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RESEARCH ARTICLE

Ethnobotany, Systematic Review and Field Mapping on Folkloric Medicinal Plants in the Zamboanga Peninsula, Mindanao, Philippines

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ABSTRACT

With the recent resurgence towards phytotherapy, ethnobotany plays a crucial role. This study documents the ethnobotanical practices of the different ethnolinguistic groups in the Zamboanga Peninsula (ZamPen), Mindanao, Philippines, with a thorough systematic review and a defined field mapping. ZamPen is regarded as a center of floral diversity and is rich in ethnic diversity. Eight ethnolinguistic groups (Chavacano, Visayan, Tausug, Bajau, Sama, Yakan, Subanen, and Subanon) were purposively chosen as representatives from the five cities and three provinces of ZamPen. A total of 330 respondents were interviewed through a snowball sampling method, with at least 30 key informants per tribe. For the systematic review on ethnobotanical studies conducted in the Zamboanga Peninsula, four published articles were recorded. Results revealed 208 medicinal plant species belonging to 74 families utilized by the ethnolinguistic groups with 18 species from Family Fabaceae. Among the different ethnolinguistic groups based on ethnobotanical studies and systematic reviews, the Visayans of Ipil and Siay, Zamboanga Sibugay, and the Subanens of Lapuyan, Zamboanga del Sur obtained the highest number of medicinal plants utilized (50 species in 32 families and 89 species in 41 families, respectively). Among the 10 DOH-approved medicinal plants, *Blumea balsamifera* (sambong) of the Family Asteraceae is the most frequently utilized herbal plant used by all studied ethnic tribes. Leaves are the topmost utilized plant parts through the process of decoction. Physical relapse (*bughat*) is the commonly cited illness among locally termed diseases. Field samplings attested the availability of medicinal plants as the second topmost health-seeking behavior of the key informants to ethnobotanical practices after having experienced its effectiveness. Literature reviews of the plant's bioactivities and bio isolates validate its medicinal use. However, there are some which need further studies supporting its claim. Documentation of this traditional knowledge and practices provides a framework for future drug discovery, promotes culture preservation, and offers opportunities for community biodiversity management.

KEYWORDS:
ethnobotany; snow-ball sampling; systematic review; Zamboanga Peninsula

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INTRODUCTION

The use of folkloric medicinal plants has been an integral part of history and culture throughout the globe.[1–5] These folkloric practices are inherent in many indigenous communities like the Philippines and have formed the basis of most novel medicines by laying down the foundation for drug discovery through its natural products.[1,2,6–11]According to the World Health Organization,[12] 80% of some Asian and African countries depend on traditional herbal medicine as their primary health care due to economical and geographical constraints. Their effectiveness, diversity, relatively low cost, and low side effects versus modern synthetic drugs make it popular in both developed and developing countries.[2,11,13–15]

Philippines, considered as one of the 18 megadiverse countries,[16–18] is home to many rare plants. With 45% to 60% flowering plant endemism, their contribution to phytotherapy and prevention is still enormous. Recently, 11/252 drugs of a flowering plant origin are considered essential.[12,19] This makes the Philippines favorable for drug discovery initiatives.[20,21]Further, the country is also rich in cultural diversity,[7,16,22] with 110 indigenous communities and more than 170 ethnolinguistic groups,[23] including the Zamboanga Peninsula. Formerly known as Western Mindanao, ZamPen is politically divided into three provinces and five cities – the provinces of Zamboanga del Norte, Zamboanga Sibugay, and Zamboanga del Sur and as well as the cities of Zamboanga, Dapitan, Dipolog, Pagadian, and Isabela.[17,24]

The southernmost part of the Philippines that includes Subanen lumads; Tausug, Sama, and Yakan Muslim tribes; and the Chavacano and Cebuano natives are regarded as a center of floral diversity and possess rich ethnic diversity. Each of this indigenous community has a wealth of knowledge and practices on folkloric medicinal plants which are passed on from one generation to another.[23]

However, some undocumented issues on its safety, efficacy, quality, and rational use pose a challenging scientific task.[15,25]Further, many of their bioactive natural products are still unidentified.[26] Therefore, a need to conduct a literature review on the folkloric usage of medicinal plants as it plays a role in the primary health care of local communities. With an ever-increasing plethora of studies being published in the health sciences,[27] literature reviews will provide a strategic guide for scientific validation of the medicinal plants' efficacy. A detailed and comprehensive search strategy in systematic reviews also aimed to synthesize all relevant ethnobotanical studies in ZamPen.[28] Field mapping involve specifying the geographical location of these medicinal plants for substantiation of necessary conservation for sustainable utilization.

This current study generally aimed to conduct an ethnobotanical study, systematic review, and field mapping on folkloric medicinal plants in the Zamboanga Peninsula, Mindanao, Philippines as a framework for the "Tuklas Lunas" (Drug Discovery) Program of the government for further identification of bioactive natural products for drug discovery initiatives in the country (Fig. 1).

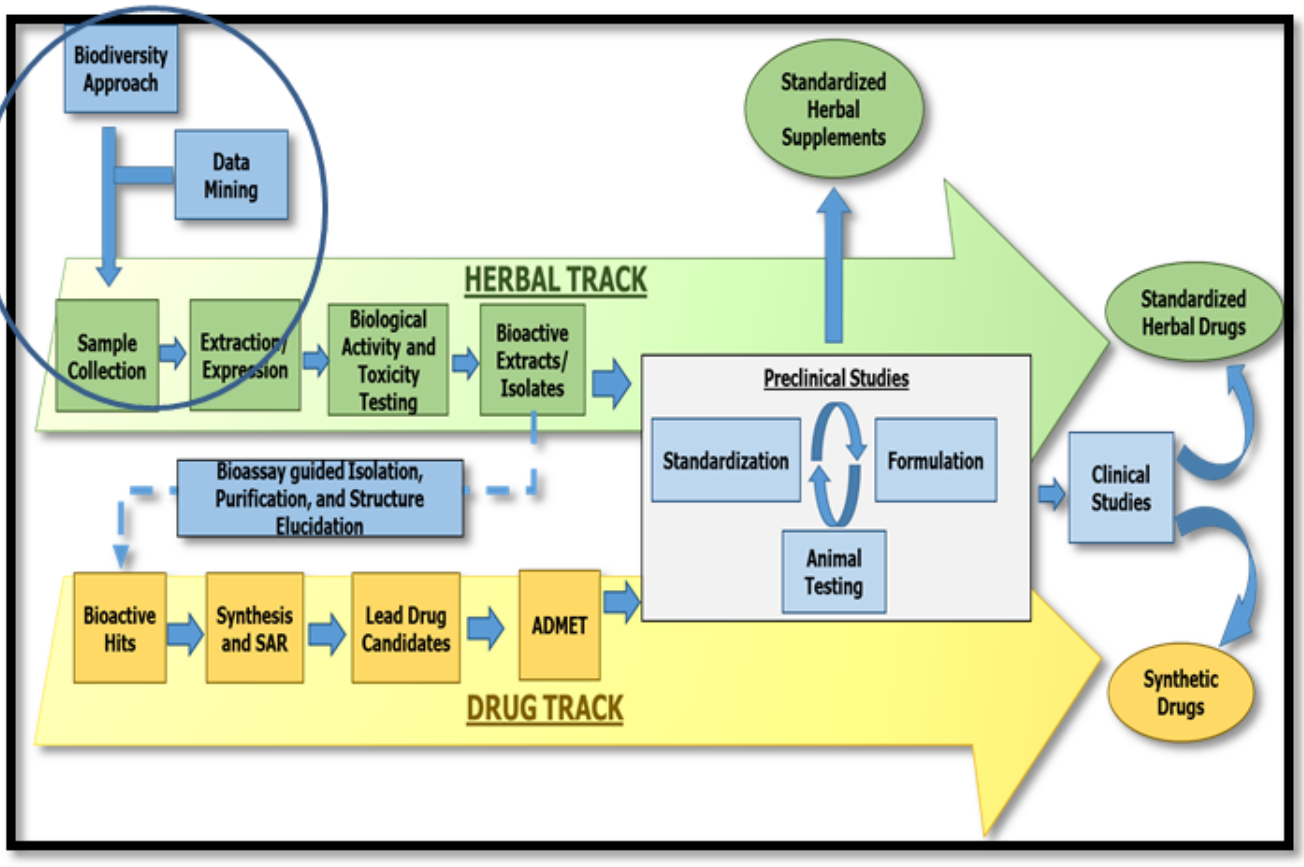

Figure 1 The *Tuklas Lunas* Program Framework of the DOST.

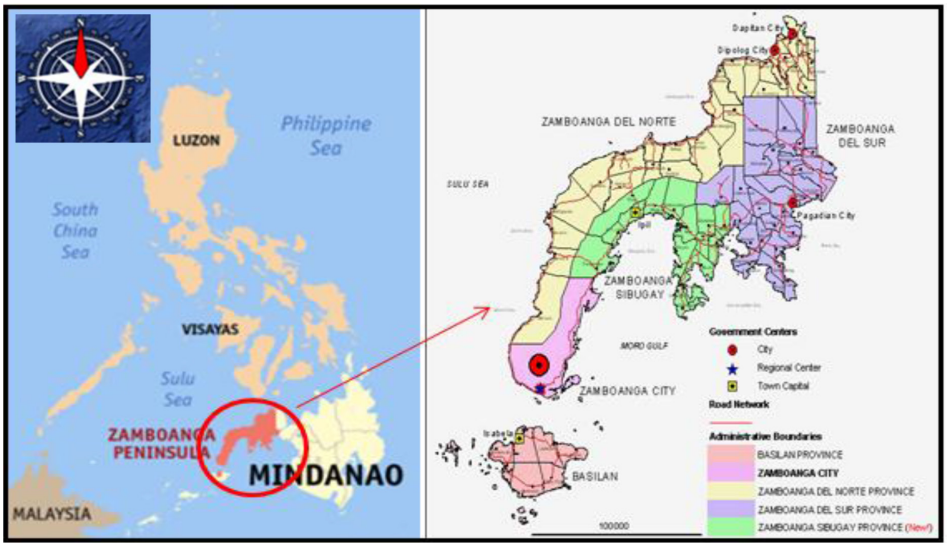

Figure 2 Map of Zamboanga Peninsula, showing the administrative boundaries of the three provinces and five cities (modified from google.com images).

METHODS

STUDY DESIGN

This study employed a descriptive survey research design, which includes documentation of the indigenous healing practices and ethnopharmacological knowledge of the folkloric groups in ZamPen. A thorough ethnohistorical background of the tribe in the form of the semi-structured interview was recorded following the tabular format by the Department of Science and Technology – Philippine Council for Health Research Development (DOST-PCHRD).

DESCRIPTION OF THE STUDY POPULATION AND STUDY SITE

The purposive sampling design was employed in choosing the study population. Figure 2 shows the map of the study site.

Eight ethnolinguistic groups were purposively chosen as representatives from the five cities and three provinces of the Zamboanga Peninsula. According to Hapalla,[29] the Zamboanga Peninsula is inhabited by a group of lumads called the Subanen, which comprise the following linguistic groups: (1) the Subanon of Malayal, Sibuco (Zamboanga del Norte), Labuan, and Patalon which are influenced by Chavacano language; (2) the Subanon of the Baliguian, Malayal, Sibuco and Siocon, being influenced by Cebuano language, (3) the Subanen of Sindangan, Tuboy, Salug, Manukan, and Siayan; (4) the Subanen in Tambulig and Dumingag, Zambonga del Sur Area; and (5) the Subanen of Dumalinao, Lakewood, Sibugay dialect, which is in use in the Lapuyan-Margosatubig-Dinas and the Buug-Kabasalan areas. Further, the area selected is comprised of Muslim indigenous cultural communities such as the Tausug, Yakan, Badjao, and Sama.[23]Visayans were also included in the study population since they are also rich in ethnobotanical knowledge as manifested in their practice known as "binisayang tambal".[30,31] Chavacanos in Zamboanga City are also known for their unique traditional practices.[32] Each of these indigenous or local communities possesses a unique body of traditional knowledge and practices which have been developed throughout centuries of use and passed down to succeeding generations.[23]

This study selected the following ethnolinguistic tribes to be part of ethnobotanical survey and field mapping:

Chavacanos of Zamboanga City

Zamboanga City is in the southernmost part of the Philippines and is the third-largest city in the country that is considered highly urbanized. The people speak one of the Spanish-based oldest creole languages in the world called Chavacano. Some of its barangays are in remote and mountainous areas, thus agriculture is the maximum shared land use. The barangays purposively chosen for this study include (a) La Paz of the West Coast (7.0201, 121.9707 GPS coordinates; 600mASL elevation), an urban barangay that is 18.5 km from the city proper with a population size of 7557 in 2015. It is considered the little Baguio of Zamboanga City since its temperature can drop up to 18°C. (b) Sibulao in the East Coast (7.3169, 122.2064 GPS coordinates; 185.5mASL elevation), a rural barangay with a population size of 4244 people in 2015. (c) Capisan (6.9815, 122.0416 GPS coordinates; 491.5mASL), located in the mountainous part around 15km from the city proper. It is also a rural barangay with a 1408 population size in 2015.

