabungyan	2		Rt	Spasm, cough	I	Boil alone or with #45, #72, #73, #93 and drink decoction
43	*Bryophyllum pinnatum* (Lam.) Oken	Crassulaceae	Damol-damol	6	0.23	Lf	Toothache	E	Apply crushed leaves on the face
						Lf	Headache	E	Pound with #26, #33, #48, #60, #81, #83 and rub extract on the body
44	*Momordica charantia* L.	Cucurbitaceae	Amargoso	2	0.06	Lf	Cough	I	Drink extract or add sugar in extract for children
45	*Tetracera scandens* (L.) Merr.	Dilleniaceae	Takinis/ Gupit	1		Rt	Spasm	I	Boil with #42, #72, #73, #93 and drink decoction
46	*Euphorbia hirta* L.	Euphorbiaceae	Tawa-tawa	15	0.42	Wp, Rt, Lf	Dengue, urinary tract infection	I	Drink decoction
						St	Sore eyes, blurry vision	E	Drop stem latex into the eyes
47	*Homonoia riparia* Lour.	Euphorbiaceae	Miyagos	5	0.13	Lf	Skin eruptions, skin allergy	E	Infuse in #21 oil and apply
						St/Rt	Kidney problems, urinary tract infection, spasm, arthritis	I	Drink decoction
48	*Jatropha curcas* L.	Euphorbiaceae	Kasla	14	0.45	Bk, Lf	Fracture, muscle pain	E	Apply heated leaves; Apply bark directly
						Bk, Lf	Fever, headache	E	Apply leaves on the forehead; Scrape bark and rub extract or pound with #26, #33, #43, #60, #81, #83 or with #61, #106 and rub extract on the body
						Bk	Cuts, wounds	E	Scrape bark and apply extract
						Pt	Ear cleansing	I	Drop latex from petiole
49	*Macaranga tanarius* (L.) Müll.Arg.	Euphorbiaceae	Binunga	1		Fl	Toothache	I	Crush and insert in the decaying tooth
50	*Crotalaria* sp.	Fabaceae	Kalay-kalay	7	0.23	Lf	Anthelmintic, diarrhea	E	Apply fresh or heated leaves on the stomach
51	*Desmodium triflorum* (L.) DC.	Fabaceae	Himbis puyo	2	0.06	Wp	Measles, typhoid fever	I	Boil with #85 and/or #12, #26 and drink decoction
52	*Gliricidia sepium* (J acq.) Walp.	Fabaceae	Kawati	6	0.19	Lf	Postpartum recovery	E	Sit on the heated leaves or apply it on the abdomen

						Lf	Scabies, Skin eruptions	E	Pound with #105 and meat of #21 and apply
53	*Leucaena leucocephala* (Lam.) de Wit	Fabaceae	San pedro/ Ipil-ipil	4	0.13	Sd	Anthelminthic	I	Eat young seeds directly
54	*Pterocarpus indicus* Willd.	Fabaceae	Naga	6	0.19	Bk, Lf	Toothache	I / E	Scrape inner bark and insert into a decaying tooth; Rub leaf latex on the face
55	*Clerodendrum quadriloculare* (Blanco) Merr.	Lamiaceae	Salin-uwak	3	0.1	Lf	Headache, skin allergy	E	Apply on the forehead or on the affected area
56	*Gmelina arborea* Roxb.	Lamiaceae	Gimelina	10	0.32	Lf	Fever	E	Apply young leaves on the forehead
						Lf	Muscle pain, arthritis	E	Apply on the affected area
57	*Hyptis capitata* Jacq.	Lamiaceae	Pasagi	8	0.23	Lf	Stomachache; nausea	E	Apply crushed leaves on the stomach
						Lf	Diarrhea	E	Apply fresh or heated leaves on the stomach alone or with #99
58	*Hyptis suaveolens* (L.) Poit	Lamiaceae	Hinluluko	8	0.26	Lf, Rt	Stomachache, diarrhea, blood in stool	I	Drink roots/leaves decoction; Apply crush leaves on the stomach
						Lf	Cuts, wounds	E	Crush leaves with #28, #77 and apply
						Lf	Fever, headache	E	Pound with #33, #48, #81, #83 and rub extract on the body
59	*Plectranthus amboinicus* (Lour.) Spreng.	Lamiaceae	Oregano	7	0.23	Lf	Cough	I	Drink extract of fresh or steamed leaves or mix with #96 juice or #81 extract
60	*Plectranthus scutellarioides* (L.) R. Br.	Lamiaceaa	Lampunaya	20	0.65	Lf	Fever, headache	E	Pound with #24, #81, #83, # 89, #106 or with #33, #43 and rub extract on the body
						Lf	Ear problems	I	Drop extract into the ears
						Lf	Fracture, muscle pain, arthritis	E	Apply fresh or heated crushed leaves or mix with #81, #83, #89, #106 and rub extract
						Lf	Stomachache, diarrhea, skin allergy	E	Apply crushed leaves or mix with #24, #81, #106 and rub extract on the stomach
						Lf	Abortifacient	I	Drink decoction

61	*Premna odorata* Blanco	Lamiaceae	Agdaw/ Argaw	3	0.13	Rt	Stomach ulcer	I	Boil with #26, #73, #93 and drink decoction
						Lf	Postpartum care and recovery	E	Boil with #2, #26, #36, #82, #83 and use for bathing
						Lf	Fever, headache, cough	E	Pound alone or mix with #48, #61, #81, #83, #106 and rub extract on the body
62	*Vitex trifolia* L.	Lamiaceae	Lagundi	6	0.19	Lf	Spasm	E / I	Apply crushed leaves or pound with #83, #89 and rub extract on the head; Boil with #26, #72, #73, #83, #89, #93 and drink decoction
						Lf	Fever, cough	E / I	Apply extract on the body; Drink decoction
63	*Persea americana* Mill.	Lauraceae	Abokado	4	0.13	Bk	Diarrhea	I	Scrape bark then boil with #67, #98 or #78 and drink decoction
64	*Barringtonia asiatica* (L.) Kurz	Lecythidaceae	Bitoon	3	0.1	Lf	Postpartum bleeding, muscle pain	E	Apply heated leaves on the abdomen or on the affected area
						Lf, Fr	Hernia	E	Apply leaf; cut fruit in half and apply on the male genitalia
65	*Hibiscus rosa-sinensis* L.	Malvaceae	Gumamela	1		Lf	Cuts, wounds	E	Apply crushed leaves
66	*Urena lobata* L.	Malvaceae	Dalupang	2	0.06	Fl	Cuts, wounds, boils	E	Apply crushed leaves
67	*Sandoricum koetjape* (Burm.f.) Merr.	Meliaceae	Hansol/ Santol	6	0.19	Bk	Stomachache	I	Scrape inner bark and drink extract
						Lf, Bk	Diarrhea	I	Drink leaf decoction; Scrape inner bark and drink extract; Boil bark with #78, #98 and drink decoction
68	*Swietenia mahogani* L.	Meliaceae	Mahogany	4	0.13	Bk, Sd	Abortifacient	I	Eat seed directly; Drink bark decoction
						Lf	Arthritis; foot pain	E	Apply on the affected area
69	*Arcangelisia flava* (L.) Merr.	Menispermaceae	Albutra	7	0.23	St	Postpartum care, stomachache, gastric pain	I	Drink decoction alone or with #94; Infuse in gin and drink
						St	Epilepsy, nervousness	I	Infuse dried stem with #9, #13, #14, #82, #100 in gin and drink

