



## ETHNOMEDICINAL PLANTS USED BY THE SUBANEN TRIBE IN TWO VILLAGES IN OZAMIS CITY, MINDANAO, PHILIPPINES

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### ABSTRACT

This paper presents the study of ethnobotanical plants as well as the traditional healthcare practices used by the Subanen Tribe of Villages Gala and Guimad in Ozamis City, Mindanao, the Philippines. Informal interviews were conducted using a semi-structured questionnaire involving 83 Subanen respondents aged 7 to 85 years. There were 113 plant species, identified and distributed to 99 genera and 52 families. Leaves were the most widely used plant parts, which were commonly prepared by decoction, maceration, poultice, and or eaten in fresh. Stomach ailments, wounds, boils, abscess, muscle pains, or over-fatigue in women after giving birth were among the most common health problems that were cured by the identified plants. Subanen frequently used ten species - *Psidium guajava*, *Allium odorum*, *Coleus aromaticus*, *Coleus scutellarioides* Blume, *Myristica philippinensis*, *Kalanchoe pinnata*, *Blumea balsamifera*, *Agave sp.*, *Annona muricata*, and *Artemisia vulgaris*. Some of these medicinal plants used by the Subanens were reported to be also used by other tribes in the Philippines and even in other countries.

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### Introduction

Knowledge of plants, particularly on their medicinal values, is based on man's experience through the years. As early as 1770 BC in Babylonia from their Code of Hammurabi, in Ancient Egypt circa in 1550 BC and 77 AD, a Roman physician Pedanius Dioscorides published *De Material Medica*, a compilation of botanical information used as medical text until the Middle Ages [1]. These resulted in many valuable discoveries leading to the development of many commercial plant-derived drugs. India, for example, a country with rich culture and traditional knowledge, had contributed a significant share of the world's ethnobotanical works [2]. The abundant knowledge of traditional plants was manifested even in their cuisine, such as the famous turmeric [3]. In the Philippines, there are less written documents about ethnobotanicals, especially to known indigenous groups. With the enactment of Republic Act No. 8423 [4], known as the Traditional and Alternative Medicine Act in 1997, studies on medicinal plants and their uses have much flourished throughout the country. This Act acknowledges and helps maintain the exceptional knowledge of indigenous people for medicinal plants, which are only orally handed down through generations. At present, there are more attempts to study and document the medicinal plants of the indigenous people of Mindanao island in the Philippines [5-26]. These plants are undergoing serious threats from extinction due to deforestation and migration of many young generations of indigenous people to urban areas just like those reported in many areas in the world [27]. The Subanens is one of the most prominent groups of the Lumad or non-Muslim indigenous cultural community on the Mindanao island. These ethnic people of Malay descent occupy the river tributaries of the entire peninsula of Sibuguey and headwater streams of Mt. Malindang in Misamis Occidental in the island of Mindanao, Philippines. While there are external and internal pressures, this group is continuously living in mountain ranges of Mt. Malindang, the recently declared fourth ASEAN Heritage Park in the Philippines. The rich culture of the Subanen people in the Mt. Malindang Mountain Ranges suggests that they have abundant knowledge on the use of ethnomedicinal plants in their healthcare practices as reported earlier in some villages in Mindanao [22-26]. Since there is the existence of many communities of these indigenous people in Mindanao, this study provides some additional information about the plants, used by this community.

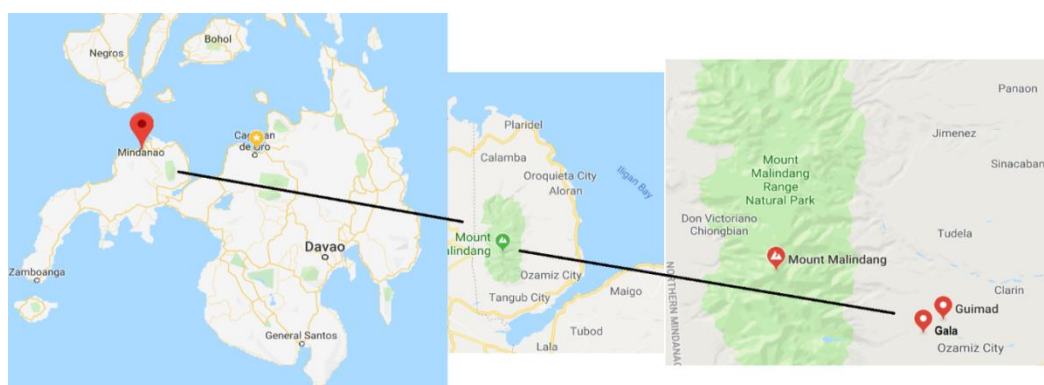
## Materials and Method

Gala and Guimad are among the 28 upland villages of Ozamis City, Misamis Occidental in Mindanao, Philippines. These are where some tribal clans of the Subanens chose to reside. Gala is situated in 51P 577217 902156 UTM and has an area of 546.300 hectares while Guimad lies in 51P 578223 902694 UTM and has an area of 303.110 hectares. The Gala village is at an altitude of 562.55 meters above sea level while Guimad is at 432.25 meters. The climate in these particular villages are noted to be cold and chilly and are considered to be potential for tourism development. Some areas of Guimad are among the 1,350 hectares that form a portion of the buffer zone and strict protection zone of the protected area of Mt. Malindang. The 1,350 hectares distributed in four buffer zone villages such as Guimad, Guingona, Trigos, and Stimson Abordo is within the 2,996 hectares of the Ancestral Domain Claims. Presently, there are a total of 3,066.17 hectares of Ancestral Domain Claims of the Subanen Tribe comprising seven villages namely, Gala, Guimad, Guingona, Stimson Abordo, Trigos, Capucao, and a little portion of Sangay.

As of 2010 National Census, Village Gala has a total population of 859 with 33 Subanen households while the village of Guimad has a population of 528, which mostly are of Subanen ancestors. These two adjacent villages are separated by the Labo River that feeds water to the lowland areas of the municipality of Clarin and cities of Tangub and Ozamis.