Bajaus of Ayuda Bajau village, Maasin, Zamboanga City

Ayuda Bajau Village (6.9751, 122.0071 GPS coordinates; 6mASL) in Maasin, Zamboanga City, is one of the indigenous cultural communities (ICCs) officially declared by the National Commission on Indigenous Peoples (NCIP). The population of this ICC is around 302 individuals in 144 Families. These people lived in *lepa* or houseboats and are replacing them with houses on stilts.[33]However, most of their occupation relies on fishing and fish vending.

Visayans of Barangay, Cawa-cawa, Dapitan City

One of the coastal barangays in Dapitan City (8.6623, 123.4255 GPS; 4.1mASL elevation) is dominated by the Visayan ethnolinguistic tribe and has a population of 2746 people in 2015 census. The Bisaya or Visayans are Austronesian people who originated from the central and southern regions of the Philippines. The sole reason for their presence in Mindanao is migration looking for livelihood. Of late Bisaya, refer to the one who comes from Mindanao – not born or raised in the Visayas but speaks any of the Visayan languages like Ilonggo, Waray, or Cebuano.[34]

Visayans of Dipolog City

Dipolog City is geographically located at 8° 35' north and 123° 20' east with an estimated elevation of 10.8 mASL. It is the coastal component of the province Zamboanga del Norte that serves as the provincial capital. Its population determined by the 2015 Census was 130,759. The Visayan tribe dominates this city.

Tausugs of Isabela City, Basilan

Basilan is one of the island provinces that make up the Philippine archipelago located in the Autonomous Region of Muslim Mindanao (ARMM) across the southern tip of Zamboanga Peninsula (Region 9). It is bounded on the north by Basilan Strait, on the east by Moro Gulf, on the southeast by the Celebes Sea, and on the west by the Sulu Sea. The province is subdivided into 11 municipalities and two cities (Isabela City which is part of the ZamPen region and Lamitan City under ARMM).[222] Isabela City (GPS 6° 42' North, 121° 58' East; 15.7 mASL elevation) is a coastal component of the island province of Basilan that also serves as the provincial capital. Its population determined by the 2015 Census was 112,788. It is also a home for several Tausugs. The area possesses several medicinal plants like coconut, rubber trees, mangroves, and other plants.[35]

Yakans of Isabela City, Basilan

Yakans in Isabela City are indigenous Muslim tribes concentrated in Tipo-Tipo, Lamitan, Sumisip, and Tuburan. Scattered populations are also present in some barangays of Isabela City.[36]

Sama of Isabela City, Basilan

Another indigenous people group of the Isabela City in Basilan is the Sama. The Sama was originally located in the islands and coastal areas separating southwestern Mindanao from the northeastern islands of Sulu. It is thought that they first began to disperse sometime in the first millennium A.D. because of expanding Chinese trade. This southward migration accelerated in the 15th century with the founding of a Sulu sultanate and increased maritime trade. From bases, particularly on Balangingi Island, Sama slave traders carried out annual raids on coastal settlements from Luzon to the central Moluccas.

Visayans of Ipil and Siay, Zamboanga Sibugay

Ipil and Siay are two municipalities located in the second district and eastern part of the Zamboanga Sibugay province in the Zamboanga Peninsula region in Mindanao, Philippines. Its capital is Ipil. Siay is 38 kilometers away from Ipil. These municipalities are dominated by the Visayan tribe.

Subanens of Siay and Diplahan, Zamboanga Sibugay

Barangay Camanga (Longitude: 122.5920, Latitude: 7.8389) in Titay, Zamboanga Sibugay, Philippines is one of the inhabited barangays by several Subanen indigenous people. The municipality of Diplahan is a third-class municipality in Zamboanga Sibugay, Philippines. It is exactly located at 7°45'21.3"N, 122°57'04.4"E. In the 2015 census, it had a population of 32,428 people. Farming is the primary source of livelihood. Eighty-seven percent of the population relies on farming, 8% in mining, and 5% are government employees or others.[223,224]

Subanen tribe in the Philippines is one of the largest among the ethnic groups in the country.[225] The term "Subanen" is derived from the word "suba" meaning river or mouth of the river, or upstream, and the Subanen people are referred to generally as the "gbansa Subanen," meaning the Subanen nation.[29] The Subanen group are dispersed all over Zamboanga Peninsula.[216]

Subanens of Margosatubig, Zamboanga del Sur

Margosatubig is a coastal municipality in the province of Zamboanga del Sur. Its GPS coordinates are 7° 35' North, 123° 10' East with elevation of 26.5 mASL. Its population based on 2015 Census is 37,873.

Subanon of Sibuco, Zamboanga del Norte

Sibuco is a coastal municipality in the province of Zamboanga del Norte. Its population as determined by the 2015 Census was 34,620. The municipal center of Sibuco is situated at approximately 7° 18' North, 122° 4' East, in the island of Mindanao. Elevation at these coordinates is estimated at 11mASL. According to an interview with the tribal chieftain (Timuay), the Subanon of Sibuco belongs to Western Subanon based on geographical division. They have almost the same culture and tradition like the Subanen, but the root word of their name is "*subang*" which means first born or first moon. They assert that they are the first people to populate Zamboanga Peninsula.

DATA COLLECTION PROCEDURES

Ethnobotanical survey

A snowball sampling method was used in choosing the respondents. The sample size for each folkloric group in each area was at least 30 representative key informants. The first key informant was the barangay captain, who later referred the other informants.

This ethnobotanical survey employed a semistructured questionnaire that involves three parts. About 10-15 min was allocated for each key informant:

Part I. General information – Includes the interview date, time, province, city or municipality, specific barangay, and description of the area (urban/rural, the major language

used, tribe, population size, and land-use systems). This was filled by the interviewer before conducting the interview.

Part II. Demographic profile – This includes the age bracket in the listed life stage, years of utilizing medicinal plants in treating some diseases, gender, civil status, educational attainment, livelihood, and ethnic tribe livelihood, and the gender of the key informant and the experience (in years) on folkloric usage on medicinal plant use.

Part III. Folkloric knowledge on medicinal plant use – This involves documentation of the various folkloric knowledge on medicinal plant use (including plant part used, mode of preparation, folkloric use, and user groups). It also included an open-ended question on the reasons for using medicinal plants to cure diseases.

ETHICAL CONSIDERATIONS

An ethics clearance from the Western Mindanao State University – Research Ethics Oversight Committee (WMSU-REOC) was obtained. Since this study involved interviews of indigenous people, a corresponding 'Clearance Pre-implementation' from the NCIP was obtained. A memorandum of agreement was signed with every ICC leader. Needed permits were also taken into consideration through the directors, municipal/provincial LGU in charge, and barangay captains. A requirement related to clearance procurement from the National Commission on Muslim Filipinos (NCMF) was also accomplished.

DATA MINING (SYSTEMIC REVIEW)

Data mining in systematic reviews was employed as patterned in the study of Alebie et al.[37] The search strategy included a web-based systematic research literature technique. Ethnobotanical/ethnomedicinal journal articles reporting on medicinal plants used for traditional practices were gathered through different search approaches, 1. search for published MSc/Ph.D. thesis research reports or funded studies using Google search engine and local university websites. 2. search for published journal articles using international scientific databases, including PubMed, Science Direct, Web of Science, and Google scholar.

Screening of search outputs was performed in two stages: first, the title and abstract of identified journal articles/theses were overviewed. After that, suitable prospects were downloaded and critically inspected for inclusion.

FIELD MAPPING

The exact location of the medicinal plants was accomplished through actual field samplings. Field mapping projects are carried out as patterned by Njue.[38] A short reconnaissance field trip was included with a local translator. Photographs, GPS coordinates, and elevation was recorded.

Sample medicinal plants were collected and preserved following herbarium techniques. These specimens later served as vouchers of the plants identified as medicinal plants and were deposited at the Western Mindanao State University (WMSU)/CSM mini herbarium.

DATA PROCESSING AND ANALYSIS

SPSS software tools were used for the descriptive statistics. The results were synthesized in a tabular form by tribes in an area. This was systematically categorized by Family in alphabetical order containing a complete overview in terms of the medicinal plants' scientific name (including authority), English name/Tagalog name and native vernacular term (as the common names), the parts used, folkloric use, preparation, and the mode of application. Institutions performing the published research or unpublished theses were emphasized. From the in-depth review of literature, bioactivities of the medicinal plants (including uses from other countries) as well as the bioactive isolated natural products and their associated purported applications were also reflected.

RESULTS AND DISCUSSION

There are only four published researches on ethnobotanical studies in Zamboanga Peninsula based on systematic reviews – the Subanens of Dumingag, ZDS by Morilla et al.;[39] Subanens of Lapuyan, and ZDS by Pizon et al.;[40] Traditional practitioners of Ramon Magsaysay, ZDS by Morilla and Demayo;[41] and Tribal healers of Pagadian City by Agapin.[30] An additional of 11 ethnobotanical studies were taken in consideration, to include other unexplored ethnic tribes in Zamboanga Peninsula to look into possible variations and similarities of plants being used in treating diseases- Chavacanos and Bajaus of Zamboanga City; Tausugs, Yakan and Sama of Isabela City, Basilan; Subanen of Titay and Diplahan, Zamboanga Sibugay; Visayans of Ipil and Siay, Zamboanga Sibugay; Subanen of Margosatubig, Zamboanga del Sur; Subanon of Sibuco, Zamboanga del Norte, Visayans of Dipolog City; and Visayans of Dapitan City.

A total of 208 medicinal plant species belonging to 74 families were found to be used across all groups studied. Family Fabaceae comprised the highest number of species used (19), followed by Euphorbiaceae (11), and the Families of Lamiaceae, Malvaceae, and Asteraceae with 10 species. Table 1 shows the ethnobotanical practices and literature review on medicinal plants utilized by the different tribes in the Zamboanga Peninsula.

Almost all ethnic tribes utilized one or more of the 10 DOH-approved medicinal plants, as supported by the Philippine Institute of Traditional and Alternative Health Care (PITAHC; R.A. No. 8423). These include: *Vitex negundo* (lagundi), *Mentha cordifelia* (yerba buena), *B. balsamifera* (sambong), *Carmona retusa* (tsaang gubat), *Quisqualis indica* L. (niyug-niyogan), *Psidium guajava* L. (guava), *Cassia alata* (akapulko), *Pepperoma pellucida* (ulasimang bato), *Allium sativum* (garlic), and *Momordica charantia* (ampalaya). Among these, *B. balsamifera* (sambong) is the most frequently utilized herbal plant (100% in all ethnolinguistic groups) in treating common diseases such as cough and colds, stomachache, postpartum care, urinary tract infection, dysmenorhhea and amenorrhea. This

Table 1. Ethnobotanical practices and literature review on medicinal plants utilized by the different tribes in the Zamboanga Peninsula.

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Acanthaceae								
Hemigraphis colorata	–	Subanen: Kuyanap	Leaves	Crushed and applied directly as poultice.	Inflammation	–		
Justicia gendarussa Burn.f.	Tuhod manok/ Water willow	Vis: Mandalasan Subanen: Tuhod manok/ Mandalusa	Leaves	Poultice Decoction	Stomach-ache, bloating, fracture Diarrhea	Anticancer, anti bacterial, hepato protective, antioxidant, anti helmintic, anti angiogenic activities	Flavonoids, alkaloids, steroids, terpenoids, saponins, phenolic compounds	Sri Ramachandra University, India[42]
Acoraceae								
Acorus verus (L.) Raf.	Sweetflag/ Lubigan	Subanen: Labigan	Leaves	Apply directly.	Toothache	Anti spasmodic, anti helminthic	Glycosides, flavonoids	Imam et al.[43]
Anacardiaceae								
Mangifera indica L.	Manga/Mango	Vis:Manga Yakan: Mampalam	Leaves	Decoction	Hyperten-sion, swelling	Anticancer, anti inflamma-tory, anti diabetic, antioxidant, anti bacterial	Poly phenols, terpenes, sterols, carote-noids, vitamins, amino acids	Ediriweera et al.[44]
Spondias purpurea Linn.	Sineguelas/ Spanish plum	Bajau: Sirigwelas	Leaves Bark Stem	Decoction Steam Scrape and applied directly.	Cough, fever Mouth sore, diarrhea Gum lesions	Anti oxidant, antiulcer	Flavonoids, caffeic acid, epigallocatechin	Universidade Federal de Pernambuco, Recife, Brazil[45]
Annonaceae								
Annona muricata L.	Guyabano/ Soursop	Chav: Sabana Bajau: Labanos Subanen: Labana/ Malabanos/ Yabana	Leaves	Decoction (Boil 7 leaves in a glassful of water, then drink).	Hepatitis, diabetes, flatulence, UTI, cancer, hypertension, ulcer	Tranquili-zing effect, cancer cells inhibitor, anti inflamma-tory, anti diabetic	Alkaloid, annona-ceous acetogenin, flavonol, triglycosidephenoli-cyclo peptide	University of Malaya[46]
			Leaves	Infusion	Coughs, fever, colds, headache, nervous disorders, digestive problems, tuberculosis			
			Leaves	Steam, by heating the leaves then apply directly to forehead.	Headache, hypertension			
			Young leaves	Pound seven leaves and apply around the wound as poultice.	Tetanus, arthritis			
			Fruits	Direct eating.	Cancer, overall health			
			Roots	Decoction	Cancer			
Friesodielsa latifolia (Hook &Thomson) Steeris	–	Subanen: Mhemot balu	Roots	Wash a small root and chew.	Prevents hypertension	–		