70	*Tinospora crispa* (L.) Hook. f. & Thomson	Menispermaceae	Badyawan	10	0.32	Lf, Pt	Toothache	I / E	Drop latex in the affected tooth or rub on the face or drop into the eyes; Blow petiole on face or near the eyes
71	*Ficus benjamina* L.	Moraceae	Lunok	2	0.06	Ar	Hair growth enhancer, spasm	E	Infuse in #21 oil and apply after bath
72	*Ficus nota* (Blanco) Merr.	Moraceae	Patilog	2	0.06	Rt	Postpartum care and recovery, milk production enhancer	I	Drink decoction
						Rt	Spasm	I	Boil alone or with #26, #62, #73, #83, #89, #93 or #42, #45 and drink decoction
73	*Ficus pseudopalma* Blanco	Moraceae	Niyog-niyog	6	0.19	Rt	Cough, tuberculosis, spasm	I	Boil alone or with #26, #62, #72, #83, #89, #93, or with #42, #45 and drink decoction
						Rt	Gastric pain, stomach ulcer	I	Boil then mix with gin and drink; Boil with #26, #62, #94 and drink decoction
74	*Ficus septica* Burm.f.	Moraceae	Lamnog	5	0.16	Lf	Fever	E	Apply on the forehead
75	*Moringa oleifera* Lam.	Moringaceae	Malunggay / Kamalunggay	10	0.32	Lf	Sore eyes	I	Crush leaves and drop extract into the eyes
						Lf	Cuts, wounds	E	Apply crushed leaves
						Lf	Bloated stomach	I	Put in hot water and drink
						Rt	Abortifacient	I	Drink decoction
76	*Musa paradisiaca* L.	Musaceae	Saging	31	1	Lf	Fever, headache, asthma	E	Apply young leaf on the forehead
						Lf; St	Stomachache, diarrhea	E	Apply leaf on the stomach; Scrape inner stem and apply
						St	Cuts, wounds, fungal infection	E	Scrape inner stem or heat decaying stem and apply
						Fl	Fracture	E	Apply petals on the affected area
						Rt	Food poisoning	I	Eat fresh root directly
77	*Psidium guajava* L.	Myrtaceae	Bayabas	11	0.35	Lf	Tuberculosis; ulcer	I	Eat young leaves; Drink extract or decoction
						Lf	Cuts, wounds	E	Apply crushed leaves or mix with #28, #58; Boil and apply as wash

						Fr, Lf	Diarrhea, stomachache	I	Eat fruit; Crush leaves and drink extract; Boil alone or with #99 and drink decoction
						Bk	Blood in stool	I	Scrape bark and drink extract
78	*Syzygium cumini* (L.) Skeels	Myrtaceae	Lumboy	7	0.23	Lf, Bk	diarrhea, stomachache	I	Boil alone or mix with #98, #63 or #67 and drink decoction
						BK	Blood in stool	I	Scrape inner bark and drink decoction
79	*Averrhoa bilimbi* L.	Oxalidaceae	Iba	4	0.13	Lf	Post illness care	E	Boil and apply as bath
						Lf	Fever	E	Pound and rub extract on the body
80	*Breynia cernua* (Poir.) Müll.Arg.	Phyllanthaceae	Uyangya	1		Lf	Skin allergy, cuts, wounds	E	Crush leaves and rub extract
81	*Piper betle* L.	Piperaceae	Buyo	12	0.39	Lf	Headache, fever, running nose	E	Pound with #48, #60, #61, #83, #106 or with #26, #33, #43 or #24, #89 and rub extract on the body
						Lf	Postpartum care and recovery	I	Drink decoction or mix with #36 resin and apply on the temple
						Lf	Stomach problems	E	Crush leaves and rub extract or mix with #99 and apply on the stomach
						Lf	Muscle pain	E	Pound leaves with #60, #83, #89, #106 and rub extract
82	*Bambusa blumeana* Schult.f.	Poaceae	Kawayan	4	0.13	Lf	Nervousness, epilepsy	I	Infuse dried bark in gin with #9, #13, #14, #69, #100 and drink
						Lf	Fish poisoning	I	Drink decoction
						Lf	Postpartum care and recovery	E	Boil with #2, #26, #36, #83 and use for bathing
83	*Cymbopogon citratus* (DC.) Stapf	Poaceae	Tanglad	12	0.35	Lf	Fever, headache	E	Pound with #48, #60, #61, #81, #106 or with #26, #33, #43 or #24, #89 and rub extract on the body
						Lf	Spasm	E / I	Boil with #26, #62,#72, #73, #93 and drink decoction; Pound with #40, #89 and rub extract
						Lf	Muscle pain	E	Pound with #60, #81, #89, #106 and rub extract on the whole body
						Lf	Postpartum care and recovery	E	Boil with #8, #83, #95 for body steaming; Boil with #2, #26, #36, #82 and use for bathing