The Gala and Guimad villages can be reached by any four-wheeled vehicles via Kinuman Norte village road but conveniently accessed by riding a motorcycle known as “habal-habal.” A separate courtesy call to the captains of the two villages was done before the conduction of the study.

From the 33 households, one member was taken as a representative respondent regardless of age and position in the family (father, mother, or children) as long as they were able to answer the questions.



**Fig. 1.** The study sites: Village Gala and Guimad, Ozamis City, Mindanao, Philippines.

The series of interviews and exploration trips were conducted by the help of the village councilman and a pure Subanen inhabitant for plant identification. A total of 83 respondents were interviewed including housewives, the male head of the family, children, head of the clan, “timely” or village chief, and the tribal healer. The gathered data included the traditional mode of preparation and application of medicinal plants, plant parts that are used, as well as the type of illnesses and diseases that are cured. Subanen names of medicinal plants were also recorded. Identification of the plants that include common English and scientific names was done. The study was conducted between November 2013 to March 2014.

## Results and Discussion

A total of 113 plant species distributed to 99 genera and 52 families were recorded. The plants were also classified as to the common names, Subanen name, plant parts used, preparation and mode of application, and their medicinal uses. Families of Asteraceae/Compositae and Euphorbiaceae had the highest number of plant representatives consisting of 8 species and followed by Family Poaceae/Gramineae with 7 species. Families of Leguminosae and Malvaceae each had 6 species. Families of Fabaceae and Moraceae each had 4 species. Families of Boraginaceae, Meliaceae, Verbenaceae, and Zingiberaceae had 3 species. And families Alliaceae, Arecaceae, Musaceae, Piperaceae, and Rutaceae each had two species. Other remaining 34 families each had one species (Table 1).

**Table 1.** Medicinal Plants Used by the Subanen Tribe in Gala and Guimad villages in Ozamis City, Mindanao, the Philippines.

Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
<i>Agavaceae</i>					
1.	<i>Sansevieria</i>	Snake Plant	Sunday-Sunday	Stem/	Pound the stem or leaves Treats Abscess, boils,

	<i>trifasciata</i>			Leaves	and apply to the wound as a poultice	and tissue inflammation
2.	<i>Agave sp.</i>		Patong	Leaves	A decoction of leaves and drink	Usually prevents bleeding after giving birth
<i>Alliaceae</i>						
3.	<i>Allium odorum</i>	Chinese Chives	Ganda	Whole Plant	Roast partly or use it fresh and rub on the affected area now and then	Relief for asthma, dry cough brought about by flatulence
4.	<i>Allium sativum</i>	Garlic	Ahos	Cloves	Peel the skin and then rub it thoroughly on the bitten part right after it was bitten	To avoid infection and poisonous effect of animal bites
					Eat fresh	Treats hypertension
<i>Anacardiaceae</i>						
5.	<i>Mangifera indica</i> Linn.	Mango	Mangga	Leaves	drink the decoction of the leaves three times a day	Treats diarrhea
<i>Annonaceae</i>						
6.	<i>Annona muricata</i>	Soursop	Sabanas	Young leaves	Boil with water and drink three times a day	Treats kidney
				Fruit	Eat fresh two hours before breakfast	Used as deworming
<i>Apiaceae</i>						
7.	<i>Hydrocotyle Asiatica/ Centella Asiatica</i>	Indian Penny Wort	Yahong-yang	Leaves	Boil the leaves for 2 minutes and drink three times a day	Treats diarrhea
<i>Arecaceae</i>						
8.	<i>Corypha elata</i>	Buri Palm	Buli	Palm	Roast the palm, pound, and then squeeze to extract the juice and rub it from head to toe	Treats over fatigue for women <i>taught</i> )
				Thorn	Get three thorns, soak it in water and drink	Relief for teething infants
9.	<i>Cocos nucifera</i>	Coconut	Lubi	Young fruit	Drink the juice of the young fruit early in the morning before breakfast	Treats kidney
					Roast the young fruit and eat the meat	Treats fever
				Bark near at the base "Lambi."	A decoction of the bark and drink three times a day before meals	Treats Ulcer
<i>Asteraceae/Compositae</i>						
10.	<i>Blumea balsamifera</i>	Blumea camphor/ Alumna	Gabon	Newly-sprouted leaves	Soak with fresh water	Treats cough
					Partly roast and then rub it on the affected body (it is better if mixed with kerosene from the used lamp)	Treats flatulence ( <i>peanut</i> )
					Eat fresh	Treats gas pain