Amaranthaceae								
Amaranthus spinosus L.	Kolitis/Thorny amaranthus	Kulitis	Roots	Decoction (Boil 1g in 2 glasses of water)	Antirabies	Cytotoxic, apoptotic	Secondary metabolites	Prajitha and Thoppil[47]
Amaranthus viridis L.	Kolitis/Green amaranth	Subanen: Kadiapa	Roots	Decoction	Fever	Potent anti inflammatory, anti hepato toxic, antiulcer antiallergic, antiviral actions	Saponins, tannins phenols, flavonoids, alkaloids, cardiac glycoside, steroid, triterpenoids	Reyadul-Ferdous et al.[48]
Amaryllidaceae								
Allium cepa L.	Sibuyas/Onion	Vis: Sibuyas Chav: Sibolyon	Bulb	Decoction Pounding/poultice	Cough, arthritis	Anti oxidant, anti diabetic, anti inflamma-tory, anticancer, anti microbial, immuno-modulatory	Flavonoids, organo sulphur compounds	Bora and Sharma[49]
Allium sativum L.	Ahos/Garlic	Ahos	Cloves	Pound and apply directly Direct chewing or blanched in boiled water for 15min	Toothache, anti-rabies Hyperten-sion	Anti bacterial, antiviral, antifungal, anticancer	Allicin	Jayaraj & Lal[50]
Allium schoenoprasum	Kusay/Chives	Ganda	Whole plant	Hyper acidity	Poultice	Anticancer, anti oxidants, anti microbial, immuno-logical effects	Organo sulfur compound, quercetin, flavonoids, saponins	Yunnan Academy of Agricultural Sciences, China[51]
Allium tuberosum	Chinese chives	Ganda	Whole plant	Poultice	Fever	Anti bacterial, antioxidant	Phenol, 3-methyl-cyclo pentanol	Lawthienchai et al.[52]
Eurycles amboinensis	–	Abod	Leaves, roots	Poultice (crushed and applied directly)	UTI, inflamma-tion	–		
Apiaceae								
Angelica keiskei	Ashitaba	Asetaba	Leaves	Decoction Pounding	Use for aching of hips and urinary tract infection. Toothache	Cytotoxic, antidiabetic antiobesity, antioxidant, anti inflamma-tory	Coumarins, flavanones	University of North Carolina[53]
Centella asiatica	Pennyworth	Chav: Yahong-yahong Tausug: Panggagah Subanen: Jaong jaong	Leaves Leaves Whole plant	Infusion Decoction Decoction(boil plenty of "jaong jaong" with enough water)	Fatigue, sun stroke, colds, and flu Fever, cough Diabetes	Hypo tensive, wound healing, vascular effects	Collagen, saponins	Gohil et al.[54]
Daucas carota L.	Carrot	Carrot	Leaves	Decoction	Tumor	Anti oxidant, anti inflamma-tory, plasma lipid modifica-tion, antitumor properties	Phenolics, carotenoids	Ahmad et al.[55]
Hydrocotyle vulgaris	–	Gotu kola	Whole plant	Decoction	Cough, kidney stones	–		

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Apocynaceae								
Alstonia scholaris L.	Dita/White cheese wood	Subanen: Malogatas	Bark Trunk	Decoction Infusion (Scrape the outer layer (7x). Add 1/2 glass of water. Drink twice a day for 3 days) Decoction (Scrape the outer layer (7x). Boil the scraped pieces with 3 glasses of water. Drink thrice a day for 3 days)	Kidney diseases Hyper tension	Anti inflammatory, analgesic bioactivity	Novel alkaloids	Chinese Academy of Sciences, China[56]
Asclepias curassavica L.	Tropical milkweed	Subanen: Gapas gapas	Bark, roots Roots	Extraction Decoction (Boil enough roots with ample amount of water. Drink as often as needed.	Difficulty in child labor Amoebiasis	Anti bacterial	Secondary metabolites	Wollega University, Ethiopia[57]
Catharantus roseus (L.) G. Don	Tsitsirika/ Periwinkle	Vis: Kumintang	Leaves	Decoction	Diabetes	Anti diabetic, bactericide,antihyper tensive	Terpenoid indole alkaloids (TIAs)	Almagro et al.[58]
Rauvolfia serpentina (L.) Kurz	Serpentina/ Snakeroot	Bajau: Pait-pait Subanen: Ampion	Leaves	Decoction Infusion	Hyper tension, “kabuhi” Stomach ache, diarrhea	Anti Hyper tensive, tranquilizer	Flavonoids	University School of Environment Management, New Delhi, India[59]
Voacanga megacarpa Merr.	-	Subanen: Thepalak Mebagal	Roots	Juice (Pound enough roots and squeeze and apply the squeezed plant material)	To abate bleeding of a fresh wound	Analgesic, anti microbial, antiulcer, cytotoxic, antioxidant, antimalarial	Indole alkaloids	University of Santo Tomas, Manila, Philippines[60]
Araceae								
Alocasia macrorrhizos (L.) G.Don	Elephant ear	Subanen: Biga	Rhi-zome	Slice, pound and apply on the affected part.	Early stage of inflam-mation	Antihyper glycemic, antioxidant, cytotoxic	Flavonoids, cynogenetic glycosides	International Islamic University Bangladesh[61]
Colocasia esculenta L.	Gabi/Taro	Chav: Gabi Vis: Badyang	Leaves	Rub the fresh leaves to the affected area. Decoction Poultice	Scabies Bronchitis Athlete’s foot	Anti inflammatory, analgesic	Orientin & vitexin	Pawar et al.[62]

Homalomena rubescens (Roxb.) Kunth	Alipayo	Subanen: Phayaw	Stem	Slice into pieces, pound, and smell often.	Colds	–		
Araliaceae								
Osmoxylon diversifolium	–	Subanen: Gulo-ulo	Stem	Decoction (Scrape stem (7x) down ward. Boil with enough water. Drink 1/2 glass thrice a day for 3 days	Dysme-norrhea, menno-rhagia	–		
Panax ginseng	Ginseng/ Korean ginseng	Bajau: Langkawas	Fruits	Decoction	Muscle pain	Antiaging, anti diabetic, anticancer, wound and ulcer healing	Ginse nosides, peptides, poly acetylenic alcohols, fatty acids	Ru et al.[63]
Arecaceae/Palmae								
Calamus sp.	–	Subanen: Dlebie	Stem Juice	Cut stem, gather juice, and apply on the wound often.	Shingles caused by *Herpes zoster*	–		
Cocos nucifera L.	Niyog/ Coconut	Bajau:Coco Tausug: Lahing Vis:Butong	Fruit Oil Flower (white) Bark Flower, leaves Flesh and the juice Root, bark	Oil Extract Infusion for bath Decoction Steam Direct eating and drinking Decoction	Muscle Pain, wounds in the head Measles Abdominal pain Measles Detoxifying for urinary tract infection. Kidney stones	Anti oxidant, anti inflammatory	Phenols, flavonoids, glycosides, tannins, alkaloids, saponins	Jaipur National University, Jaipur, Rajasthan, India[64,65]
Corypha elata Roxb.	Talipot palm	Vis:Buli	Roots	Decoction	Physical relapse	–		
Aristolochiaceae								
Aristolochia philippinensis Warb.	Puso-pusoan	Subanen: Barubo	Leaves	Decoction	"Bughat", body pains	–		
Asparagaceae								
Cordyline fruticosa (L.) A. Chev.	Baston de San Jose	Vis: Makilala Yakan: Kilale Subanen: Guilala	Leaves Young leaf	Decoction Eat the leaves often until needed.	Bloody stools, menstrual cramps, dysme-norrhea Hyper tension	Antioxidant	Phenolic compounds	Fouedjou et al.[66]

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Dracaena trifasciata	Cylindrical snake plant	Spada	Leaves	Direct chewing	Tetanus	Antioxidant	Tannins, saponins, terpenoids, cardiac glycosides, quinones	Universiti Sains Malaysia[67]
Sansevieria spp.	–	Espada-espada	Whole plant	Crushed and applied directly	Wound	–		
Sansevieria trifasciata Prain	–	Tigre-tigre	Leaves	Infusion (in efficas-cent oil)	Fever	–		
Asphodelaceae								
Aloe barbadensis M. (Syn. *Aloe vera* (L.) Burm.f)	Aloe vera	Chav: Aloe vera	Leaves	Extraction Scraping Decoction	Wounds, dry hair, inflammation, burns Bleeding, ulcer Cancer, parasitic worms	Antifungal, antioxidant	Lignin and saponins	Raksha et. al.[68]
Asteraceae/Compositae								
Artemisia sp.	–	Barogbarog	Leaves	Decoction	Stomach ache	–		
Artemisia vulgaris L.	Damong maria/ Maiden wort	Chav:Yerba Sta. Maria Vis:Herba Buena Yakan:Sta. Maria Subanen: Hilbas	Leaves Leaves Whole Plant	Infusion Decoction Infusion	Coughs and colds, asthma, fever, pain relief, ulcer, hyper tension, hyper acidity Menstrual abnorma-lities, stomach ache, “panuhot”, cough Infusion	Analgesic, hyper lipidemic activity	Terpenoids, flavonoids, coumarins	Abad et al.[69]
B. balsamifera (L.) DC	Sambong/B. camphor	Chav: Lengua de baka Bajau: Sambon Vis: Gabon Tausug: Daklan-bulan Yakan: Lakad-bulan Subanen: Bubulan	Leaves Leaves Leaves Leaves Leaves Leaves Roots	Decoction (drink) Decoction (bath) Pound the leaves and put in the forehead. Pound the leaves then drink the extract. Poultice Infusion Decoction	Coughs and colds, “pasmo sa kusog”, UTI and kidney stones, physical relapse, hyper tension, measles stomach ache, dysmenor-rhea & amenor-rhea Post-partum care Fever High fever, cough, urinary tract infection, stomach-ache Body pain, “panuhot”, aching due to “piang” Cough Bleeding	Anti microbial, anti inflamma-tory, anti spasmodic	Flavonoids	Chinese Academy of Tropical Agriculture Sciences [70]

Chromolaena odorata (L.) R.M King & H.Rob	Hagonoy/Devil Weed	Vis: Hagonoy Tausug: Lahunay Yakan: Lahuney Subanen: Gunoy Subanon: Sunggonoy	Leaves	Crush and apply directly.	Wound	Kerati nocyte prolifera-tion	Flavonoid, phyto prostane compound including chromo-moric acid	Sirinthipaporn and Jiraungkoor-skul[71]
Chrysanthemum sp.	Mums or chrysanths	Chrysan-themum	Roots	Direct applica-tion	Toothache	Cytotoxic, anti bacterial, inhibitory	Secondary metabolites	Central Institute of Medicinal and Aromatic Plants, India[72]
Emellia sonchiflolia	Red Tassel Flower	Pisaw-pisaw	Leaves Leaves Leaves	Decoction Pounding Extraction (Drink the extract)	Fever, cough Constipation, "kabag" Cough, colds, and kid's fever	Antimicrobial	Secondary metabolites	Couto et al.[73] 2011
Pseudelephantopus spicatus (B. Juss. ex Aubl.) Rohr. ex C/F. Baker	Dilang-aso/Dog's tongue	Vis:Dila-dila sa iro Vis: Kukug-banog Subanen: Kokog banog	Roots, stem, and leaves	Decoction	Hyper acidity, physical relapse	Antiacne, antioxidant, cytotoxic	Hydroxyl groups, phenolic compound, flavonoids and tannins	Lalisan et al.[74]
Sphagneticola trilobata (L.) Pruski	Trailing daisy	–	Leaves	Extract	Toothache	Analgesic, anti microbial, anti inflamma-tory properties	Tannin, saponins, flavonoids, phenol, terpenoids	SV University, India[75]
Spilanthes acmella	–	Subanen: Dilag-dilag	Flower	Applied directly	Toothache	Anti microbial	Phytochemicals	Prachayasitti-kul et al.[76]
Tridax procumbens Linn.	–	Subanen: Kanding-kanding	Leaves	Crushed and applied directly.	Wound	Wound healing, anti coagulant, antifungal	Secondary metabolites	Mir et al.[77]
Balsaminaceae								
Impatiens balsamina	Kamantigue/ Rose balsam	Chav: Kamanti-gue Tausug: Saunggah	Leaves, stems Leaves and stem	Extraction Decoction	Inflamma-tion, joint pains Urinary tract infection	Anti microbial, antidiabetic	Glycosides	Su et al.[78] 2012
Basellaceae								
Basella alba	Malabar spinach/ Malabar nightshade	Chav: Alugbati	Leaves Leaves	Pound and apply directly. Decoction	Wounds and boils, fever Hyper tension	Anticancer, antioxidant	Saponin, xanthones	Kumar et al.[79]