84	*Dinochloa* sp.	Poaceae	Agbulokawi / Bulokawi	5	0.16	St	Spasm, ulcer, cough	I	Drink water in the culms
85	*Imperata cylindrica* (L.) Raeusch	Poaceae	Kogon	2	0.06	Sh	Measles, typhoid fever	I	Boil with #12, #51 and drink decoction
86	*Oryza sativa* L.	Poaceae	Palay	1		Sd	Anti-rabies	E	Apply as poultice with #6
87	*Saccharum officinarum* L.	Poaceae	Tubo	3	0.1	St	Spasm, muscle pain, cough	I	Heat then pound and drink extract
88	*Drynaria quercifolia* (L.) J. Sm.	Polypodiaceae	Sapin-sapin	1		Ar	Cough, asthma	E	Apply as poultice
89	*Embelia* sp.	*Primulaceae*	Salimawmaw/ Malawmaw	7	0.23	Lf, Rt	Spasm	E / I	Pound leaves with #40, #83 and rub extract; Boil leaves with #26, #62, #72, #73, #83, #93 and drink decoction
						St	Running nose	I	Drink water from the stem for children
						St	Fever, headache	E	Pound with #24, #60, #81, #83, #106 and rub extract on the body
						Lf	Muscle pain, arthritis	E	Crush leaves alone or with #60, #81, #84, #106 and rub extract
90	*Ardisia* sp.	Primulaceae	Tagpo	4	0.13	Rt	Blood in stool, menstrual problems	I	Drink decoction
						St	Tuberculosis	I	Scrape inner bark and drink extract
91	*Physalis angulata* L.	Solanaceae	Tino-tino	3	0.1	Lf	Diarrhea	E	Apply heated leaves on the stomach
92	*Morinda citrifolia* L.	Rubiaceae	Anino	1		Bk, Fr	Fever	I	Drink decoction
93	*Mussaenda philippica* A. Rich	Rubiaceae	Agboy	4	0.16	Lf, Bk	Fever	E	Scrape inner bark and apply on the forehead; Apply leaves on the forehead
						Rt	Spasm	I	Boil with #26, #62,#72, #73, #83, #89, and drink decoction
						Rt	Stomach ulcer	I	Boil with #26, #61, #73 and drink decoction
94	*Nauclea orientalis* (L.) L.	Rubiaceae	Bangkal	4	0.12	Lf	Fever	E	Apply on the forehead
						Lf	Postpartum care and recovery	I	Boil with #69 and drink decoction

95	*Citrus maxima* (Burm.) Merr.	Rutaceae	Sibugaw	2	0.06	Bk Lf	Cough Postpartum care and recovery	I E	Drink decoction Boil with #8, #83 for body steaming
96	*Citrus microcarpa* Bunge	Rutaceae	Simuyaw	6	0.19	Fr	Cough	I	Drink juice alone or with #59, #81 or with honey
97	*Lunasia amara* Blanco	Rutaceae	Panyat	3	0.1	St	Sore eyes	I	Drop stem latex into the eyes
98	*Chrysophyllum cainito* L.	Sapotaceae	Star apol	10	0.29	Bk, Fr, Lf, Rt	Diarrhea, stomachache	I	Boil inner bark with #67, #78 or #63 or boil leaves with #77 or #67, #78 and drink decoction; Eat fruit; Drink root decoction
99	*Capsicum annuum* L.	Solanaceae	Katumbal/ Kutitot	17	0.52	Lf, Rt	Stomachache, bloated stomach, diarrhea	E / I	Apply fresh or heated crushed leaves on the stomach alone or mix with #17, #81, #102 or #57 or #34; Boil with #34, #60 and drink decoction
						Lf	Fever	E	Apply as poultice
						Fr	Anti-tetanus	E	Crush and apply
100	*Poikilospermum suaveolens* (Blume) Merr.	Urticaceae	Dangkalan	3	0.1	Bk	Epilepsy, Nervousness	I	Infuse dried bark in gin with #9, #13, #14, #69, #82 and drink
						Lf	Muscle pain	E	Rub with salt and apply
						Lf	Sore eyes	I	Drop leaf latex into the eyes
101	*Lantana camara* L.	Verbenaceae	Hagonoy puro	1		Lf	Cuts, wounds	E	Crush leaves and apply
						Lf	Diarrhea	E	Apply as poultice on the stomach area
102	*Stachytarpheta jamaicensis* (L.) Vahl	Verbenaceae	Salmamento/Almamento	17	0.55	Lf	Stomachache, diarrhea	E	Apply fresh or heated leaves or crush leaves with #17 or #99 and rub extract on the stomach
103	*Leea* sp.	Vitaceae	Hamangal	1		Lf	Muscle pain	E	Apply on the affected area
104	*Alpinia galanga* (L.) Willd.	Zingiberaceae	Langkawas	4	0.12	Rh	Spasm; Fungal infection	I	Drink decoction; apply on the affected area
						Rh	Nervousness	I	Boil with #106 and drink
105	*Curcuma longa* L.	Zingiberaceae	Dulaw/ Lampuyang	2	0.06	Rh	Skin eruptions	E	Pound with #21 meat and #52 or mix with #21 oil then apply
						Rh	Gastric pain	E	Apply with #106 on the stomach

106	*Zingiber officinale* Roscoe	Zingiberaceae	Luy-a	13	0.42	Rh	Gastric pain; stomach problems; cough	E / I	Apply alone or with #106 on the stomach; Drink decoction
						Rh	Headache	E	Pound with #48, #60, #61, #81, #83, or with #24, #89 and rub extract on the body
						Rh	Muscle pain	E	Pound with #83 or #60, #81, #89,and rub extract
						Rh	Nervousness	I	Boil with #104 and drink
						Rh	Spasm	I	Boil with #38 and drink decoction

[a]UV – computation was considered if the use-report is at least 2.
[b]Plant parts: Lf, leaf; Bk, bark; Rt, root; Bl, bulb; Fl, flower; Fr, fruit; Rh, rhizome; Sd, seed; Sh, shoot; St, stem; Ar, Aerial root; Wh, whole plant.
[c]I, internal; E, external

Table 3. Categories reported disease, Informant Consensus Factor (ICF), and Fidelity level (FL) of frequently used species.