11.	<i>Gynura procumbens</i>	Longevity Spinach	Sangbong	Leaves	Wash the leaves and eat it fresh	Treats Urinary Tract Infection (UTI)
12.	<i>Tagetes erecta</i>	Marigold	Utot-utot	Leaves	Boil the leaves and then drink	Treats toothache
13.	<i>Pseudoelephantopus spicatus</i> (Juss.) Rohr.	Tobacco Weed	Dila-dilag iro	Leaves	Pound the leaves and then squeeze the juice to the affected area	Treats wounds and abscesses
14.	<i>Mikania cordata</i>	Heartleaf hempvine	Hagonoy	Leaves	Pound and squeeze the juice to the affected area	Treats wound and abscesses
				Roots	Wash the roots thoroughly, soak it in freshwater and then drink three times a day	Relief from over fatigue for women ( <i>timughat</i> )
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
15.	<i>Artemisia vulgaris</i>	Mugwort	Hilbas	Leaves	Boil with water and drink three times a day	Treats cough
					Pound thoroughly and apply the sap to the affected ear	Ear infection ( <i>bungog</i> )
16.	<i>Elephantopus scaber</i>	Prickly-leaved Elephant's Foot	Kukog-banog	Whole Plant	Roast partly and then rub or apply on the affected part of the body ( <i>must be effective if done during night time</i> )	Relief for flatulence ( <i>panuhot</i> )
17.	<i>Emilia sonchifolia</i> (L.) DC ex Wight	Lilac Tassel Flower	Pisaw-pisaw	Whole Plant	Wash the plant thoroughly and then soak in water and drink it instead of water	Relief from fever among infants
					Pound the plant and then rub on the affected area	Relief from numbness due to flatulence ( <i>panuhot</i> )
<i>Athyriaceae/Woodsiaaceae</i>						
18.	<i>Athyrium esculentum</i>	Vegetable fern	Pako	Roots	Wash the roots carefully, boil for at least five minutes and then drink three times a day	Treats Hypertension
<i>Basellaceae</i>						
19.	<i>Basella rubra</i> Linn.	Malabar Night Shade	Alugbati	Leaves	Pound the leaves and apply it around the wound or in the affected part as a poultice	Improving wound inflammation and preventing tetanus infection. Relieve pain caused by toothache
<i>Boraginaceae</i>						
20.	<i>Heliotropium indicum</i> Linn.	Indian turnsole	Elepante	Roots	Wash the roots, soak with water and then drink it three times a day	For over fatigue for women ( <i>timughat</i> )
21.	<i>Cordia dichotoma</i>	Soap Berry	Anonang	Leaves	Boil leaves with water and drink	Relief of dyspepsia
22.	<i>Carmona heterophylla</i> Cav.	Wild Tea	Alangit-ngit	Leaves	Partly roast the leaves and then apply it overnight ( <i>haklop</i> )	Relief from flatulence ( <i>panuhot</i> )
	Family/	English/ Common	Local/ Subanen	Plant Part	Preparation and Mode of	Medicinal Uses

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	Scientific Name	Name	Name	Used	Application	
<i>Bromeliaceae</i>						
23.	<i>Ananas comosus</i>	Pineapple	Pinya	Leaves	Pound the leaves and drink the juice at least two teaspoonfuls after dinner	Used as dewormer
				Young fruit	Eat the young fruit in raw	Relief from tonsillitis
<i>Burseraceae</i>						
24.	<i>Canarium Luzonicum</i>		Salong-lonay	Latex	Burn the latex in glowing charcoal with myrrh and sauna "toob"	To the outcast bad spirit
25.	<i>Canarium sp.</i>		Bintoko	Leaves	Squeeze young leaves in the water used for bathing for infants and mothers after giving birth	Prevents flatulence
				Stem	Scrape the stem and apply to the womb overnight	Prevents flatulence for pregnant women
<i>Cannaceae</i>						
26.	<i>Canna generalis/ L.H. Bailey</i>	Canna Lily	Saging-saging	Stem	Pound it thoroughly and then apply around the affected area as a poultice	Treats boils, wounds, and abscess
<i>Caricaceae</i>						
27.	<i>Carica papaya</i>	Papaya	Kapayas	Young fruit	Eat the young in raw	Treats tonsillitis
<i>Caryophyllaceae</i>						
28.	<i>Drymaria cordata</i>	Tropical Chickweed	Kunay-kunay	Whole plant	Wash the plant thoroughly, soak in freshwater and drink three times a day	Soothing infants from teething
<i>Chrysobalanaceae</i>						
29.	<i>Atuna racemosa Raf.</i>	Merbatu	Tabon-tabon	Young fruit	Scrape the meat, extract the juice and then drink at least two teaspoonfuls before breakfast	Treats ulcer
<i>Combretaceae</i>						
30.	<i>Quisqualis indica L.</i>	Chinese Honeysuckle	Awoy	Leaves	Boil the leaves with water and then drink it. Usually used instead of water	Treats flatulence (panuhot)
<i>Commelinaceae</i>						
31.	<i>Rhoe discolor</i>	Moses-in-the-cradle	Bangka-bangkaan	Leaves	Decoction of leaves	Treats cough
<i>Convolvulaceae</i>						
32.	<i>Ipomoea batatas</i>	Sweet Potato	Kamoteng Balagon	Leaves	Wash the leaves and then steam in a pot. Drink the produced juice and eat the cooked leaves without a mix	Treats anemia
<i>Crassulaceae</i>						
33.	<i>Kalanchoe pinnata</i>	Miracle plant	Handilika	Leaves	Pound the leaves and apply to the affected area	Treats abscess and toothache
<i>Cucurbitaceae</i>						
34.	<i>Momordia charantia Linn.</i>	Bitter Gourd/ Bitter Melon	Paleya	Fruit	Eat the fruit raw	Treats diabetes
<i>Cyperaceae</i>						