(Continued)

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Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Brassicaceae								
Brassica rapa subsp. *chinensis*	Pechay	Pechay	Leaves	Cook directly	Overall health	Anti hyper tensive	Secondary metabolites	Raiola et al.[80]
Begoniaceae (1)								
Begonia sp.	Angel-wing begonia	Begonia	Flower	Poultice	Burns, sores	Anti prolifera-tive activity towards tumor	Cucurbitacins	Swiss Federal Institute of Technology (ETH) Zurich, Switzerland [81]
Bignoniaceae								
Crescentia cujete	Common calabash tree	Calabash tree	Fruit Fruit Fruit Leaves	Direct eating Decoction Juice Extraction Decoction	Diarrhea, colds, Bronchitis Cough, asthma, urethritis Hyper tension	Anti bacterial, antidiabetic	Alkaloids, cardiac glycosides, flavonoids, phytosterol, reducing sugars, saponins, tannins, triterpenes	Billacura and Laciapag 2017[82]
Oroxylum indicum (L.) Benth. ex Kurz	Indian trumpet flower	Subanen: Bnenloy	Young leaves	Pound enough leaves and add little amount of water. Put on the head or affected area	Body pain, fever	Anti microbial, anti diabetic, hepatoprotective, anti inflamma-tory	Flavonoids (chrysin, oroxylin-A, scutellarin, baicalein, quercitin)	Jamia Hamdard, India [83]
Radermachera sp.	–	Subanen: Phelebo-nayan	Trunk	Decoction (Boil enough size with ample amount of water. Drink often.)	Diabetes, hyper tension, cough	–		
Bixaceae								
Bixa orellana	Achiote	Chav: Atsuetes Yakan: Achuete	Leaves Leaves & roots	Infusion Decoction	Nausea, vomiting, fever "Ugam" (thrush), cough and colds, lean body mass (LBM)	Phyto therapeutic	Phyto chemicals	Vilar et al.[84]
Bombacaceae								
Durio zibethinus Murr.	Durian/Civet fruit	Durian	Bark	Decoction	Itchy genitals	Antiproliferative effect	Flavonoids (flavanols, antho cyanins), ascorbic acid, carotenoids	Universiti Sultan Zainal Abidin, Malaysia[85]
Boraginaceae								
Carmona retusa (Vahl.) Masam.	Tsaang gubat/ Scorpion bush	Tsaang gubat	Leaves	Decoction	Diarrhea, stomach ache	Anti Inflamma-tory, anti bacterial, analgesic	Secondary metabolites	Shridevi Institute of Engineering and Technology, Tumkur, India[86]

Cordia dichotoma	Anonang/Soap berry	Anonang	Bark	Submerge in hot water and drink	"Bughat"	Anti bacterial, antiviral, antitussive	Betulin, octacosanol	Jamkhande et al.[87]
Heliotropium indicum L.	Trompang elepante/ Indian heliotrope	Elepante	Leaves Stem and roots	Decoction Decoction	Physical relapse, wound healing	Wound healing	Collagen	Institute of Pharmacy and Technology, India[88]
Bromeliaceae								
Ananas comosus	Pineapple	Pinya	Fruit Shoot	Juice Extraction Extraction (Mix with oil then apply as poultice)	Hyper tension Sprain	Anti oxidant, anti bacterial	Phenolic compounds	Putri et al.[89]
Cactaceae								
Opuntia cochenillifera	Cactus/Cochineal nopal cactus)	Busay-busay	Leaves	Grilled	Tetanus	–		
Cardiopteridaceae								
Citronella mucronata	Citronella	Citronella	Leaves	Get the extract and mix it with coconut oil then apply it to affected areas	Dandruff, ringworm	Anti inflammatory, anticancer, antioxidant, anti proliferative, anti microbial	Citral, vitro on 5-lipoxy-genase, caspase-3, a- and b- unsaturated aldehyde groups	Bhavaniram-ya et al.[90]
Caricaceae								
Carica papaya L.	Papaya	Chav: Papaya Bajau: Kapaya Vis: Kapayas	Leaves Fruit Flower	Juice Extraction Direct eating Decoction	Dengue fever, malaria LBM, constipation Dengue fever	Anti bacterial, cytotoxic	Chymo papain, quercitin	Madjos and Luceno[91]
Chenopodiaceae								
Dysphania ambrosiaides (L.) Mosyakin and Clemants	Wormseed/ Epazote	Chav: Apasote	Leaves	Decoction	"Kabag" (Gas pain)	Laxative properties	Ascaridole,cymene, geraniol	Koba et al.[92]
Combretaceae								
Quisqualis indica L.	Niyug-niyogan	Niyug-niyogan	Seeds	Direct eating two hours after supper	Parasitic worms	Anti oxidant, anti helminthic	Flavonoids, phenolic components	Shah et al.[93]
Terminalia cattapa	Indian almond	Talisay	Dead leaves	Decoction	Sepsis	Anti microbial	Secondary metabolites	Nair and Chanda [94]
Convolvulaceae								
Ipomea aquatica Forsk.	Kangkong/Water spinach	Kangkong	Leaves	Decoction and mixed with "kayuma-nis" and "kambal-simang-ko"	Fever, overall health	Carmina-tive agent, anti inflamma-tory	Flavonoids	Manvar and Desai[95]

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Ipomoea batatas L.	Kamote/Sweet potato	Chav: Kamote	Leaves	Decoction Cooking	Fever, anemia	Hypo tensive, hypo lipidemic	Isoflavones	Dewijanti et al.[96]
Jacquemontia paniculata	–	Himag	Roots	Pounding, mixing	Wounds	Laxative, antioxidant	Alkaloids, flavonoids, saponins, steroids, tannins, anthrax-quinones	Clemeña and Galarpe[97]
Commelinaceae								
Rhoeo spathacea (Swartz) Stearn	Klapa-klapa/ Bangka-bangkaan	Kapal-kapal	Leaves and roots	Extract	Toothache, headache	Anti oxidant, anti bacterial	Phenolic content, flavonoid components	Tan et al.[98]
Costaceae								
Chamaecostus cuspidatus	Costus or spiral flag	Insulin plant	Leaves	Decoction	Diabetes, hyper tension	Anti diabetic properties	Secondary metabolites	Chalapathi Institute of Pharmaceu-tical Sciences, Guntur[99]
Costus igneus	Insulin plant	Insulin Plant	Leaves and shoots	Wash the leaves and shoots then directly consume it	Diabetes, anemia, stroke, hyper tension	Anti oxidant, anti diabetic, hypo lipidemic, diuretic, anti microbial	Triterpe-noid, alkaloids, tannins, saponins, flavonoids, steroid, appreciable amounts of trace elements	Hedge et al.[100]
Clusiaceae/Guttiferae								
Garcinia mangostana L.	Mangostan/ Mangosteen	Bajau: Mangis Yakan: Mangostan	Fruit peels, bark	Decoction	Tubercu-losis, diabetes, diarrhea, stomach ache, anemia	Anti oxidant, anti prolifera-tive, pro apoptotic, anti inflammatory, anti carcino genic, anti microbial	Xanthones, flavonoids, triterpenoi-dand-benzo phenones	Failla and Gutierrez–Orozco[101]
Crassulaceae								
Bryophyllum pinnnatum Lam. (Syn. *Kalanchoe pinnata)*	Kataka-taka/ Miracle plant	Chav: Handalika/ Siempre viva Vis: Kataka-taka Yakan: Karitana Subanen: Hanlilika	Leaves Leaves Leaves	Smash the leaves and apply on the affected area. Infusion Decoction	Wounds and inflamma-tion, boils Toothache Physical relapse	Stringent, antiseptic, hemostatic, anti Inflammatory	Alkaloids, triterpenes, glycosides, flavonoids, steroids	Gupta et al[102]; Fernandes et al.[103]
Cucurbitaceae								
Momordica charantia L.	Ampalaya/Bitter gourd	Bajau: Paliya Subanen: Palya	Leaves Leaves Fruits	Decoction and drink Wash in hygienic part Cooking (viand)	Diabetes, Fever, LBM Postpartum care Anemia, diabetes	Anti diabetic, hypogly-caemic effect	Triterpene, proteid, steroid, alkaloid, phenolic compounds	Budrat and Shotipruk[104]

Lagenaria siceraria (Molina) Standl.	–	Miracle Plant	Leaves Fruits	Decoction Direct eating	Cancer, kidney stone Hyper tension	Emetic, purgative, diuretic	Sterols, terpenoids, flavonoids, saponins	Prajapati et al.[105]
Luffa acutangula Roxb.	Patola/Sponge gourd	Subanen: Tikwa	Leaves	Heat enough leaves until burnt. Apply and change when dry.	Early stage of inflamma-tion	Anti diabetic, hepato protective, antiulcer, anticancer, anti microbial, analgesic, anti inflamma-tory	Flavonoids, anthrax-quinones, proteins, fatty acids, saponin, triterpene, volatile components	School of Pharmacy and Technology Management, India[106]
Sechium edule (Jacq.) Sw.	Chayote	Vis: Sayote	Leaves	Decoction	Hyper tension	Antioxidant	Poly phenols, carotenoids	Vieira et al.[107]
Cyperaceae								
Cyperus kyllingia	Mutha/Nut grass	Subanen: Kukemot	Whole plant	Infusion	Diarrhea, fever	Anti inflamma-tory, anti diabetic, analgesic	Starch, alkaloids, flavonoids	Bajpay et al.[108]
Kyllinga monocephala	Bosikad	Bosikad	Stem and leaves	Soaking in water during night-time and drink the water in the morning	Headache, muscle pain, fever	Analgesic	Flavonoids, tannins, phenolic compounds	Amor et al.[109]
Dilleneaceae								
Dillenia philippinensis Rolfe	Katmon/ Elephant apple	Subanen: Dlhembog	Leaves	Decoction (boil seven leaves with 1.5 glass of water. Once lukewarm, drink a half-glass once)	Diarrhea and vomiting	Anti microbial	Triterpenes	De La Salle University[110]
Dipterocarpaceae								
Shorea astylosa	Yakal	Yakal	Bark	decoction	Physical relapse (“bughat”)	–		
Euphorbiaceae								
Breynia cernua (Poir.) Mull. Arg.	–	Subanen: Thetulog	Stem Leaves	Use a thin section of the stem as a toothpick. Pound handful of leaves. Squeeze the juice on the affected area.	Toothache prevention Open wound	–		
Euphorbia hirta L.	Tawa-tawa/Asthma plant	Chav: Tawa-tawa Bajau: Patik-patik Yakan: Patik-patik Vis: Mangaw-ngaw Subanen: Tematik	Whole plant Leaves Sap	Decoction Juice extraction Direct applica-tion	Dengue fever, cough, stomach ache, physical relapse (“bughat”), malaria, measles Wounds, tumor, pus Sore eyes	Anti bacterial, antifungal, anti malarial, anti spasmodic, hemostatic	Gallic acid, quercetin, alkaloids, essential oils, phenols, sterol, flavones and fatty acids	Ghosh et al.[111]

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Euphorbia pulcherrima Willd.	Christmas flower	Poinsettia	Leaves	Extraction	Fever	Anti bacterial	Terpenoids, flavonoids, alkaloids, saponin, steroids	Bayero University, Kano, Nigeria [112]
Codiaeum variegatum (L.) Rumph.ex. A. Juss	San Francisco	San Francisco	Leaves	Poultice	Swelling	Anti inflamma-tory	Alkaloids, glycosides, steroids, flavonoids	Bijekar and Gayatri [113]
Jatropa curcas	Tuba-tuba/Physic nut tree	Tuba-tuba	Leaves Roots and leaves Leaves	Poultice/Smoking ("hampol "or applied as poultice) Decoction Pound and use like a bandage or are directly applied on skin like a liniment; Steam and poultice	Flatulence, sprain, stomach ache, "kabag", fever Diarrhea, insect repellent, "panuhot" Fractured bone, body aches, sprain	Anti microbial, anticancer	Alkaloids	Patil et al.[114]
Jatropha podagrica	–	Ginseng	Roots	Crushed and applied directly	Wound	–		
Macaranga tanarius (L.) Muell.-Arg	Binunga/ Elephant's ear	Subanen: Binunga	Leaves	Extraction	Wounds	Anti oxidant, anti microbial, anti inflamma-tory	Flavonoids	Magadula[115]
Mallotus floribundus (Blume) Muell.-Arg.	Tula-tula/Blue blade	Subanen: Tula-tula	Roots	Decoction	Kidney diseases	–		
Manihot esculenta Crantz	Kamoteng kahoy/ Cassava	Chav: Kamanting Subanen: Balanghoy	Leaves Tubers	Decoction Decoction	Swelling Furuncle	Anti-inflamma-tory, anti microbial	Flavonoids, saponins and vitamin C	Tao et al.[116]
Melanolepis multiglandulosa Reinw. Ex Blume	Alim	Vis: Alom Subanen: Ghalem	Leaves Leaves Bark	Decoction Poultice Poultice	Parasitic worms Flatulence Sore throat	Anti helminthic	Taraxeryl fatty acid esters, squalene	Apostol et al.[117]
Ricinus communis L.	Tangan-tangan/Castor bean	Tangan-tangan	Leaves	Steam	Injuries	Anti inflammation, anticancer	Alkaloids	Patil et al.[114]