ICD-11	Category Name	Reported Diseases or Purposes	No. of use-report	No. of taxa	ICF	Frequently used species	(%) FL
1	Certain infectious or parasitic diseases	Anti-rabies, anthelminthic, Anti-tetanus, dengue, fungal infection, measles, scabies, tuberculosis, typhoid fever, wart,	33	17	0.50	*Psidium guajava*	54.55
5	Endocrine, nutritional or metabolic diseases	Goiter	3	2	0.50	*Catharanthus roseus*	100.00
8	Diseases of the nervous system	Epilepsy, nervousness	9	8	0.13	*Arcangelisia flava*	100.00
9	Diseases of the visual system	Sore eyes, blurry vision	17	4	0.81	*Euphorbia hirta*	60.00
10	Diseases of the ear or mastoid process	Ear cleansing, ear problems	5	2	0.75	*Plectranthus scutellarioides*	15.00
11	Diseases of the circulatory system	Hypertension	3	2	0.50	*Gynura procumbens*	100.00
12	Diseases of the respiratory system	Asthma, cough, running nose	50	19	0.63	*Blumea balsamifera*	62.50
13	Diseases of the digestive system	Bloated stomach, stomachache, stomach ulcer, stomach problems, blood in stool, diarrhea, gastric pain, nausea, toothache, vomiting, hernia	151	37	0.76	*Stachytarpheta jamaicensis*	100.00

14	Diseases of the skin	Boils, cyst, hair growth enhancer, skin allergy, skin eruptions, abscess	14	11	0.23	*Cocos nucifera*	23.08
15	Diseases of the musculoskeletal system or connective tissue	Muscle pain, arthritis, foot pain	30	16	0.48	*Gmelina arborea*	50.00
16	Diseases of the genitourinary system	Urinary tract infection, kidney problems, uterine cancer, menstrual problems	16	9	0.47	*Annona muricata*	60.00
18	Pregnancy, childbirth or the puerperium	Abortifacient, contraceptive, milk production enhancer, postpartum care and recovery, postpartum bleeding	38	17	0.57	*Andrographis paniculata; Arcangelisia flava*	57.14
21	Symptoms, signs or clinical findings, not elsewhere classified	Headache, fever, dizziness, spasm, body chill, post illness care	163	43	0.74	*Musa paradisiaca*	64.52
22	Injury, poisoning or certain other consequences of external causes	Fish poisoning, food poisoning, cuts, wounds, fracture	54	21	0.62	*Cyanthillium cinereum*	100.00

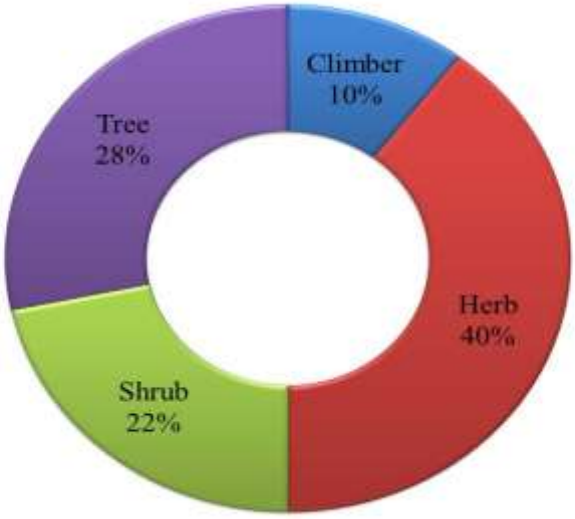

Figure 2. Plant growth habits.

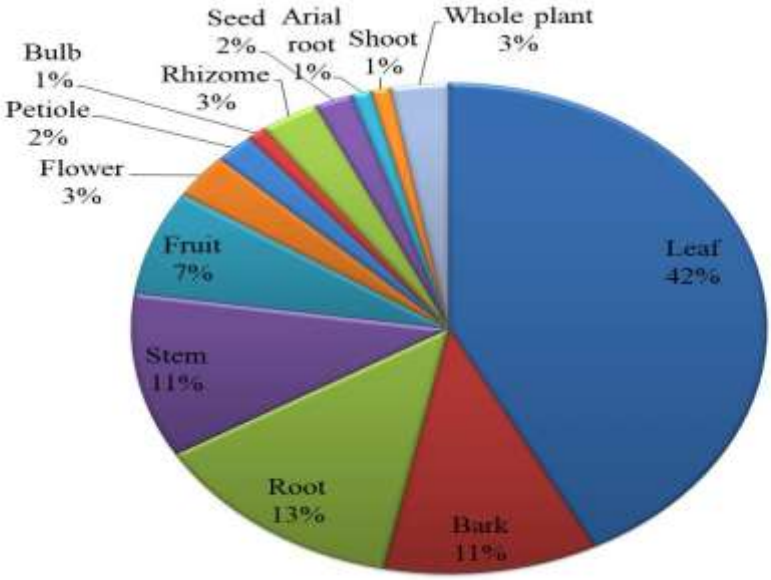

Figure 3. Plant parts.

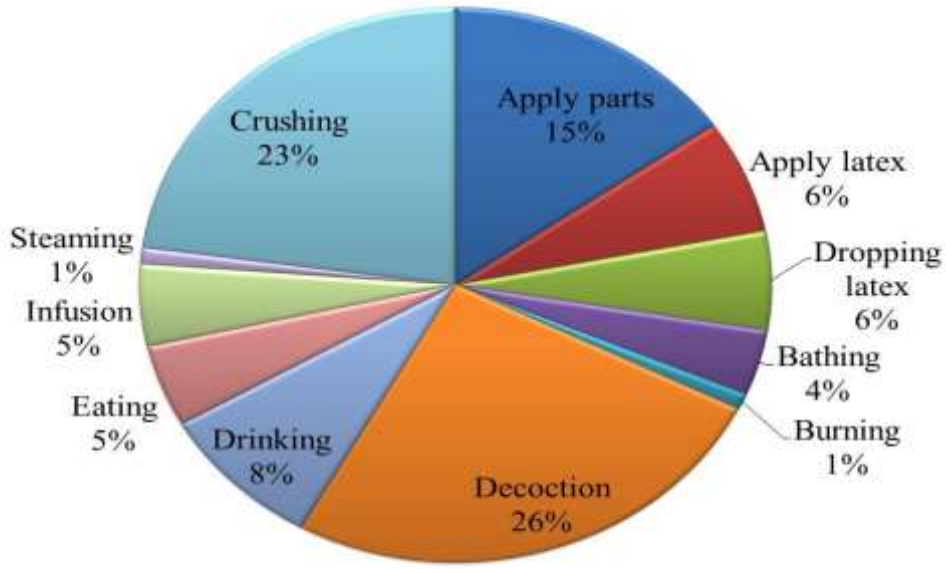

Figure 4. Mode of preparation

RESULTS

Demographic profile of informants

A total of 31 purposively selected key informants were interviewed in the documentation of medicinal plants, 26 females (84%) and 5 males (16%). Majority of the informants (32%) were between 56-70 years old and the least (10%) were between 25-40 years old. In terms of educational attainment, 10 informants (32%) did not have a formal education, 14 (45%) have elementary, 2 (6%) have secondary, and 5 (16%) have tertiary level of education. Most of them were married (68%), 8 (26%) were widowed, and 2 (6%) were single. For the occupation, majority were housewife (42%), followed by self-employed 8 (26%), then employed 4 (13%), and herb doctor and farmer, (10%) each.