35.	<i>Kyllinga monocephala</i>	Whitehead Spikehedge	Busikad	Whole plant	Wash the plant thoroughly, soak in freshwater and drink three times a day (Usually mixed with Tropical Chickweed)	Relief from cough and fever especially for teething infants
<i>Euphorbiaceae</i>						
36.	<i>Jatropha gossypifolia</i>	Red Physic Nut	Kaslang limbahon	Seeds	Roast the seeds and pound thoroughly then mixed with tobacco ash and then apply to all the joints	Relief of over fatigue for women "timughat"
				Stem	Scrape, then partly roast and then rub on the body	Relief from flatulence
37.	<i>Jatropha curcas</i>	Purging Nut Tree	Kaslang Puti	Stem	Scrape the stem and then apply overnight	Treats flatulence and over fatigue for women
38.	<i>Ricinus communis Linn</i>	Castor Oil Plant	Tangan-tangan	Stem	Scrape the stem, partly roast and then apply overnight	Treats flatulence
39.	<i>Manihot esculenta</i>	Cassava	Kamanting-kahoy	Leaves	Wrap around the forehead with fresh leaves	Relief of fever and headache
40.	<i>Phyllanthus niruri</i>	Seed-Under-Leaf	Tulog-tulog	Leaves	Partly roast the leaves and then rub it all over the body (usually mixed with other herbal plants like guava leaves)	Treats flatulence
41.	<i>Euphorbia hirta</i>	Snake weed/Asthma weed	Tawa-tawa	Whole plant	Boil with water and drink now and then	Relief of dengue fever
42.	<i>Euphorbia nerifolia</i>	Common Milk Hedge	Soro-soro	Stem	Scrape the stem and then rub it fresh on the affected area	Relief from joint inflammation and beriberi
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
44.	<i>Macaranga bicolor</i>		Hanomom-o	Roots and stem	Scrape the stem and roots and then apply overnight	Treats Flatulence
45.	<i>Myristica philippinensis</i>		Duguan	Stem and branches	A decoction of the chopped stem and then drink it three times a day	Treats high blood pressure
<i>Fabaceae</i>						
46.	<i>Erythrina orientalis</i>	Tiger's Claw	Dap-dap	Roots and stem	Scrape the roots and stem, partly roast them and then apply to the affected part	Treats muscle pain, boils, and cysts
47.	<i>Glicicidia sepium</i>	St. Vincent Plum	Madre de Cacao	Leaves	Partly roast the leaves, pound it, extract the juice, and then rub it on the itchy part	Treats skin itches ( <i>kurikong</i> )
48.	<i>Derris elliptica</i>	Poison Vine	Tubli	Roots	Scrape the roots and then apply	Treats stitch and avoids bad spirit ( <i>giuray</i> )
49.	<i>Caesalpina sappan Linn.</i>	Sappan Wood	Sibukaw	Stem	A decoction of stem and bark	Treats high blood and anti-cancer
<i>Guttiferae</i>						
50.	<i>Garcinia</i>	Mangosteen	Mangosteen	Leaves	Boil the leaves and then	Treats stomach ache

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	<i>mangostana</i>				drink a glass of it	and diarrhea
<i>Lamiaceae/Verbenaceae</i>						
51.	<i>Ocimum basilicum</i>	Sweet basil	Humutan	Leaves	Pound the leaves and then rub t o n o the affected area	Treats chickenpox
52.	<i>Coleus aromaticus</i>	Oregano	Kalabo	Leaves	Soak in freshwater and then drink once a day or steam three times, extract the juice, and drink.	Treats cough
53.	<i>Premna odorata Blanco</i>	Fragrant Premna	Agbaw	Leaves	Dissolve the young leaves in the water, used for bathing	To prevent flatulence for infants
54.	<i>Coleus scutellarioides Blume</i>	Painted Nettle	Manyana	Leaves	Pound and then squeeze the juice to the wound	Treats wounds
<i>Leguminosae</i>						
55.	<i>Cajanus cajan Linn.</i>	Pigeon Pea	Kadyos	Leaves	Boil it with water and then use it for bathing	Treats inflammation of the legs ( <i>panghupong</i> )
56.	<i>Mimosa pudica</i>	Bashful Mimosa	Hibi-hibi	Roots	Wash the roots, pound thoroughly and then apply it in between or on the hole of the teeth that is aching	Relief of toothache
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
57.	<i>Adenanthera pavonina</i>	Circassian Bean	Bahay	Seeds	Roast, peel, pound thoroughly and then apply to the bitten part	Protection from the venom from insect and animal bites
58.	<i>Cassia alata</i>	Ringworm bush	Asunting	Leaves	Pound the leaves, mix with a pinch of salt, roast partly, and then rub thoroughly on the affected area twice a day	Treats acne and ringworm
	<i>Cassia occidentalis</i>	Coffee Senna	Santo. Domingo	Roots	Drink one glass of the decoction of roots twice a day	Treats stomach ache
59.	<i>Flemingia strobilifera</i>	Wild Hops	Hagupit/Tulay-tulay	Roots	Drink one glass of the decoction of roots instead of water	Relief from over fatigue for women
<i>Lauraceae</i>						
60.	<i>Persea Americana</i>	Alligator Pear	Abokado	Leaves	Boil the leaves usually mixed with leaves of guava and star apple and then drink a day	Treats diarrhea
	<i>Cinnamomum zeylanicum</i>	Cinnamon	Hantotoknaw	Roots	A decoction of roots and drink it three times a day	Treats over fatigue for women
<i>Lythraceae</i>						
61.	<i>Lagerstroemia speciosa</i>	Queen's flower	Banaba	Leaves	Boil with water and drink three times a day	Treats diarrhea and kidney infection
<i>Malvaceae</i>						
62.	<i>Abelmoschus moschatus</i>	Musk mallow	Alikway	Leaves	Pound and then wrap to the forehead	Relief of headache
63.	<i>Theobroma cacao</i>	Cacao plant	Kakaw	Fruit	Scrape the peeling of the	Relief from boils and