Fabaceae/Leguminosae								
Afzelia rhomboidea (Blanco) Vidal	Malacca teak	Subanen: Glonghigi	Trunk	Juice extraction (Scrape trunk (3x) and squeeze the juice. Apply on the head after shampoo. Leave for half an hour. Rinse.)	To get rid of lice	–		
Arachis hypogaea	Mani/Peanut	Mani	Seeds	Crushed and applied directly	Sore	Anti bacterial	Flavonoids, phenols, alkaloids, tannins	Al-Azawil and Hassan[118]
Caesalpinia sappan L.	Sappan wood	Sibukaw	Bark Roots Bark Leaves	Decoction Decoction (drink as needed) Infusion with coconut oil Decoction	Diarrhea, fever, rheumatism arthritis, anemia Physical relapse, cough, tuberculosis Fractures, muscle pain, physical relapse, flu Tubercu-losis	Anti inflamma-tory	Haematein, flavonoids	Jeong et al.[119]
Cassia alata L.	Acapulco	Tausug: Andalan Yakan: Kwit subong/pitsubo Subanen: Asunting	Leaves Roots, leaves	Pounding Decoction	Scabies, fungal infection, athlete's foot, *Tinea flava*, ringworm Cyst, fungal infections	Anti mutagenic, antifungal, analgesic, anti inflamma-tory, hypogly-cemic	Secondary metabolites	Villaseñor et al.[120]
Clitoria ternatea L.	Pukingan/ Butterfly pea flower	Yakan: Balogbalog	Leaves Roots and Bark Flower	Poultice Infusion Extraction	Swollen joints Kidney disease Hyper tension	Anti microbial, antipyretic, anti inflamma-tory, analgesic, diuretic, anesthetic, anti hyper glycemic, anti hyper lipidemic	Alkaloids, flavonoids, free amino acids, glycosides, phenols, proteins, reducing sugars, steroids, and tannins	Al-Snafi[121]
Derris elliptica (Wall.) Benth.	Tubli/Tuba root	Subanen: Thoba	Leaves	Pound plenty leaves and apply until itchiness subsides.	Itchiness	Cytotoxic	Rotenone	Zubairi et al.[122]
Desmodium capitatum	–	Mani-mani	Leaves	Apply directly in the stomach	For pregnant women	–		
Desmodium pulchellum	–	Gaan-gaan	Leaves	Decoction	Physical relapse	Cytotoxic	Alkaloids	Institute of Nationality Medicine, China[123]

(Continued)

Table 1. (Continued)

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						Bio-activities	Active isolates	
Flemingia strobilifera (L.) W. F. Alton	Panapana-rahan/Wild hops	Subanen: Kolipes	Roots	Decoction(boil with water and Take regularly. Taking fresh water is prohi-bited).	Tuberculosis	Anti microbial	New flavanone	Hamdard University, India[124]
			Roots	Decoction (pound enough roots and boil with half glass of water. Drink thrice a day for 3 days.)	Diabetes			
			Leaves	Pound 7 leaves and apply on the inflamed area.	Inflammation			
Gliricidia sepium (Jacq.) Walp.	Madre de cacao/ St. Vincent Plum	Chav: Madre de cacao Tausug: Madri kakao Vis: Kakawate	Stem	Extraction	Swollen wound, "panuhot"	Anti microbial, antiscabies, antiviral	Formosin, formono-netin	Kumar and Simon[125]
			Leaves	Pounding	Scabies, fungal infection, rashes			
			Leaves	Decoction	Skin allergy, "panuhot", swelling			
			Leaves	Poultice (pound the leaves, add vinegar then rub all over the body)	Convulsion due to high fever			
Leucaena leucocephala (Lam.) de Wit	–	Ipil-ipil	Leaves	Chewing	Parasitic worms	Anti helminthic	Flavonoids	King Saud University, Riyadh, Saudi Arabia[126]
Mimosa pudica L.	Makahiya/ Sensitive plant	Tausug: Sipug-sipug Subanen: Selom-patay/Maharlika	Roots	Decoction	Fertility, myoma, abdominal pain	Analgesic, anti depressant,anti asthmatic, aphrodisiac	Flavonoids, alkaloids, non-protein amino acid (mimosine)	Ahmad et al. 2012 [127]
			Leaves and roots	Decoction	UTI, physical relapse, "pasmo" .			
			Roots	Direct application	Toothache			
Premna odorata Blanco	Alagaw/Fragrant Premna	Abgau	Leaves	Bathing	"Panuhot"	Anti microbial, antioxidant, anti inflamma-tory, cytotoxic	Flavonoids, iridoid glycosides, diterpenoid	Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia[128]
			Roots	Decoction	Myoma, tumor			
Pterocarpus indicus	Narra/Burmese rose-wood	Narra	Bark	Decoction (drink on an empty stomach)	Post-partum care, LBM, hemorrhage	Anti microbial	Terpenoids	De La Salle University, Philippines[129]
Phyllodium pulchellum	Payang-payang/ Angel locks	Subanen: Gaan-gaan	Roots	Decoction	Physical relapse	Anti helmintic, anti diarrhea	Alkaloids, bufotenin	Cai et al.[123]

Senna alata (L.) Roxb.	–	Asunting	Leaves Leaves	Decoction Steam	Kidney problems *Tinea versicolor*	Anti bacterial, antioxidant, antifungal, anticancer, antiviral	Secondary metabolites (tannins, alkaloids, flavonoids, anthrax-quinone, saponins, phenolics	Oladeji et al.[130]
Sesbania grandiflora (L.) Pers.	Katuray/West indian pea	Subanen: Thori	Trunk	Infusion (Scrape the trunk (7x) and boil with enough water. Drink the infusion often until well)	Diarrhea	Thrombo-lytic and membrane stabilizing activities	Secondary metabolites	Laboni et al.[131]
Tamarindus indica	Sampalok/ Tamarind	Vis: Sambag	Leaves Fruit and leaves	Decoction of the leaves for taking a bath. Direct eating/Extraction	Measles Gastro intestinal system and related disorders	Anti diabetic, anti microbial, anti venomic, antioxidant, laxative, amelio rative	Essential amino acids, potassium, malic acid, tartaric acid	Kuru[132]
Vigna radiata (L.) R.Wilczek	Monggo/Mongo bean	Monggo	Fruits	Cooking	Anemia	Anti hyperten-sive, anti cancer, immuno modulatory activities	Polyphenol (vitexin and isovitexin)	Hou et al.[133]
Lamiaceae								
Callicarpa tomentosa	Malabar hoary/Tigaw	Subanen: Tigau	Young leaves	Apply directly.	Toothache	Analgesic, diuretic	Glycosides, flavonoids, tannins	Shankar et al.[134]
Coleus blumei (Syn. *Plectranthus scutellarioides* (L.) R.Br.)	Mayana/Coleus	Chav: Lampuya	Leaves Leaves Leaves Leaves	Pounding and direct application Decoction Steam and applied as poultice. Extraction	Swelling, boils Fever, cough Fever Wounds, post-partum cleansing, boils	Analgesic, anti inflamma-tory, anti microbial	Alkaloids	Obena[135]
Gmelina arborea Roxb.	Gmelina	Gmelina Tausug: Jibilina	Leaves Leaves Leaves Young leaves	Direct application. Poultice Heat leaves then apply directly to the affected area. Put 3 leaves on the area. Always change when dried.	Fever, colds Arthritis, inflammation, flatulence Headache, fracture, "panuhot" Back pain	Anti bacterial, antioxidant, antidiabetic	Ethanol, n-butanol, ethyl acetate	Nayak et al.[136]
Mentha cordifelia	Yerba buena	Yerba buena	Leaves	Sap extraction, then massage to affected part with eucalyptus.	Headache, muscle pain, arthritis, rheumatism	Analgesic	Mentha-lactone	UP-Diliman, Philippines[137]

(Continued)

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						Bio-activities	Active isolates	
Ocimum africanum	Balanoy/Sweet Basil	Chav: Albahaca Bajau: Sulase/ Mamba-wing Subanen: Sangig	Leaves Leaves Roots Roots and leaves	Decoction Extraction Decoction Decoction	Skin diseases Fever, polio, newborn care Asthma Post-partum care	Analgesic, anti inflamma-tory, anti microbial	Alkaloids, phenols, tannins, saponins, flavonoids, steroids, terpenoids	Pandey et al.[138]
Origanum vulgare L. (Syn. *Coleus aromaticus* Benth.)	Oregano	Chav: Marjoram Vis: Kalabo Tausug: Origano Subanen: Gliganu	Leaves Leaves Young leaves	Decoction ExtractionSteam Pound enough leaves and extract the juice. Give half tsp to a child twice a day.	Asthma, cough, colds Pneumonia Kid's cough	Anti microbial activity	Methanol, dichloro methane and cyclo hexane, phenolic compounds	Singletary[139]
Orthosiphon aristatus	Cat's whiskers	Chav: Barbas de gato Vis:Balbas pusa Subanen: Wachichao	Leaves Leaves	Infusion Decoction	Pains, diabetes, urinary tract infection, kidney stones Cough	Anti inflammatory	Ursolic acid	Hsu et al.[140]
Pogostemon auricularis	Cat's tail	Buntot pusa Subanen: Buntot sa iring	Leaves and flowers	Decoction	UTI	Cytotoxic	Alkaloids, tannin, glycosides, saponins, phenolic, flavonoids, flavon glycosides	PG and Research Dept of Botany, Tiruchirap-palli-1, Tamil nadu, South India[141]
Premna odorata Blanco	–	Alagaw	Roots Leaves	Decoction Bathing	Myoma, tumor "Panuhot"	Cytotoxic, antihyper glycemia, anti microbial, antioxidant, anti inflammatory, immune modulatory	Flavonoids, diterpenoid	Dianita and Jantan, 2017[128]
Vitex negundo L.	Lagundi/Five-leaved chaste tree	Lagundi	Leaves Young leaves	Decoction (Boil 7 leaves with one glass of water) Pound and extract the juice. Drink 1 tbsp. often.	Cough, asthma, fever, stomach ache, headache, fever Cough	Anti inflamma-tory, analgesic, cytotoxic effects	Phyto chemical secondary metabolites	Sri Sathya Sai University, India[142]
Lauraceae								
Cinnamomum mercadoi	Cinnamon	Litik-litik	Shoots	Get the extract and filter it, then drink. Cover the leaves with banana leaves, place it in a mild fire then get the extract from it.	Cough for kids	Anti bacterial, antioxidant	1,1-diphenyl-2-picrylhydrazyl (DPPH)-radical scavenging phenols	Kumar et al.[143]

Litsea glutinosa (Lour.) C. B. Rob.	Puso-puso/Indian laurel	Yakan: Pusoh baih Sama: Lakdan bulan	Leaves, stem	Decoction	LBM, post-partum care	Cytotoxic, anti Helminthic, antioxidant	Phenolic, flavonoids, tannin	Khwaja Yunus Ali University, Bangladesh[144]
Persea americana Mill.	Abokado/ Alligator Pear	Abokado	Leaves Fruits Leaves	Decoction Shake (blend) Poultice	LBM, stomach ache, cough, UTI Hyper tension, diabetes Fever	Anti-oxidant, anti-inflam-matory	Ethanol, phenolic com-pounds	Owolabi et al.[145]
Lecythidaceae								
Barringtonia Asiatica	Fish poison tree	Bitoon-bitoon	Leaves	Heated and externally applied as poultice	Wounds, stomach ache, rheumatism	Anti microbial, analgesic	Amides, alkaloids, lignans, flavones	Umaru et al.[146]
Liliaceae								
Allium ascalonicum	–	Sibujing	Whole plant	Decoction	Fever	–		
Lilium sp.	–	Subanen: Niyog-niyog	Bulb	Decoction(Slice into 7 pieces and boil with 3 glasses of water. Drink the decoction often until needed.)	Kidney trouble, internal illness, tuber-culosis, vomits blood	–		
Lythraceae								
Lagerstroemia speciosa	Banaba/Queen's Flower	Banaba	Leaves Trunk & roots Leaves & bark	Infusion, Decoction Decoction Mixing of extracts	Diabetes and kidney disorder Body aches, UTI Overall health	Anti Hyper lipidemic, antioxidant, antiviral activity	Corosolic acid, gallic acid, ellagic acid	Dept. of Pharmaceu-tical Chemistry, Vignan Pharmacy College, India[147,148] Chan *et al.*, 2018)
Malvaceae								
Abelmoschus esculentus (L.) Moench.	Okra/Lady's fingers	Okra	Fruits Leaves	Decoction Decoction	Stomach ache LBM	Cardio protective, renal protective, neuro protective, anticancer, analgesic, anti ulcer, anti bacterial, anti fatigue	Flavonoids, polysac-charides, vitamins	Durazzo et al.[149]
Bidens pilosa L.	Beggar-ticks/Spanish needle	Vis: Tuway-tuway Subanen: Tulay-tulay	Roots	Decoction	High fever, over fatigue, physical relapse	Anti microbial, cytotoxic, antioxidant	Phenolic compounds	Singh et al.[150]
Camptostemon philippinense (Vidal) Becc.	-	Gapas-gapas	Leaves	Decoction	Diabetes	-		