Medicinal plant collections and characteristics

Collections of medicinal plants were carried out after the interview if the reported plants were available nearby or cultivated near the informant's house. Fifty-seven (57) percent of the medicinal plants were cultivated for medicinal purposes, vegetables, and ornaments, while 44% were collected in the wild; growing in the forests, riverbanks, along the beach, while others were ubiquitously growing as weeds; and 2% can be bought from the market. Collections of plants in the wild were done thru the assistance of the *albularya*, some informants, and other members of the community who have the knowledge of the location of the medicinal plants. This study documented 106 medicinal plant species distributed in 48 families and 95 genera that are traditionally used by the *Ati* to treat 62 ailments across 14 categories. About 40% of the plants were herbs, followed by 28% trees, 22% shrubs, and 10% climbers (Figure 2). The family Asteraceae was best represented with 10 species, followed by Lamiaceae with 8, Apocynaceae and Poaceae with 6 species each, and Fabaceae and Acanthaceae with 5 species each. The information of the medicinal plants and their uses in traditional medicine were summarized in Table 2.

Plant part used, mode of preparation, and administration

There were 13 different plant parts used by the *Ati* to treat different illness and conditions. The most frequently used parts were the leaves (43%), roots (13%), and barks and stems with (11%) each (Figure 3). In some instances, different parts of the plant were used to treat a particular ailment and sometimes in different preparations. The most common methods of medicinal plant preparation were decoction (26%), crushing or pounding (23%), and applying parts directly (15%) (Figure 4). Plants can be used alone (47%), alone or with other plant/s (38%), or combination with several plants (15%) but this depends on the illness or condition to be addressed. Some informants revealed that combination of several plants is more effective than using just one plant. Usually seven (or at least odd number) different plant species or plant parts such as leaves or sliced rhizomes are being used for the preparation whether it is done by decoction, crushing or pounding, or applying directly. Some reported plant combinations is for the treatment of fever, headache, spasm, postpartum care and recovery, epilepsy,

nervousness, and muscle pain. Fifty percent (50%) of the medicinal plants were administered orally or internally by drinking the decoction, fresh extract, water from the fruit or culms, eating fresh plant parts, and drinking infusion with tonic gin. One unusual preparation encountered in this study if for the treatment of spasm and cough using a young coconut fruit. The fruit is opened then grilled (coconut water is intact) in the evening and around 4:00am the following day, it will be placed in an open area where it can catch morning dew, and then around 6:00am the coconut water is drink. Fifty percent (50%) are also administered externally by applying the plant parts directly on the affected area, applying or rubbing the latex from stem or petiole, bathing or washing the concoction, body steaming, burning as incense, applying extract of crushed or pounded plants, and applying the coconut oil with infused plant parts (Figure 4). Sometimes the leaves are heated over the flame or rubbed with salt before applying. The use of medicinal plants in traditional medicines is greatly influenced by the culture, tradition, and personal beliefs and experienced.

Use value

The use value determines the relative importance of the plants as indicated with their high use reports (Table 2). Use value of medicinal plants with single use report was not computed. The top three plants with the highest use value were *Musa paradisiaca* (1.00), *Blumea balsamifera* (0.77), and *Plectranthus scutellarioides* (0.65). These were the plants that are commonly used by the *Ati* in traditional medicine. *M. paradisiaca* was used in five categories and is frequently used to suppress fever and headache by applying a piece of young leaf directly on the forehead. It is also use to cure asthma, stomach problems, diarrhea, fungal infection, cuts and wounds, fracture, and food poisoning. It is cultivated by the *Ati* as a crop and grown everywhere in the community. *B. balsamifera* was used in 5 categories and is widely known to cure cough. Young leaves can be eaten fresh or the roots or leaves are boiled and taken orally. The *Ati* also use this plant to cure urinary tract infection, stomach problems, diarrhea, cuts and wounds, fever and headache, postpartum care and recovery, and spasm. The plant was collected in the wild but some informants also cultivated it for medicinal purposes. *P. scutellarioides* is being used in seven categories and is widely known to treat fever and headache in combination with other herbs. For the remedy of fever and headache, the leaves are pound with *Artemisia vulgaris*, *Piper betle*, *Cymbopogon citratus*, sliced rhizomes of *Zingiber officinale* or with leaves of *Wollastonia biflora*, and *Bryophyllum pinnatum* then the extract is rubbed on the whole body of infants and children. It is also used to cure ear problems, muscle pain, arthritis, fracture, stomachache, diarrhea, skin allergy, and an abortifacient. There were 16 the medicinal plants that the use report came from a single informant. Most of these plants were reported by the *arbularyo/arbularya*" and prepared in combination especially for the treatment of epilepsy and nervousness. These plants are suggested be further evaluated for phytochemical and pharmacological analyses for efficacy.

Fidelity Level

The fidelity level determines the relative importance of medicinal plant to treat a particular disease or illness. A high value suggests that a particular medicinal plant is preferred to cure a specific disease by many informants. A total of 19 plants were recorded to have 100% FL and the following have at least 9 use-reports: *Cyanthillium cinereum* for cuts and wounds, *Pseuderanthemum carruthersii* for fever and headache*, Tinospora crispa* for toothache and *Chrysophyllum cainito* for diarrhea and stomachache*.* Plants with 100% FL but with low use reports (2) were *Momordica charantia* for cough*, Curcuma longa* for skin eruptions, *Gynura procumbens* for hypertension, and *Mangifera indica* for postpartum care and recovery.