					fruit and apply around the boils or wound as a poultice	swelling wound
64.	<i>Sida acuta</i>	Broom weed	Escobang miyawes	Leaves	Pound and rub on the affected area	Treats skin irritation
65.	<i>Abelmoschus esculentus</i>	Gumbo	Okra	Young fruit	Soak the young fruit in water and drink	Treats diabetes
66.	<i>Hibiscus rosa-sinensis</i>	China Rose	Antuwanga	Flower	Pound the flower and apply around the affected area as a poultice	Relief from the swelling wound
67.	<i>Hibiscus tiliaceus</i>	Sea Rosemallow	Balibago	Bark	Scrape the bark, pound it thoroughly, partly roast and then rub on the affected area	Treats sprain "lisa"
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
<i>Meliaceae</i>						
68.	<i>Melia dubia</i>	Bead Tree	Bagalnga	Leaves	Pound the leaves, extract the juice, mix with little kerosene, and apply to the affected area.	Treats skin allergies
69	<i>Swietenia macrophylla</i>	Broad-leaved Mahogany	Mahogany	Seeds	Boil the seeds and drink the juice twice a day	Treats stomach ache and diarrhea
70.	<i>Sandoricum koetjape</i>	Lolly Fruit	Santol	Roots	A decoction of roots and then drink	Cures diarrhea
<i>Menispermaceae</i>						
71.	<i>Tinospora rumphii</i>	Heavenly Elixir	Panyawan	Vine	A decoction of the vine and then drink it three times a day	Treats Highblood and diabetes
				Latex	Drop the latex at least twice to the opposite of the teeth that are aching	Treats toothache
<i>Moraceae</i>						
72.	<i>Ficus septic</i>	Hauili tree	Lagnob	Leaves	Boil with water then drink twice a day	Treats stomach ache
				Stem	Scrape the stem and then apply it overnight	relief from flatulence
73.	<i>Poikilospermum suaveolens (Blume) Merr.</i>		Hanopol-tubig	Leaves	Partly roast the leaves and then apply to the affected area "haklop"	Treats muscle and body pain caused by flatulence
74.	<i>Artocarpus heterophyllus</i>	Jackfruit	Nangka	Leaves	A decoction of leaves and then drink	Treats constipation
75.	<i>Ficus sp.</i>	Weeping Fig	Balete	Bark	Put the bark between the fractures, tie it with a cloth and leave it until dries	Treats sprain and fractures
<i>Moringaceae</i>						
76.	<i>Moringa oleifera</i>	Horse Radish Tree	Kamonggay	Roots and seeds	A decoction of roots and/or seeds and then drink three times day	Treats diarrhea
				Leaves	Pound the leaves and rub it on the affected area	Prevents bulging of the skin due to hard impact
<i>Musaceae</i>						



77.	<i>Musa sapientum</i>	Banana	Saging	Palm	Roast the palm, pound, extract the juice and use it as oil in massaging the body	Relief of overfatigue for women
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
				Dried leaves	Pound and press the juicy sap to the wound	Prevent bleeding
78.	<i>Musa textilis</i>	Abaca	Abaka	Palm	Roast the palm, pound, extract the juice and massage it on the body from head to toe. Usually used with banana and buri	Treats overfatigue of women
<i>Myrtaceae</i>						
79.	<i>Syzygium aquieum</i>	Malay Apple	Tambis	Leaves	A decoction of the leaves and then drink instead of water	Treats stomach ache and diarrhea
80.	<i>Psidium guajava</i> Linn.	Guava	Bayabas	Newly sprouted leaves	Pound the leaves and rub it on the wound	Used to avert bleeding
				Young leaves	Boil with water and use the juice to clean the wound	Prevent infection from open wound most specifically newly-circumcised kids
					Boil with water and drink it three times a day (usually mixed with avocado and star apple leaves)	Treats stomach ache and diarrhea
					Partly roast and apply overnight	Treats flatulence
81.	<i>Abutilon indicum</i>	Chinese Bell Flower	Marbas	Leaves	Partly roast and apply	Treats flatulence
82.	<i>Syzygium jambolanum</i>	Black Plum	Lumbuy	Bark	A decoction of the bark and drink it three times a day	Treats ulcer
<i>Oxalidaceae</i>						
83.	<i>Averrhoa carambola</i> Linn.	Star Fruit	Balimbing	Leaves	Pound the leaves and rub on the affected area	Treats chicken pox
<i>Pandanaceae</i>						
84.	<i>Pandanus odoratissimus</i>	Dwarf Screw Pine	Pandang humotan	Leaves	Boil the leaves and drink	Treats arthritis
<i>Piperaceae</i>						
85.	<i>Peperomia pellucid</i>	Shiny Bush	Sinaw-sinaw	Whole plant	Boil and drink at least once a day	Treats kidney infection
86.	<i>Piper sp.</i>	Betel Leaf Pepper	Buyo	Leaves	Apply the leaves upside down to the breast and back overnight	Treats flatulence
<i>Pittosporaceae</i>						
87.	<i>Pittosporum pentandrum</i>	Cheese Wood	Hagbuyo	Leaves	Partly roast and apply every night	To avoid flatulence for pregnant women

	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
<i>Poaceae/Gramineae</i>						
88.	<i>Andropogon aciculatus</i>	Love Grass	Amorseko	Roots	Boil the roots and drink	Treats diarrhea
				Flower stalk	Extract the juice and drop to the bitten area	To avoid bulging of insect bites and stings
89.	<i>Eleusine indica</i>	Goose Grass	Bila-bila	Whole plant	Wash thoroughly and soak in freshwater and then drink	Treats hypertension
90.	<i>Imperata cylindrical</i>	Spear Grass	Kogon	Rhizome	Wash thoroughly and boil with water and then drink it three times a day	Treats high blood
91.	<i>Cymbopogon citrates</i>	Lemon Grass	Tanglad	Roots and stem	Wash thoroughly and boil with water and then drink	Treats high blood
92.	<i>Cynodon dactylon</i>	Bermuda Grass	Bermuda	Roots	Boil with water and drink	Treats high blood
93.	<i>Pennisetum purpureum</i>	Napier Grass	Data	Leaves	Boil with water and drink at least two glasses a day	Treats over fatigue for women after delivery
94.	<i>Saccharum officinarum</i>	Sugarcane	Tubo	Stem	Roast the stem and then squeeze the juice, then add with one teaspoonful of oil and then drink	Treats Hepatitis A
95.	<i>Bambusa spinosa</i>	Bamboo	Kawayang tonukon	Dried Leaves	A decoction of leaves and drink it instead of water	Treats high blood pressure
<i>Rubiaceae</i>						
96.	<i>Morinda citrifolia</i> Linn.	Indian Mulberry	Bangkoro	Leaves	Apply overnight usually mixed with leaves of guava and wild tea	Treats gas pain and constipation
<i>Rutaceae</i>						
97.	<i>Triphasia trifolia</i>	Lime Berry	Lemonsito	Fruit	Roast and then eat without any mix, or extract the juice and then drink it. It is also eaten fresh.	Treats dry cough and lower cholesterol level
98.	<i>Citrus maximus</i>	Pomelo	Boongon	Newly sprouted leaves	Mixed in water used for taking a bath	Prevents illnesses and diseases for infants usually mixed with leaves of Blumea camphor
<i>Sapotaceae</i>						
99.	<i>Chrysophyllum cainito</i>	Star Apple	Caimito	Leaves	Boil with water and drink	Treats diarrhea
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
<i>Scrophulariaceae</i>						
100.	<i>Scoparia dulcis</i>	Sweet Broom Weed	Wachichaw	Leaves	Boil with water and drink	Treats diabetes
<i>Solanaceae</i>						
101.	<i>Nicotiana tabacum</i>	Tobacco	Tabako	Leaves	Roll the leaves and then use it as cigarette and blew the smoke to the womb	Treats gas pain or flatulence
<i>Ulmaceae</i>						
102.	<i>Trema orientalis</i>	Pigeon Wood	Hinagdong	Bark	Roast, pound and then apply	Treats sprain