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Ceiba pentandra (L.) Gaertn.	Kapok	Tausug: Kapuk Yakan: Kayo	Bark Leaves Leaves	Infusion Decoction Pound 7 leaves and apply on the inflamed area.	Fever Arthritis, hyper tension Inflammation	Analgesic, anti microbial, diuretic, aphrodisiac	Flavonoids, isoflavones	Osuntokun et al.[151]
Corchorus olitorius	Jute mallow	Saluyot	Leaves Leaves Leaves	Get the leaves and dry it. After drying, pour hot water to the dried leaves like a tea Decoction Cooking	Hyper tension Hyper tension, diabetes Fever	Anticancer, antioxidant, anti inflamma-tory, analgesic, antipyretic, anti microbial	Polyphenol, butanol extract, ethyl acetate, coumaric acid, ferulic, vanillic, hydroxyl-benzoic, vanillic acids	Hasan and Kadhim[152]
Hibiscus rosa-sinensis	Gumamela/ Hibiscus	Gumamela	Flower	Extraction through pounding (Apply as poultice)	Headache, boils, swelling and coughs, wounds	Anti bacterial, antioxidant, antipyretic	Flavonoids, pro anthocya-nidins	Singh et al.[153]
Pachira aquatica	Malabar chestnut	Money tree plant	Leaves	Decoction	"Pasmo"	–(only to seeds)		
Pterocymbium tinctorium Merr.	Taloto	Subanen: Thelloto	Trunk	Poultice (Scrape the trunk thrice, put on the wound and secure with a bandage or cloth)	Fresh wound	–		
Sida acuta Burm. f.	Escobang haba/ broom weed	Vis:Siligon Subanen: Eskubang mayawis	Leaves Roots	Poultice Decoction	Stomach ache Physical relapse	Anti asthma, anti inflamma-tion, antiulcer	Alkaloids and steroidal compounds	Karou et al.[154]
Theobroma cacao L.	Cacao	Cacao	Leaves Young fruit	Poultice Crushed and applied directly	Boils Inflammation	Anti inflamma-tory, anticancer	Secondary metabolites	Baharum et al.[155]
Meliaceae								
Lansium domesticum Correa	Lansones	Yakan: Bulahan Subanen: Buwahan	Fruit peels Bark Trunk	Decoction Decoction Infusion (Scrape the trunk 3x and put ¾ glass water and let it stay for half an hour. Drink 3x a day with or without meal. Do this as needed.)	UTI Malaria Hyper tension	Anticancer, cytotoxic, apoptotic	Secondary metabo-lites	Chiang Mai University, Chiang Mai, Thailand[156]
Sandoricum koetjape (Burm.f.) Merr.	Santol	Vis:Santol Tausug: Santul	Bark & leaves Fruit peels Leaves	Decoction Decoction Decoction	Diarrhea, washing genitals during post-partum care LBM Swelling	Anti inflamma-tion	Limonoids	Pancharoen et al.[157]

Swietenia macrophylla King	Mahogany	Tausug: Mahugani	Seeds	Decoction & taken orally	Cough, stomach ache	Anti microbial, anti inflamma-tory, antioxidant, anti mutagenic, anticancer, antitumor, antidiabetic	Limonoids and its derivatives	University of Malaya, Kuala Lumpur Malaysia[158]
Menispermaceae								
Tinospora rumphii Boerl	Makabuhay/ Heavenly elixir	Bajau: Pitawali Yakan: Pait-pait Vis: Panyawan Subanen: Patawali	Stem/ Vines	Decoction	Birth control, hepatitis, diabetes, fever, "bughat", "pasmo" malaria, cough, prostate cancer, tuberculosis	–		
				Get the extract then mix it with candle wax to make it like an ointment, then massage the body using it.	Arthritis, skin allergies, hyper tension, stroke			
				Decoction	LBM, diabetes			
				Pounding	Stomach ache, headache, dog bites			
				Poultice	Eczema			
Tiliacora tiandra	Yanang	Tausug: Jannang	Roots	Decoction	Mouth ulcer, fever	Antioxidant	Carotenoid, phenolic compounds	Ubon Ratchathani University, Thailand[159]
Moraceae								
Artocarpus heterophyllus Lam.	Jackfruit	Nangka	Leaves Leaves Bark	Decoction Poultice Sap extraction	Hyper acidity, asthma Sore Wounds	Anti Inflamma-tory	Flavonoids	Universiti Teknologi Malaysia, Malaysia[160]
Ficus elastica Roxb. ex Hornem.	–	Balite na dako Yakan: Goma	Leaves, roots	Poultice, decoction	Cough, rashes, cancer	Antitumor, antioxidant, cytotoxic	Flavonoids	Hawary et al.[161]
Ficus benjamina L.	Balete/weeping fig	Balite na gamay Subanen: Nunok	Roots	Poultice/pounding/ crushing/pulveri-zing	Broken bones	Anti microbial, antioxidant	Phenolic compounds	Imran et al.[162]
Ficus heteropoda Miq	–	Subanen: Thetanek	Trunk	Infusion (Scrape the trunk many times and put in a glass of water. Take the infusion regularly.)	Tubercu-losis	–		
				Infusion (Soak small slices in a glass of water for several minutes. Drink only once.)	Antibiotic after bleeding			

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Ficus pumila L.	–	Balite na sanga	Roots	Decoction	Impotence, menstrual disorders	- (leaves only)		
Ficus septica Burm.f.	Hauili	Lagnob	Leaves	Decoction	Physical relapse, stroke	Cytotoxic, analgesic	Secondary metabolites	De La Salle University[163]
Ficus sp.	–	Subanen: Menaol	Leaves	Poultice	Mild fractures, flatulence	–		
Moringaceae								
Moringa oleifera Lam.	Malunggay/ Horse raddish	Vis: Kamung-gay	Leaves Leaves Leaves Bark Fruits Seeds	Pounding/crushing/ pulveri-zing when dried	Lumps, bruises, contusion, antifungal Wound Fever, hyper tension, arthritis, hyper choleste-rolemia, diabetes, cancer Dog bites, wounds Diabetes Headache, toothache	Anti inflammation, cytotoxic	Vitamins, phenolic acids, flavonoids, isothio cyanates, tannins, saponins	Vergara-Jimenez et al.[164]
Muntingiaceae								
Muntingia calabura L.	Aratiles/Cherry tree	Datiles Subanen: Mansanitas	Leaves Fruits	Decoction Direct Eating	Bleeding, kidney infection, ulcer, myoma, UTI, hyper tension tuberculosis Diabetes	Cytotoxic, antioxidant, anti inflamma-tory, antipyretic	Flavonoids, phenolic compounds	De La Salle University, Philippines (Ragasa et al.[165])
Musaceae								
Musa spp.	Saging/Banana	Saging Tausug: Saying	Leaves	Chewing, poultice	Open wounds	–(only to flowers, peels, and trunk)		
Musa acuminata	Banana	Saying	Sap, bract	Extraction	Fever	–		
Musa sapientum	Saging/Banana	Saging	Young leaves	Wrap around the child's body. Change when dry.	High grade fever in children	–(only to flowers, peels & trunk)		
Musa sapientum L. var. *cinerea* (Blco.) Teod.	Latundan/ Banana	Subanen: Solibadyu	Fruit Leaves	Eat including the fiber Pound plenty leaves and apply on the affected part often.	Heart failure Shingles	–		
Musa textilis Nee	Abaka/Manila hemp	Abaka	Trunk Stem	Watery sap extraction Heat a small portion of the stem and roll over on the paralyzed part.	Wounds Paralysis	–		

Myrtaceae								
Psidium guajava L.	Bayabas/Guava	Bayabas	Leaves Leaves Leaves Fruits	Pound and apply directly, decoction Prepared as quid through oral mastication Decoction & direct drinking Direct eating	Wounds, Rashes, toothache Induce proper digestion Diarrhea, post-partum care, LBM, fever, cough, rashes LBM	Anti diarrheal, antiseptic, anti spasmodic, antioxidant, anti microbial, anti inflamma-tory	Alkaloids, flavonoids, glycosides, saponins and tannins	University of Granada, Spain[166]
Syzygium cumini (L.) Skeels	Indian berries	Lomboy	Young leaves Seeds	Direct eating Decoction	Type II Diabetes Gastro enteritis	Diastatic conversion of starch into sugar	Antho cyanins, glucoside, alkaloid, jambosine, glycoside, jambolin, antimellin	Ayyanar & Subash-Babu[167]
Syzygium malaccense (L.)	Makopa/Malay apple	Subanen: Tual	Trunk	Wash the inner part and eat until needed. Chew a ortion of the inner part of the trunk. Swallow the juice.	Cough	Antioxidant	Phenolics, antho cyanins (cyanidin 3-glucoside)	Nunes et al.[168]
Ochnaceae								
Ochna serrulata	Mickey mouse bush	Tausug: Santing	Leaves	Decoction	Physical relapse	Anti microbial	Biflavonoid	Dongguk University, Korea[169]
Oleaceae								
Jasminum sambac L.	Sampaguita/ Arabian jasmine	Sampaguita	Stem	Decoction	Birth control	Anti inflamma-tory, anticancer, antioxidant, antidiabeticanti microbial	Secondary metabolites	Jaya Prakkash et al.[170]
Oxalidaceae								
Averrhoa bilimbi L.	Kamias/ Cucumber tree	Iba Vis: Balimbing	Fruits Fruits	Decoction Direct eating/Juice extraction	Arthritis Chronic headache, fever, cough, gastro enteritis	Anti microbial	Aliphatic acids, oxalic acid, vitamin C	Alhassan and Ahmed[171]
Biophytum sensitivum (L.) DC	-	Subanen: Guyeng-ham	Leaves	Spread and mix leaves with the seedlings prior to planting. Spread the leaves all over the field and crops prior to harvest.	Ritual on planting and harvesting rice	Anti ulcer, anti bacterial, antioxidant antitumor, antipyretic, immuno-modulatoryantidiabetic	Secondary metabolites	Bharati and Sahu[172]

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Pandanaceae								
Pandanus amaryllifolus	Pandan	Pandan Tausug: Pangdan magih	Leaves and roots	Decoction can be used for bath	Rheuma-tism, hyper tension, pain reliever	Anti inflamma-tory, antioxidant	Panda marine B and pandalizine C and D	Cheng[173]
Pandanus sp.	Fragrant screw pine	Romlon	Leaves	Decoction	Fever	Anti oxidant	Phenolic content	Jimtaisong and Krisdaphong[174]
Pedaliaceae								
Sesamum indicum L.	Linga/Sesame	Bajau: Lunga	Seeds	Extraction and applied as poultice	Skin itch, wounds	Anti-oxidant, chelating capacity	Proteins (lysine, tryptophan & methionine)	Miraj and Kiani[175]
Phyllanthaceae								
Phyllanthus niruri L.	Sampa-sampalukan/ Gale of the wind	Sambag-sambag Subanen: Tulog-tulog	Leaves Roots	Extraction Decoction	Burns High fever	–		
Piperaceae								
Piper aduncum L.	Spiked pepper	Subanen: Thalon-thalon	Roots	Decoction(Boil 3 pieces of 7 inches roots with enough water. Gargle some and drink the remaining	Toothache	Anti microbial	Essential oils	Monzote et al.[176]
			Young leaves	Pound and squeeze the juice on the wound only once.	Fresh wound			
Piper betle L. (Syn. with *Piper betel* Blanco)	Betel	Buyo Yakan: Tekkey Subanen: Thalon	Leaves Leaves Leaves	Chewing Poultice Extraction and mix with rubbing alcohol, applied directly	Dental caries “Panuhot” “Binat”, cancer	Anticancer, Anti bacterial	Alkaloids, tannins, steroids, chavibetol, chavicol	Dwivedi and Tripathi[177]
Piper interruptum	-	Subanen: Thalon gekbek	Leaves	Pound leaves, mix with lime powder and apply on the affected area often.	Ringworm	Emollient, anti rheumatic, diuretic, stimulant, anti inflamma-tory, anti bacterial, antifungal	Alkaloids	Gutiérrez et al.[178]
Peperomia pellucida	Ulasimang bato	Chav: Alumbre Vis: Sinaw-sinaw Tausug: Lansang-lansang	Leaves	Extraction & direct applica-tion	Wound dressing, headache, toothache	Anti microbial, antioxidant, anti inflamma-tory, analgesic	Alkaloids, flavonoids, saponins, terpenoids, steroids and glycosides	Raghavendra & Prashith[179]