Informant Consensus Factor

There were 62 diseases in 14 categories documented in this study (Table 3). The ICF value is based on the number of use-reports in each of the category and the number of species used. The results showed that the ICF value ranges from 0.13 to 0.81. The highest value (0.81) is in the category 9, diseases of the visual system, followed by category 13, diseases of the digestive system (0.76), and category X, diseases of the ear or mastoid processes (0.75). The reported diseases in category 9 were blurry vision and sore eyes and *Euphorbia hirta* (100% FL) was the frequently used species, followed by *Moringa oleifera* (55.56% FL), and *Lunasia amara* (100% FL). Stem latex of *E. hirta* and *L. amara* is dropped into the affected eye while leaf extract for the *M. oleifera* is used. The diseases in the digestive system (category 13) includes bloated stomach, stomachache, stomach ulcer, other stomach problems, blood in stool, diarrhea, gastric pain, nausea, toothache, vomiting, and hernia. The most frequently used plants were *Stachytarpheta jamaicensis* (100% FL), for stomachache and diarrhea; *Chrysophyllum cainito* (100% FL) for diarrhea; *Tinospora crispa* (100% FL) for toothache; and *C. annuum* for stomachache, diarrhea, and bloated stomach. Fresh or heated leaves of *S. jamaicensis* are applied on the stomach area or crushed the leaves with *Capsicum annuum* and *Tabernaemontana pandacaqui* and rub extract

on the stomach. Latex from the petiole or leaves of *T. crispa* is dropped into the affected tooth or into the eyes or can be rubbed on the face. Blowing the petiole on the face or near the tear duct can also be done. Dropping the latex into the eyes or blowing the petiole near the tear duct is a dangerous practice. It can give an extreme bitter sensation on the throat and can cause someone to fall unconscious. It is not advisable for everyone to use this practice but according to the informants it is very effective for the treatment of toothache. The diseases of the ear or mastoid process (category 10) includes ear cleansing, and other ear problems and the most frequently used plant is the *P. scutellarioides* in which the leaf extract is dropped into the ears. The highest number of use-reports and used taxa is the category 21 which includes the symptoms, signs or clinical findings, not elsewhere classified. The reported diseases were headache, fever, dizziness, spasm, body chill, and post illness care and *M. paradisiaca* is the most frequently use species for fever and headache. The lowest ICF value is in the category 8 (0.13) which includes the diseases of the nervous system. Epilepsy and nervousness were the reported disease and only *A. flava* is commonly used.

DISCUSSION

Archaeological evidences reveal that the use of medicinal plants started thousands of years ago [31-32] and in the recent years there has been an increasing interest in the use of plants in primary health care [33-34]. The Philippine tropical forests, which have a diverse flora and fauna are also rich in medicinal plants. The use of medicinal plants in traditional medicine for Filipinos is very accessible because plants can be easily grown everywhere and are readily available [35].

This present study shows the rich ethnobotanical knowledge of *Ati* on medicinal plants in addressing their health conditions. The documentation of 106 plant species in 48 families used by the Ati people of Malay, Aklan is a great contribution to the limited information of locally available medicinal plants. The families of Asteraceae, Lamiaceae, Apocynaceae, Poaceae, Fabaceae, and Acanthaceae have represented with high number of species reported. The Asteraceae (daisies) are one of the largest families of flowering plants along with Orchidaceae [36-37]. Plants from this family were known to have anti-inflammatory, antimicrobial, antioxidant, and other various healing activities [38-40]. Several studies have been conducted on the bioactive compounds present in this family with great potential in pharmaceutical and medicinal use [41-42]. Lamiaceae (mint) families are composed of aromatic medicinal plants that contain essential oils with antimicrobial and antioxidant properties used traditionally for centuries [43-44]. Essential oils from these plants also exhibited cytotoxic activity against cancer cells [45-46]. The family Apocynaceae (dogbane) contains milky latex and sap rich in phytochemical compounds that have antimicrobial, anti-inflammatory, antioxidant, and have cytotoxic properties [47-48]. Poaceae (grass) contain secondary metabolites that exhibited antibacterial, antifungal, antioxidant, and cytotoxic activities [49], antidiabetic, antitumor, antiplasmodial, analgesic, diuretic, antimutagenic and hepatoprotective activity [50]. Some ethnobotanical studies include cure for dysentery, cancer, inflammation and joint pain [51]. Fabaceae (legume/bean) composed of a highly diverse species and its pharmacological importance is highly valuable [52-54]. Their ethnobotanical use includes treatment of abscess, asthma, cough and cold, skin diseases, ulcers, leprosy [55] and has an anticancer property [56]. Acanthaceae (acanthus) produce secondary metabolites that have significant effect against harmful diseases and its medicinal value have been studied extensively [57-59].

The use of leaves as primarily plant part is similar to other studies conducted in *Ati/Aeta* communities [12,60-62] and other ethnobotanical studies across the archipelago [26,63-68]. Leaf is one of the plant parts that contain the highest bioactive compounds that are used for medicinal purposes [69]. Leaves are available all year-round in tropical region and collection of leaves from the plant can't give damaging effect and can grow back easily compare to other parts. It's readily available and accessible in times of need. Barks, roots, and stems were less utilized in this study compare to leaves and this could be attributed to the negative effects if harvested in large quantities. Collection of barks and roots in medicinal plants can cause damage and even death, and may also affect the sustainability of the plant [70].

Decoction is the most preferred preparation of ethnobotanical studies among other indigenous groups in the country [12,61,63-66,70]. Drinking the decoction is the most common form of administration especially for serious conditions. It can be absorbed faster in the body and have the strongest action. But it also has disadvantages such as, the preparation is time consuming, difficult to store and transport, and sometimes the taste is awful [71]. Combination of several medicinal plants to treat health conditions is more effective. This is a common traditional practice for the indigenous communities in Western Visayas [11-12,72]. Combination of different plants for treating a particular disease demonstrates the synergistic effects [70].