					to the affected area	
<i>Umbelliferae</i>						
103.	<i>Hydrocotyle vulgaris</i>	Penny Wort	Gotocola	Leaves	Wash thoroughly and then eat it in raw	Treats diabetes
<i>Uritaceae</i>						
104.	<i>Pipturus asper</i>	Handalamay / Lanutan	Pipturus	Leaves	Get 21 leaves from the tip. First, stroke seven (7) leaves from head to toe most especially to the affected part followed by another seven leaves and finally the last seven leaves. This hang in the chimney of the dirty kitchen	Treats Herpes
<i>Verbenaceae</i>						
105.	<i>Vitex negundo</i>	Five-leafed Chaste Tree	Lagundi	Leaves	Boil with water and drink three times a day	Treats cough
106.	<i>Gmelina elliptica</i>	Rais Madre de Dios	Gmelina	Leaves	Apply the fresh leaves in the affected area	Treats sprain
107.	<i>Stachytarpheta jamaicensis L.</i>	Bastard vervain	Kanding-kanding	Leaves and stem	Pound the leaves thoroughly, scrape the stem and then mix and rub on the affected part	Treats joint inflammation and beriberi
<i>Xanthorrhoeaceae</i>						
108.	<i>Aloe barbadensis</i>	Aloe vera	Sabila	Leaves	Extract and juice and used it as a shampoo every bath	Stops hair fall due to over fatigue for women after delivery
					Extract the juice and then apply it to the affected area now and then	Relief for skin burn
	Family/ Scientific Name	English/ Common Name	Local/ Subanen Name	Plant Part Used	Preparation and Mode of Application	Medicinal Uses
<i>Zingiberaceae</i>						
109.	<i>Zingiber officinale</i>	Ginger	Luy-a	Rhizomes	Eaten fresh and or make it like candy or pound it then rub on the affected part	Treats cough and flatulence
110.	<i>Curcuma domestica Valet</i>	Long turmeric	Dulaw	Rhizomes	Pound the rhizomes and then rub it on the affected area	Relief from inflammation of joints and treats muscle pain
111.	<i>Hedychium coronarium</i>	Ginger Lily	Kamias	Leaves	Boil with water and drink	Helps maintain a regular menstruation
112.	<i>Costus speciosus (Koenig ex. Retz. Smith)</i>		Sungkod-sungkod	Roots	Boil and drink three times a day	Treats over fatigue of women

The Subanen of various villages in Mindanao use different plants in their surrounding, utilizing various parts of them including leaves, seeds, flowers, stem, bark, fruit, roots, palm, rhizome, thorn, juice, and even latex of the plants, which are also found to be of similar practices observed in the current study [22-26]. The most commonly used part of the plants was the leaves including the newly-sprouted, young, and or even dried leaves with 58 species. The roots were utilized in 14 species of plants; stem, bark, and vine in 14 species; Fruits in 7 species, the whole plant in 5 species; the rhizome in 3

species, palm in 3 species; latex and or juice in 2 species; and seeds, thorn, flower, and flower stalk were utilized in 1 species (Table 1).

The most frequently used medicinal plants by Subanen include *P. guajava*, *A. odorum*, *C. aromaticus*, *C. scutellarioides*, *M. philippinensis*, *K. pinnata*, *B. balsamifera*, *Agave sp.*, *A. muricata*, and *A. vulgaris*. These species were noted to effectively treat common ailments and are usually planted in their backyard and or protected from timber poaching especially for *M. philippinensis*, which normally grows in dense forests and along riverbanks. It was also noted that one of the techniques applied by the Subanen for medicinal plants to be more effective was the mixture of different species during preparation. There were also instances that all parts of the plants were used in treating various diseases. For example, the juice of *C. nucifera* was identified as good medicine for kidney infection. Its fruit is roasted, and the meat is eaten to treat fever caused by “*pasmo*” or famish. The decoction of bark found at the base locally known as “*lambi*” was effective in treating ulcer (Figure 2). Among the common diseases and illnesses, experienced by the Subanen were muscle and body pain caused by hard labor in their farms. They usually suffered flatulence, locally known as “*panuhot*”, which resulted in gas pain, constipation, joint inflammation, and stitch. These illnesses were given remedies by boiling the leaves of *Q. indica* and taken three times a day or by applying the fresh scraped roots of *D. elliptica* and scraped stem of *J. curcas*, *F. septic*, and *R. communities* as poultice overnight. The leaves of *P. ninuri*, *E. scaber*, *C. heterophylla*, *A. indicum*, and *P. guajava* were partly-roasted and applied as a poultice in affected areas usually during night time. This was argued to be effective since all the veins in the body were at rest and also to avoid being disturbed from their work during day time. These plants were individually prepared or mixed to be more effective like the partly-roasted leaves of *A. indicum*, *E. scaber*, and *P. guajava* whenever available.