Poaceae								
Bambusa bambos (L.) Voss.	Kauayan-tinik/ Spiny Bamboo	Chav:Kania	Leaves	Burn the leaves and the ashes will be applied on the affected area as poultice	Scabies	Anti Inflamma-tory, anti microbial	Alkaloids, steroids, tannins, glycosides, flavonoids	Thapa et al.[180]
Cymbopogon citratus	Lemon grass	Chav: Tanglad Bajau: Saiy Tausug: Sai Yakan: Saley Subanen: Thenlad	Stem and leaves	Decoction	Nausea, hyper-tension; sore throat	Anti inflamma-tory, anticancer, anti bacterial, analgesic activity	Essential oil components	MSU-IIT[181–184]
Cynodon dactylon	-	Bermuda	Whole plant	Decoction	Hair fall, kidney stones	-		
Eleusine indica (L.) Gaertn	Paragis/Goose grass	Bila-bila Subanen: Sulapid/Shelapid	Leaves/ Roots	Decoction	Myoma, cysts, cancer, fever	Antibiotic and anticancer	Saponins, cyanogenic glycosides, unsaturated lactones, glucosino lates	Al-Zubairi et al.[185]
Imperata cylindrica (L.) Raeusch.	Cogon grass	Kugon Subanen: Gegi	Roots	Decoction	Nosebleed	–		
Saccharum officinarum L.	Sugarcane	Tubo Subanen: Thebu	Stem	Roasted and eaten	Cough	Anti inflamma-tory, analgesic, antihyper glycemic, diuretic, and hepato protective	Fatty acid, alcohol, phytosterol, higher terpenoids, flavonoids, glycosides, phenolic acids	Taylor[186]
Saccharium violaceium Tussac	Tubo/Sugar cane	Subanen: Thebu menubo	Stem	Eat the stem/fruit often.	Hepatitis	Antioxidant activity, cholesterol-lowering properties	Various fatty acid, alcohol, phytosterol, higher terpenoids, flavonoids, -O- and -C-glycosides, phenolic acids	Singh et al.[187]
Zea mays	Mais/Corn	Mais	Fruit grains	Direct Cooking	Diabetes	Hypo glycemic, antioxidant	Phenolic content (TPC), antho cyanins	Fabila-Garca et al.[188]
Polypodiaceae								
Asplenium sp.	Bird's nest fern	Kabkabon	Frond extract	Infusion/Decoction	Labor pains, "bughat" (physical relapse)	Anticancer, antioxidant, anti microbial	Flavonoids	Jarial et al.[189]
Rubiaceae								
Coffea arabica L.	Coffee	Kape	Seeds	Decoctionpounding	Lung cancer	Anti microbial, antioxidant	Chloro-genic acid and caffeine	University of Phayao, Phayao, Thailand[190]

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Morinda citrifolia L.	Apatot/Noni fruit	Bajau: Bangkoro	Leaves, fruit	Decoction	Fractures, cancer	–		
Psychotria velutina Elmer	-	Subanen: Dlebalud	Trunk	Decoction (Scrape the inner part and boil with water. Drink until the bleeding stops.	Hemor-rhage	–		
			Roots	Wash a small root and eat. Repeat the procedure until the bleeding stops.	Hemor-rhage			
Rutaceae								
Citrofortunella microcarpa	Calamansi	Kalamansi	Leaves Fruits	Decoction Juice extraction of fruit and mix with warm water	Diabetes Lowers blood cholesterol, cough	Anti microbial, antioxidant	Flavonoid, vitamin C	De La Salle University[191]
Citrus maxima (Burm.) Merr.	Pomelo	Boongon	Leaves	Decoction	Gas pain, "panuhot"	Anti-dermato-phytic and fungicidal activity	Essential oils	Vijaylakshmi& Radha[192]
Citrus limon (L.) Osbeck	Lemon	Lemon	Fruits	Infusion, Extraction	Cancer, bacterial infections, cough	Anti oxidant, anti microbial	Essential oils (limonene, geranial, and neral)	Hojjati & Barzegar[193]
Citrus microcarpa Bunge	Calamansi	Kalamansi	Fruits	Juice extraction	Cough	Anti oxidant, anti microbial	Flavonoid, vitamin C	De La Salle University[191]
Sapotaceae								
Chrysophyllum cainito L.	Star apple	Caimito	Leaves	Decoction	Diabetes, excessive bleeding, LBM	Anti oxidant, anti inflamma-tory, hypo tensive, anti microbial	Poly phenolic anti oxidants, quercetin, myricitrin	Lou et al.[194]
Synsepalum dulcificum	Miracle fruit	Magic fruit	Fruit	Direct eating	Kidney diseases	Anti oxidant, glucosidase inhibition	Acarbose, MFP-S, MFP-L, poly saccharides	Jian et al.[195]
Schizaeaeceae								
Lygodium sp.	–	Subanen: Nitoan miha	Roots	Wash roots and eat regularly	"Pagan"	–		
Selaginella delicatula (Desv. ex. Poir.)	–	Subanen: Dendunay	Leaves	Heat enough leaves until burnt. Apply powder around the wound.	Severe wound on the breast, shingles	–		
Simaroubaceae								
Eurycoma longifolia	Tongkat ali/Longjack	Yakan: Tungkat ali	Leaves	Decoction	Headache	Ergogenic effect	Alkaloids	Universiti Sains Malaysia[196]

Smilaceae								
Smilax bracteata Presl.	Sarsaparilla vine	Subanen: Banag	Roots	Decoction(Boil with enough roots and drink often)	"Pagan"	–		
Solanaceae								
Capsicum annuum L.	Sili	Sili	Fruits	Pounding	Toothache	Anti oxidant, analgesic	Capsai-cin, carote-noids lutein, ascorbic acid	Anand and Bley[197]
Capsicum frutescens L.	Sili/Red pepper	Sili	Leaves	Steam	Fever	Analgesic, antioxidant	Lutein, ascorbic acid, capsaicin, carotenoids	Anand and Bley[197]
Datura metel L.	Katsu-bong/Thorn apple	Subanen: Ginte-long	Seeds	Heat the seeds in a pot covered with coconut shell with a hole. Sip the fume through a straw and spit on a paper afterwards	Toothache	-		
Lycopersicon esculentum Mill.	Kamatis/Tomato	Kamatis	Leaves	Direct Chewing	Cough	Anti oxidative, anti prolifera-tive, anticancer, anti inflamma-tory	Flavonoids	Chaudhary et al.[198]
Solanum melongena	Talong/ Nightshade	Chav: Patong-patong	Entire plant	Infusion	Pain reliever, muscle relaxer, cough	Anti inflamma-tory, antioxidant	Alkaloids, solanine	Department of Physiology and Pharma-cology, Rome, Italy[199] (Di Sotto *et al*., 2018)
Solanum nigrum	Black nightshade	Tausug: Antutu-ngaw	Whole plant	Infusion of the whole young plant	Fever	Anti oxidant, anti inflamma-tory, antipyretic agent, anti tumorigenic	Glyco-alkaloids (solamar gine, solasonine, solanine)	Jain et al.[200]
Tiliaceae								
Triumfetta bartramia L.	–	Subanen: Dalupang	Flower	Crushed and applied directly	Furuncle	–		
Urticaceae (3)								
Leucosyke capitellata (Poir) Wedd.	–	Subanen: Glombilan/Alagasi	Stem	Eat a small portion until needed	Cough	–		
Pipturus asper	Dalunot	Subanen: Handala-may	Leaves	Poultice	Allergy	–		

(Continued)

Table 1. (Continued)

Family/Scientific name (Incl. Author)	Common name(local + English)	Indigenous name	Plant part used	Mode of preparation	Folkloric use	Literature review		Research done by Institution (References)
						Bio-activities	Active isolates	
Urtica dioica	Stinging nettle	Alingatong	Leaves and roots	Decoction	For some cancer ailments, "hilo"	Anti-oxidant, anti microbial, anti inflamma-tory, antiviral, antiulcer	Essential amino acids, fatty acids, carotenes, terpenoids, poly phenolic compounds	Adhikari et al.[201]
Verbenaceae								
Lantana camara L.	Koronitas/Stink grass	Vis:Warak/Baho-baho Subanen: Kanding-kanding	Leaves	Decoction	LBM	Anticancer	Essential oils	Zandi-Sohani et al.[202]
Stachytarpheta jamaicensis (L.) Vahl	Kandila-kandilaan/Blue porter weed	Yakan: Bilu-bilu Subanen: Dlompe-reng	Leaves	Decoction	Breast cyst	Anti microbial, antifungal	Verbas-coside	Liew and Yong[203]
Vitaceae								
Tetrastigma hemsleyanum	Ayo/Alupidan	Subanen: Taparak	Bark, sap	Pound, poultice	Wound	Rheuma-tism, hepatitis	Alkaloids, phyto steroids	Krishna et al.[204]
Zingiberaceae								
Costus speciosus (J. Koenig) Sm.	Spiral ginger	Subanen: Tiwasi	Leaves	Decoction(Boil 2 glasses of leaves with ample water. Drink often.)	Cough, diabetes	–		
Curcuma longa L.	Turmeric	Dulaw Subanen: Dluya Thembaga	Rhi-zomes	Decoction Use the infusion as eyedrops	Myoma, hepatitis, physical relapse Sore eyes, stye	Anti-oxidant, anti-ulcer	Alkaloids, terpenoids, curcumi-noids	Department of Medicine, The University of Arizona, Tucson, AZ[205]
Kaempferia galanga L.	Gisol/Resurrec-tion lily	Subanen: Gisol	Rhi-zomes	Poultice	Deeply punctured	–		
Zingeber officinale Roscoe	Ginger	Luy-a Subanen: Tawasi	Rhi-zomes	Decoction	Sore throat, headaches, colds, nausea, emesis	Anti oxidant, anti inflamma-tory, anti microbial, anticancer, antiemetic activities	Phenolic compounds (gingerols and shogaols), terpenes,	Mao et al.[206]

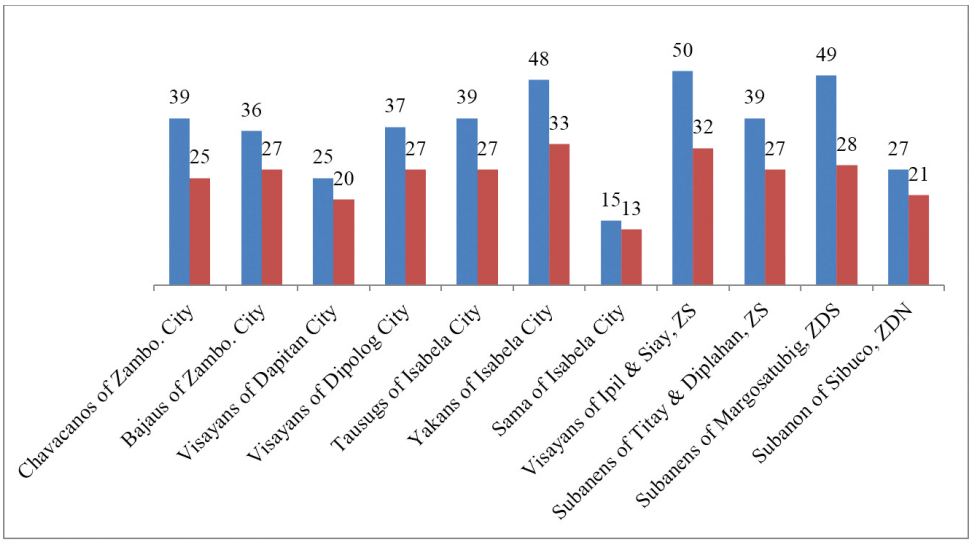

Figure 2 Graphical variations among the different ethnolinguistic groups per area in terms of the species and families of medicinal plants utilized based on ethnobotanical studies.

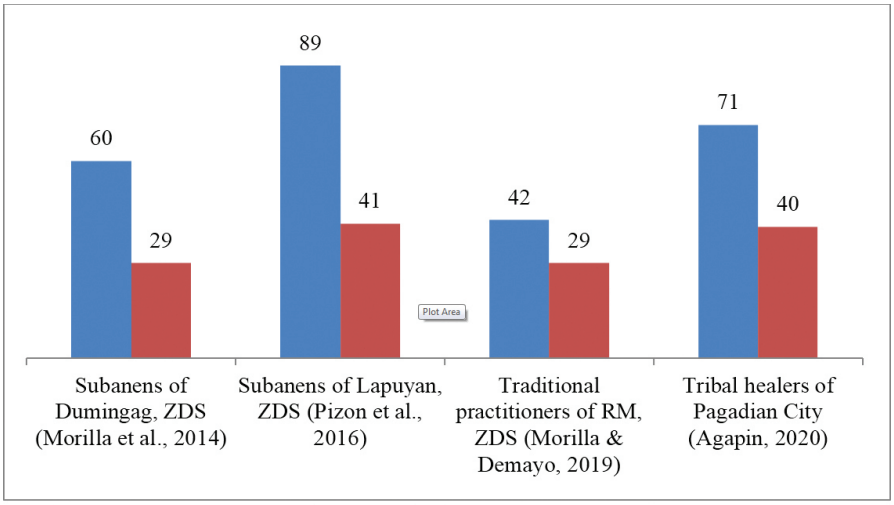

Figure 3 Graphical variations among the different ethnolinguistic groups per area in terms of the species and families of medicinal plants utilized based on systematic reviews.

is followed by *V. negundo* (Family Lamiaceae) and *P. guajava* (Family Mrytaceae). On the other hand, *Annona muricata* (guyabano) of the Family Annonaceae, is the most frequently utilized plant in treating diabetes, hypertension, and cancer.