Plants with the highest use value were *M. paradisiaca*, and *B. balsamifera*. *M. paradisiaca* is frequently used by the *Ati* to treat nine ailments in

five categories. Several studies showed that it is also use as anti-diabetic, anti-cancer, anti-hypertensive, anti-diarrhea [73] antioxidant, antimicrobial, fungal, and viral activities, and temperature control [74]. *B. balsamifera* is one of the ten medicinal plants endorsed by the Department of Health (DOH) through its "Traditional Health Program" that has been clinically proven to cure different ailments [75]. Category 9, diseases of the visual system has the highest ICF value with *E. hirta* as frequently used species for treating sore eyes. It is also reported to cure sore eyes and other eye-related conditions in other ethnobotanical studies abroad [51,76]. Other ethnobotanical studies in the country documented that *E. hirta* is used to treat dengue [12,67,77] and wounds [78].

CONCLUSION

This documentation of medicinal plants used by the *Ati* in mainland Malay, Aklan showed their rich and diverse ethnobotanical knowledge in addressing their primary health care needs. Most of the medicinal plants were herbs and usually cultivated. Leaves were the most common parts used and decoction is the most common mode of preparation. Category 21 of the ICD-11 has the highest number of use-report and taxa. Medicinal plants can be used alone or in combination with other plants for the treatment of different diseases effectively. It is urgent to document this indigenous knowledge before it is totally forgotten. This study also serves as a basis for further pharmacological research in the medicinal plants used by the indigenous peoples in drug discovery and formulation.

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Supplementary

Plant No.	Scientific Name	Family Name	Local Name	Administration	Growth habit	Collection Site
1	*Andrographis paniculata* (Burm.f.) Nees	Acanthaceae	Marabilos	I	H	C
2	*Justicia gendarussa* Burm.f.	Acanthaceae	Bunlaw	E	S	C
3	*Pseuderanthemum carruthersii* (Seem.) Guillaumin	Acanthaceae	Pasaw	E	S	C
4	*Pseuderanthemum* sp.	Acanthaceae	Panit-panit it manok	E	S	W
5	*Sanchezia speciosa* Leonard	Acanthaceae	Pasaw-pasaw	E	S	C
6	*Allium sativum* L.	Amaryllidaceae	Ahos/ Bawang	E/I	H	M
7	*Anacardium occidentale* L.	Anacardiaceae	Kasoy	I	T	C
8	*Mangifera indica* L.	Anacardiaceae	Mangga	E	T	C
9	*Anaxagorea luzonensis* A.Gray	Annonaceae	Balikaskasa	I	S	C
10	*Annona muricata* L.	Annonaceae	Bana-bana	E/I	T	C

11	*Uvaria* sp.	Annonaceae	Banawak	I	C	W
12	*Centella asiatica* (L.) Urb.	Apiaceae	Yahong-yahong	I	H	W
13	*Alstonia scholaris* (L.)R. Br.	Apocynaceae	Bita	I	T	W
14	*Alstonia* sp.	Apocynaceae	Ugayan	I	T	C
15	*Catharanthus roseus* (L.) G.Don	Apocynaceae	Rosas pinggan	I	H	C
16	*Parameria laevigata* (Juss.) Moldenke	Apocynaceae	Tagulaway	E	C	W
17	*Tabernaemontana pandacaqui* Lam.	Apocynaceae	Alibotbot	E/I	S	C
18	*Tabernaemontana* sp.	Apocynaceae	Alibotbot (baye)	E	S	W
19	*Aglaonema commutatum* Schott	Araceae		E	H	W
20	*Homalomena philippinensis* Engl.	Araceae	Payaw	E	H	W
21	*Cocos nucifera* L.	Arecaceae	Niyog	E/I	T	W
22	*Areca catechu L.*	Arecaceae	Bunga	I	T	W
23	*Sansevieria trifasciata* Prain	Asparagaceae	Tigre-tigre	E	H	C
24	*Artemisia vulgaris* L.	Asteraceae	Helba singa-singa	E	H	C
25	*Ayapana triplinervis* (Vahl) R.M.King & H.Rob.	Asteraceae	Ayupana	E	H	C
26	*Blumea balsamifera* (L.) DC	Asteraceae	Ililibhon/ Alibhon	E/I	S	W
27	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Kipot-kipot	E	H	W
28	*Chromolaena odorata* (L.) R.M.King & H.Rob.	Asteraceae	Hagonoy	E	H	W
29	*Cyanthillium cinereum* (L.) H.Rob.	Asteraceae	Bitsin-bitsin	E	H	W
30	*Elephantopus tomentosus* L.	Asteraceae	Dila-dila	I	H	W
31	*Gynura procumbens* (Lour.) Merr.	Asteraceae	Asintaba	I	H	C
32	*Synedrella nodiflora* (L.) Gaertn.	Asteraceae	Silhig-silhig	I	H	W
33	*Wollastonia biflora* (L.) DC.	Asteraceae	Hagonoy sa baybay	E	H	W
34	*Heliotropium indicum* L.	Boraginaceae	Makabra/Kamra-kamra	E/I	H	W
35	*Ananas comosus* (L.) Merr.	Bromeliaceae	Pinya	I	H	W
36	*Canarium* sp.	Burseraceae	Salong	E/I	T	W
37	*Garuga floribunda* Decne.	Burseraceae	Bugo	I	T	C
38	*Canna indica L.*	Cannaceae	Saging-saging	E/I	H	W
39	*Carica papaya* L.	Caricaceae	Papaya	E/I	H	C
40	*Commelina diffusa* Burm.f.	Commelinaceae	Sabilaw	E	H	C
41	*Decalobanthus peltatus* (L.) A.R.Simões & Staples	Convolvulaceae	Anukol	E	C	C
42	*Hellenia speciosa* (J. Koenig ex Retz.) Govaerts	Costaceae	Tabungyan	I	H	W
43	*Bryophyllum pinnatum* (Lam.) Oken	Crassulaceae	Damol-damol	E	H	C
44	*Momordica charantia* L.	Cucurbitaceae	Amargoso	I	C	C
45	*Tetracera scandens* (L.) Merr.	Dilleniaceae	Takinis/ Gupit	I	C	C
46	*Euphorbia hirta* L.	Euphorbiaceae	Tawa-tawa	I	H	W
47	*Homonoia riparia* Lour.	Euphorbiaceae	Miyagos	E/I	S	W
48	*Jatropha curcas* L.	Euphorbiaceae	Kasla	E/I	S	C
49	*Macaranga tanarius* (L.) Müll.Arg.	Euphorbiaceae	Binunga	I	T	W
50	*Crotalaria* sp.	Fabaceae	Kalay-kalay	E	H	W