It was learned from the respondents that *B. camphor* was best known for its healing effect in treating cough and also in treating flatulence by rubbing the partly-roasted leaves on the body. Also, the extract of this plant can be mixed with kerosene, and the extract of *Z. officinale* was used for massage. The species *A. odorum* was commonly used to treat dry cough and asthma triggered by flatulence. The whole plant was either partly-roasted or freshly rubbed on the chest and back of the body. Several respondents also identified *N. tabacum* as the medicine of flatulence but of different application. The leaves were used like a cigarette, and the smoke will be blown to the stomach of the patient. *P. petandrum* was also noted to prevent flatulence among pregnant women by applying the partly-roasted leaves to the womb overnight while the leaves of *P. odorata Blanco* is mixed in water used for bathing for women after giving birth and for infants. This was usually accompanied by newly-sprouted leaves of *Canarium species* locally known as “Bintoko,” *B. camphor* and *C. decumana*. For gastrointestinal problems such as stomach ache and diarrhea, the common cure was by a decoction of the leaves of *P. americana*, *P. guajava*, and *C. cainito*. These three medicinal plants were usually mixed upon preparation as locally termed as “ABC” or “Abokado, Bayabas, and Caimito,” but these could also be used individually. They also identified *S. malaccense*, *M. indica*, and *F. septic* as an effective cure using the decoction of leaves. A decoction of roots of *S. koetjape* was also argued as effective. The seeds of *S. mahogany* was also identified as medicine for stomach ache. Roots or seeds of *M. oleifera* were also a cure for stomach ache by boiling them but were not advisable for pregnant women due to their abortive effect.

Overfatigue or “bughat” was also one of the common health problems most especially among women after giving birth. *M. textilis*, *M. sapientum*, and *C. elata* were used to treat overfatigue by roasting the palm, pounding, extracting their juices and using as a massage oil. The thorns of these plants were also used in giving relief for teething infants by just soaking three thorns to a glass of water and using instead of water. *J. curcas* and *J. gossypifolia* were also used by applying the partly-roasted scraped stem only as a poultice. The seeds of *J. gossypifolia* were also effective by pounding the roasted seeds and applying in the pulses throughout the body, locally termed as “*ihimulso*”. The roots of *M. cordata* and *H. Indicum* were identified as an effective cure by soaking them in freshwater or maceration and drinking instead of water. The extract of *A. barbadensis* was used in treating hair fall due to overfatigue. There were species identified as an effective medicine for coughs such as *B. balsamifera* and *C. aromaticus* by just soaking young leaves to freshwater and drinking three times a day. Boiling the leaves of *A. vulgaris*, *R. discolor*, and *V. regundo* were already popular medicine. The partly-roasted whole plant of *Allium odorum* was also effective by rubbing it on the chest and back of the body.

The Subanen also identified 11 species of plants to cure boils, abscess, and open wounds. These were *S. trifasciata*, *P. spicatus*, *M. cordata*, *C. generalis*, *K. pinnata*, *C. scutellarioides*, *T. cacao*, *H. rosinensis*, *B. rubra*, *M. sapientum*, and *P. guajava*. These were used as a poultice or applied directly to the wounds. Young leaves of *P. guajava* and dried leaves of *M. sapientum* were noted to prevent or avert bleeding by pounding the leaves and immediately applying to the wounds. Boiling the leaves of *P. guajava* was also used as a disinfectant to newly-circumcised male children. The scraped roots of *E. orientalis* were also used in treating boils and cysts.

The Subanens were also aware of diseases like hypertension and increased cholesterol level. The use of the decoction of roots of *A. esculentum*, *I. cylindrical*, *C. citrates* and *C. dactylon* was argued to be an effective treatment. A decoction of the vine of *T. rumphii* and the chopped stem and branches of *M. simiarum* were also reported as cures for high blood pressures. *M. simiarum* is an effective medicine but difficult to find since this species can only be seen in dense forest and seldom accessed. Cloves of *A. sativum*, eaten raw, fresh juice of *T. trifolia*, and the macerated whole plant of *E. indica* were also commonly used because they are most accessible.

Kidney infections and other urinary problems were treated by regular drinking of the juice of *Cocos nucifera*, by boiling the leaves of *A. muricata* and *L. speciosa*, boiling the whole plant of *P. pellucid*, or by eating fresh leaves of *G. procumbens*.

For curing the inflammation in the joints and legs known as “panghupong” arthritis and beriberi, the species used as cures were *S. jamaicensis* L. and *E. neriifolia* where the leaves were chopped, and the stem was scraped and rubbed freshly on the affected areas. Boiling the leaves of *C. cajan* was also used by mixing with water for bathing. The boiled leaves of *P. amaryllifolius* were also noted to cure arthritis. The pounded rhizome of *C. domestica* was an effective medicine for joint inflammation.

For diabetes, *T. rumphii*, fruits of *A. esculentus*, and *M. charantia* were known as cures. Boiled leaves of *S. dulcis* were also used, while leaves of *H. vulgaris* were freshly eaten to lower blood sugar. These two species were reported to be introduced by the Health Workers of their village and also were argued to be effective.

Treatment of stomach ulcer was by drinking the decoction of barks near the base and eating the scraped meat of the young fruits of *C. nucifera*, *S. jambolanum*, and *A. racemosa*.

Minor illnesses like headache, fever, and pain caused by teething of infants were given remedies through decoction of the whole plant of *E. hirta* and maceration of the whole plant of *E. sonchifolia*, and *K. monocephala*. The young leaves of *M. esculenta* and *A. moschatus* were also used to ease the pain by wrapping them around the forehead. Toothache was cured by pounding the roots of *M. pudica* and inserted them between the teeth that were aching. The boiled leaves of *T. erecta* were used as a relief by drinking the decoction three times a day. The crushed leaves of *B. rubra* and *K. pinnata* were used to prevent gum inflammation by applying them as a poultice. The latex of *T. rumphii* was used in treating toothache in a very different way. The latex was dropped to the eye opposite to the aching tooth at least twice enough to taste the bitterness. This sounded weird but was argued to be a very effective medicine.