51	*Desmodium triflorum* (L.) DC.	Fabaceae	Himbis puyo	I	H	W
52	*Gliricidia sepium* (Jacq.) Walp.	Fabaceae	Kawati	E	T	W
53	*Leucaena leucocephala* (Lam.) de Wit	Fabaceae	San pedro/ Ipil-ipil	I	T	W
54	*Pterocarpus indicus* Willd.	Fabaceae	Naga	E/I	T	C
55	*Clerodendrum quadriloculare* (Blanco) Merr.	Lamiacea	Salin-uwak	E	S	C
56	*Gmelina arborea* Roxb.	Lamiaceae	Gimelina	E	T	C
57	*Hyptis capitata* Jacq.	Lamiacea	Pasagi	E	H	W
58	*Hyptis suaveolens* (L.) Poit	Lamiaceae	Hinluluko	E	S	W
59	*Plectranthus amboinicus* (Lour.) Spreng.	Lamiaceae	Oregano	I	H	C
60	*Plectranthus scutellarioides* (L.) R. Br.	Lamiaceaa	Lampunaya	E/I	H	C
61	*Premna odorata* Blanco	Lamiaceae	Agdaw/ Argaw		T	C
62	*Vitex trifolia* L.	Lamiaceae	Lagundi	E/I	S	C
63	*Persea americana* Mill.	Lauraceae	Abokado	I	T	C
64	*Barringtonia asiatica* (L.) Kurz	Lecythidaceae	Bitoon	E	T	C
65	*Hibiscus rosa-sinensis* L.	Malvaceae	Gumamela	E	S	C
66	*Urena lobata* L.	Malvaceae	Dalupang	E	S	W
67	*Sandoricum koetjape* (Burm.f.) Merr.	Meliaceae	Hansol/Santol	I	T	C
68	*Swietenia mahogani* L.	Meliaceae	Mahogany	E/I	T	C
69	*Arcangelisia flava* (L.) Merr.	Menispermacea	Albutra	I	C	C
70	*Tinospora crispa* (L.) Hook. f. & Thomson	Menispermaceae	Badyawan	E/I	C	C
71	*Ficus benjamina* L.	Moraceae	Lunok	E	T	C
72	*Ficus nota* (Blanco) Merr.	Moraceae	Patilog	I	T	C
73	*Ficus pseudopalma* Blanco	Moraceae	Niyog-niyog	I	S	C
74	*Ficus septica* Burm.f.	Moraceae	Lamnog	E	T	C
75	*Moringa oleifera* Lam.	Moringaceae	Malunggay/ Kamalunggay	E/I	S	C
76	*Musa* × *paradisiaca* L.	Musaceae	Saging	E/I	H	C
77	*Psidium guajava* L.	Myrtaceae	Bayabas	E/I	T	C
78	*Syzygium cumini* (L.) Skeels	Myrtaceae	Lumboy	I	T	C
79	*Averrhoa bilimbi* L.	Oxalidaceae	Iba	E	T	C
80	*Breynia cernua* (Poir.) Müll.Arg.	Phyllanthaceae	Uyangya	E	S	W
81	*Piper betle* L.	Piperaceae	Buyo	E/I	C	M
82	*Bambusa blumeana* Schult.f.	Poaceae	Kawayan	I	H	C
83	*Cymbopogon citratus* (DC.) Stapf	Poaceae	Tanglad	E/I	H	C
84	*Dinochloa* sp.	Poaceae	Agbulokawi/ Bulokawi	I	C	W
85	*Imperata cylindrica* (L.) Raeusch	Poaceae	Kogon	I	H	W
86	*Oryza sativa* L.	Poaceae	Palay	E	H	C
87	*Saccharum officinarum* L.	Poaceae	Tubo	I	H	C
88	*Drynaria quercifolia* (L.) J. Sm.	Polypodiaceae	Sapin-sapin	E	H	W
89	*Embelia* sp.	Primulaceae	Salimawmaw/ Malawmaw	E/I	C	C
90	*Ardisia* sp.	Primulacea	Tagpo	I	T	W

91	*Physalis angulata* L.	Solanaceae	Tino-tino	E	H	W
92	*Morinda citrifolia* L.	Rubiaceae	Anino	I	T	W
93	*Mussaenda philippica* A. Rich	Rubiaceae	Agboy	E/I	S	C
94	*Nauclea orientalis* (L.) L.	Rubiaceae	Bangkal	E/I	T	W
95	*Citrus maxima* (Burm.) Merr.	Rutaceae	Sibugaw	I	T	C
96	*Citrus microcarpa* Bunge	Rutaceae	Simuyaw	I	S	C
97	*Lunasia amara* Blanco	Rutaceae	Panyat	I	S	C
98	*Chrysophyllum cainito* L.	Sapotaceae	Star apol	I	T	C
99	*Capsicum annuum* L.	Solanaceae	Katumbal/ Kutitot	E/I	H	C
100	*Poikilospermum suaveolens* (Blume) Merr.	Urticaceae	Dangkalan	E/I	C	W
101	*Lantana camara* L.	Verbenaceae	Hagonoy puro	E	S	W
102	*Stachytarpheta jamaicensis* (L.) Vahl	Verbenaceae	Salmamento/Almamento	E	H	W
103	*Leea* sp.	Vitaceae	Hamangal	E	S	C
104	*Alpinia galanga* (L.) Willd.	Zingiberaceae	Langkawas	I	H	W
105	*Curcuma longa* L.	Zingiberaceae	Dulaw/ Lampuyang	E	H	C
106	*Zingiber officinale* Roscoe	Zingiberaceae	Luy-a	E/I	H	C

Administration	I - Internal
	E - External
Plant Habit	H- Herb
	S- Shrub
	T - Tree
	C- Climber
Collection Site	C-Cultivated
	W- Wild
	M - Market

Administration	No. Plants	Percentage
External	39	37
Internal	39	37
Combination	28	26
Total	106	100

Plant habit	No. Plants	Percentage
Climber	11	10
Herb	42	40
Shrub	23	22
Tree	30	28
Total	106	100

Collection Site	No. Plants	Percentage
Cultivated	60	57
Market	2	2
Wild	44	42
Total	106	100