For other health issues, the extract of the leaves of *A. comosus* and fruit of *A. muricata* were identified as having deworming effects. The young leaves of *Ipomoea batatas* were also used in treating anemia while the extract of roasted stem of *S. officinarum* was noted to heal Hepatitis or jaundice.

They also identified *P. asper* as medicine for herpes with only 21 leaves from the tip, used distributed as follows. First, 7 leaves are stroked from head to toe most especially to the affected part followed by another 7 leaves and finally the last seven leaves. These will be then hanged in the chimney of the dirty kitchen. Once the procedure was correctly followed, the leaves will dry as well as herpes will also be cured.

Animal bites, stings, and rabies were also given remedies like rubbing the clove of *A. sativum*, by applying the roasted, peeled seed of *A. pavonina*, and the extract of flower stalk of *A. aciculatus* on the affected areas. Skin diseases like skin allergies, acne, and ringworm, were treated using species of *C. alata*, *S. acuta*, *G. sepium*, and *M. dubia*. Barks of *F. benjamina* and *T. orientalis*, as well as the leaves of *G. elliptica* were known for their effectiveness in curing sprains. Tonsillitis can be relieved by eating young fruits of *A. comosus* and *C. papaya*.

The Subanen have rich cultural beliefs and traditions as they worshipped their gods and goddesses. They also believed in animism and the existence of supernaturals, witches, as well as vampires that suck blood known to them as “*balbal* or “*wakwak*”, which can be avoided by putting *A. sativum* and *B. spinosa* around the house. Pregnant women were also advised to always carry *A. sativum* to protect them from witches. The application of scraped roots of *Derris elliptica* overnight was also known for casting bad spirits locally known as “*giuray o giawok*.” They also believed in “hilo” or power to poisonous people by just looking or patting them. They protected themselves from this wickedness by always bringing coconut oil mixed with chopped bark of *M. Philippines*, *C. domestica*, and *C. zeylanicum*.

It can be seen from the results of this study that the medicinal plants used by the Subanen have commonalities with other tribal societies in the Philippines [2] and other Subanen communities [22-26] based on the pattern of their utilization such as decoction, maceration, poultice, etc. However, while the plants identified were most likely the same species, with different names among the tribes, and there were variations in the mode of preparations for curing different illnesses and diseases. In the study, conducted on the Higaonon tribe in Rogongon, Iligan City, 32 out of the 62 species of the medicinal plants were used by the Subanen, were found with different usages in other tribes [5]. For example, *A. vulgaris* was noted to give relief of stomach ache by the Higaonon tribe, but the Subanen used it as an effective cure for cough and ear infection. *C. dichotoma* was known to cure tuberculosis by the Higaonon, but it was used as a treatment for dyspepsia among the Subanen. A study conducted on a different Subanen settlement at a Toliyok village in Oroquieta City revealed that though the same tribe, the same species identified were observed with different local names and ailments to be cured. For example, *P. americana* was known to heal urinary tract infection (UTI) using the seeds of the fruit by the Subanen settlement, but in the present study, this species was used to treat diarrhea through boiling its young leaves plus leaves of *P. guajava* and *C. cainito*. It was also observed that for the two study areas (Gala and Guimad), the local names of the selected species such as *F. strobilifera*, *S. jamaicensis*, *P. asper*, and *C. sappan* were different i.e. they were hagupit or tulay-tulay, butay-butay or kanding-kanding, handalamay or lanutan and sebukaw or sedukaw, respectively. Subanen used only 73% of the medicinal plants identified by the Subanen in Oroquieta City in Gala and Guimad. It is however noted that while there were little variations in the names and applications within and between the Subanens in the 2 villages, both communities have intrinsic knowledge on the use of these medicinal plants for the treatment of their health problems.

For most elders of the Subanen people, herbal plants are not considered as an alternative to the treatment of ailments rather they are as their main source of medicine. They have attributed this because of not only the high costs of modern life-saving

drugs, hospitalization, and primary healthcare services but also the inaccessibility and having experienced discrimination and usually being neglected when asking for health assistance. These concerns, therefore, leave them no other choice but to depend on the traditional health-saving properties of the plant resources available in the mountains. This scenario is common in developing countries where modern healthcare facilities are inaccessible to the majority of people, especially in rural areas. Thus the use of local herbal remedies has become the primary solution in treating their illnesses. The World Health Organization (WHO) reported that more than 80% of the world's population now depends mostly on traditional medicine for their healthcare needs.

The study also revealed that while few Subanen individuals cultivated some of the species, most of the medicinal plants were now located in areas that were difficult to access, especially in dense forests of Mt. Malindang. This has posed problems to the tribe because plant collection is already not allowed since the area is already a protected landscape. Moreover, some species are found along riverbanks and are prone to timber poaching and other illegal activities. While the Subanen elders are aware of their rights as stipulated in RA 8371 or the Indigenous Peoples' Rights Act of 1997 (IPRA Law) [4], they are still afraid that this indigenous knowledge would become extinct and eventually forgotten due to continuous external pressures such as deforestation, conversion of forests into agricultural areas, hotels, resorts, etc. The colder weather of the Mt. Malindang environs has become attractive to investors to construct projects for tourism purposes in the area and the conversion to farm and rest houses owned by several wealthy families from the lowland. The presence of lawless elements such as the New People's Army of the Communist Party of the Philippines also added pressure to the lives of the Subanen inhabitants. These issues may lead to the extinction of many medicinal plants species used by the tribe and their ethnomedicinal knowledge about these plant resources.

## Conclusions

The Subanen's skills and knowledge on ethnobotanical and traditional healthcare practices are considered to be important in the identification and conservation of available plant resources to cure various ailments and the cheapest source of medicines to cure different diseases. More pharmacologic studies, however, are still needed to provide a scientific basis for the efficacy of these claimed therapeutic plants.

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