The leaf part is the most frequently utilized plant part in a decoction process since they are easily collected and stored.[31]Leaves are also the sites of production and storehouse of many chemical compounds (tannins, alkaloids and flavonoids) generating important phytochemicals for effective healing ability .[39] In terms of the mode of preparation, the decoction is the most common process in preparing herbal medicines. This preparation involves the boiling of the plant materials for an extended period, so the hard material of the plants will soften and release its active components.[207]

Figures 2 and 3 show the graphical variations among the different ethnolinguistic groups per area in terms of the species and families of medicinal plants utilized based on ethnobotanical studies and systematic reviews, respectively.

In terms of the ethnobotanical practices, the Visayans of Ipil and Siay, Zamboanga Sibugay, comprised the highest number of utilized medicinal plants (50) from 32 families being. According to De Guzman et al.,[31] Visayans are resourceful enough to utilize plants as alternative medicine (commonly called *"Binisayang tambal"*). *B. tambal* practice serves as the local primary health care, especially in rural areas and patients claimed that it is effective. In terms of systematic reviews, the Subanens of Lapuyan, Zamboanga del Sur, comprised the highest number of medicinal plant species (89) from 41 families. Bellen,[207] in their study wrote that "they regard that the knowledge on the use of plants for medicines are bestowed through a dream and the practice of utilizing these medicinal plants are passed on throughout generations."

Table 2 Variations in terms of locally termed diseases and associated rituals among the different ethnolinguistic groups. [AQ2]

Locally termed diseases	Total per locally-termed disease	Ethnolinguistic groups														
		1	2*	3	4	5	6	7	8*	9	10	11*	12#	13#	14#	15#
1. Bughat	9		√	√			√		√		√	√		√	√	√
2. Butod sa tiyan	2	√									√					
3. Kabuhi	1			√												
4. Hilo	2			√								√				
5. Panuhot	5	√			√				√		√					√
6. Pasmo	6	√			√	√					√	√				√
7. Piang	2								√		√					
Total per tribe		3	1	3	2	1	1	–	3	–	5	3	–	1	1	3

Legend: 1 – Chavacanos of ZC
2 – Bajaus of ZC
3 – Visayans of Dapitan City
4 – Visayans of Dipolog City
5 – Tausugs of Isabela City, Basilan
6 – Yakans of Isabela City, Basilan
7 – Sama of Isabela City, Basilan
8 – Visayans of Ipil & Siay, Zambo. Sibugay
9 – Subanens of Titay & Diplahan, Zambo. Sibugay
10 – Subanens of Margosatubig, Zambo. Sur
11 – Subanons of Sibuco, Zamboanga del Norte
12 – Subanens of Dumingag, ZDS[39]
13 – Subanens of Lapuyan, Zambo. Sur [40]
14 – Traditional practitioners of RM[41]
15 – Tribal healers of Pagadian City, ZDS[30]
* With unique traditional ritual related to folkloric medicinal use.
# Based on systematic reviews.
√ Observed in the tribe

Literature reviews from the different published research reveal important bioactivities and bioisolates of the medicinal plants utilized. Among all ethnolinguistic groups, the following 52 medicinal plants need further investigations for their active bioisolates and bioactivities: *P. aquatica, O. cochenillifera, T. rumphii, M. citrifolia,* kayumanis and kambal-simangko, *C. utan, S. trifasciata, Artemisia* sp., *I. cylindrica, C. philippinse, Ficus* sp., *F. pumila, M. acuminata* bract, *S. astylosa* bark, *F. latifolia, H. rubescens, O. diversifolium, Calamus* sp., *Radermachera* sp., *B. cernua, A. rhomboidea, Lilium* sp., *P. tinctorium, F. heteropoda, M. textilis, M. sapientum, M. sapientum* L. var. *cinerea, P. velutina, Lycodium* sp., *S. delicatula, S. bracteata, D. metel, S. tarpheta jamaicensis, C. speciosus, K. galanga, C. elata, A. philippinensis, M. floribunchus, P. ninuri, H. colorata, E. ambionensis, H. vulgaris, Sansevieria* spp., *P. spicatus, J. podagrica, M. floribunda, D. capitatum, A. ascalohicum, C. dactylon, T. bertramia*, and *L. capitellata.*

While all the ethnolinguistic groups utilized medicinal plants to cure common respiratory diseases to critical diseases, they also have unique traditional practices in treating locally termed conditions. Table 2 shows the variations in terms of the seven locally termed conditions and associated rituals among the different ethnolinguistic groups.

Among the locally termed diseases of the different ethnolinguistic groups, "bughat" occupies the topmost (9), followed by "pasmo" (6), and "panuhot" (5). The Subanens of Margostubig exhibits the highest of these locally termed diseases, five of which are: bughat, kabag, panuhot, pasmo, and piang that lack scientific support yet. Many locals believe in these even today. In the preceding discussions, these are described based on literature reviews:

BUGHAT (PHYSICAL RELAPSE)

This condition is usually experienced by women who perform heavy physical activity post pregnancy. The woman suffering from physical relapse feels weak, very tired, and sometimes has flu-like symptoms. According to Millondaga,[208] "bughat" is often perceived as a natural reaction of women to pregnancy and childbirth in some rural areas of the Philippines. However, the word "relapse," refers to the state of deterioration of health after recovery.[31]

BUTOD SA TIYAN (GAS PAIN DUE TO ABDOMINAL DISTENTION)

Symptoms include bloating and irritable bowel syndrome. The pathophysiology of bloating and abdominal distention is complicated and incompletely understood.[209]On the other hand, butod sa tiyan caused by "impasto" (indigestion) may lead to infantile colic. According to Sung,[210]infantile colic refers to excessive crying of unknown causes in infants.

KABUHI

This is an indescribable feeling in the epigastric region of the abdomen. The symptoms include rapid palpitation that causes dizziness and cold sweats. The remedy according to folkloric treatment, is to apply pressure at the point of origin. There are many other treatments from different regions of the Philippines, but historically they just apply pressure on the gastric area and wrap the waist with a piece of cloth, making it like a belt.

HILO

The Visayans of Dapitan and Subanen believed in "hilo." According to Elago et al.,[23] some folks died or were sick because of *saled* (*hilo*). Feelings of physical malaise, indescribable overfatigue, with untreated cough are often experienced by folks diagnosed with *hilo*. *Saled* or poison is a practice to make someone ill or die. This is still in practice, by the all the folks. In an interview with a "timuay," the transmission of "hilo" can either be accidental or intentional.

Figure 4 (a) Medicinal plant ***(gua)*** used to fight against ***hilo***. (b)The ***lana*** made by a ***balian*** (traditional healer).

Accidental is through food while intentional is done by an expert "manghiloay."

They conspire because they are jealous of somebody's growth, or do not want others to be ahead of them in terms of wealth, wisdom, or even in physical appearance. Saled is also a way of defending oneself from enemies or possible allies and is not advisable as it is dangerous.

Figure 4 shows the medicinal plant used to fight against "hilo" and the "lana" made by a "balian" (traditional healer).

The medicinal plant known as "*gua*" is used by the Subanon to fight *hilo*. Their root parts are directly chewed as medicine. The individual attacked by a "manghiloay," will feel the following symptoms: sore throat, cough, muscle pain, vomiting, fatigue, fever, and the indescribable feeling of malaise. Chewing this medicinal root will counteract the effect of hilo. If the individual feels a bitter taste, this confirms the attack by hilo and vice versa.

In a similar manner, the "lana", made by a *balian* can cure "hilo" and is considered as a "sulukupan" (multi-purpose medicinal plant). This comprises the roots of 3 medicinal plants that are under molecular analyses for their identification. This root mixture is infused with coconut oil and applied on the head or any areas that need treatment or a teaspoonful of it can also be orally taken. The folks caution that a not properly stored mixture can be ineffective.

PANUHOT

"Panuhot" is another illness reported by the Visayans, which occurs when wind enters the body's nerves and tissues, causing pain and swelling in areas where they have consolidated.[211]

PASMO

"Pasmo" occurs when a person is over working beyond his physical capacities without adequate rest. The symptoms are body malaise, muscle jerking, and spasms evident on the extremities, accompanied by headache and dizziness.[212]

PIANG

"Piang" is a sprain or dislocation of nerves or tissues, affecting any part of the body brought about by a fall or mishandling of the child. [211] These result in cough mainly when they affect the chest, back, or underarm.

The folk etiology also reports that, cold wind can enter the "piang" site causing the cough termed "gipanuhot ang piang."

Table 3 Factors influencing the health-seeking behavior of the key informants to ethnobotanical practices (***N***=330).

Factors	Total	Percentage (%)
Effectiveness of treatment based on personal experience	330	100
Testimony from other users (pass on)	228	69.09
Availability/accessibility	313	94.85
Affordability	36	10.91
Nil side effects	18	5.45

[211] Only a *manghihilot* (masseur) can treat this condition; midwives or physicians are not capable of managing "piang." "Piang" as a significant cause of cough is widespread in many areas of the Philippines.[213]

All the locally termed diseases among different ethnic groups are diagnosed based on their local traditional healers, which can be influenced by the individual's health-seeking behavior and the healer choices. Table 3 shows the factors influencing the health-seeking behavior of the key informants to ethnobotanical practices.

The outcomes of Table 3 show that all the respondents (100 %) revealed that the effectiveness of the treatment based on their personal experiences influenced their health-seeking behavior to ethnobotanical practices. Effectiveness refers to the extent to which specific treatments can relieve or cure certain ailments. This is followed by the availability/accessibility of the medicinal plants within the locality (94.85%). This is attested by the defined field sampling conducted. A fact sheet of the WHO (dated December 2015) stated that one of the topmost reasons why 80% of the population in some Asian and African countries depends on traditional medicine is because of the easy availability of medicinal plants and geographical constraints versus health care facilities.

Some folkloric groups perform rituals before the use of the medicinal plant for enhanced effective disease treatment. According to them a ritual is a communicative means for uniting spiritual and material, scientific and special, daily expectations, past and present, and other principle structures contributing to the development of an individual's life.[214] Only few studies are reported with rituals because of the challenges encountered to sustain these practices.[215]The present study has documented the rituals performed by the three ethnolinguistic tribes (the Subanon of Zamboanga del Norte, Bajau of Zamboanga City, and Visayan of Ipil, Zamboanga Sibugay) with photo and video evidences.

Subanon (same with Subanen but different pronunciation) is one of the tribal groups in Mindanao, the Philippines, which performs various rituals,[218] their traditional folkloric healing knowledge in the Zamboanga Peninsula area is minimal. The challenges encountered to sustain these practices include the barrier in transmitting this tradition to the next generation. The link https://youtu.be/WO2OQ62tGIw documents the video performed by the "balian" of Subanon in Sibuco, Zamboanga del Norte, with medicinal plant usage. Imbing[220]mentioned

Figure 5 Rituals performed by a "balian" of Subanon in Sibuco, Zamboanga del Norte.

this ritual as "Gbeklug Mangenawa" which is performed for healing of the ill.

Informed consent was obtained from the "Timuay" or tribal chieftain to document it, and was approved by the "Gulang gokum" (highest among chieftain among the seven rivers based on political subdivision/eldest timuay). The NCIP was also informed before publishing the evidence. Figure 5 shows the rituals performed by a balian of Subanon in Sibuco, Zamboanga del Norte, while Table 4 summarizes the materials used in the traditional healing ritual of the Subanon of Sibuco and its symbolism.

Balians are the only ones who can perform the tribal ritual. They are also believed to be the one who can see and communicate with supernatural entities or creatures, both good and evil.[29] The ritual is usally performed on a full moon day because it enhances their abilities to see and communicate with the supernatural entities.

In the study of Mabini et al.[215] the "balian" usually uses the eggs in identifying the disease by performing "*Tigi-tigi*" in treating or healing such diseases. In this process, the egg are placed for few minutes on the particular r part of the person's body that has the illness, ache, or discomfort. The white egg is a primary ingredient in performing different rituals since it is believed to attract spirits.

In the Subanen tribe of Lapuyan, Zamboanga del Sur, some medicinal plants such as *E. indica (paragis),* Lygodium *sp.,* and *S. bracteata* (banag) are used for "pagan" meaning folkloric use. This is a religious belief that in the goddesses of the sea/ god of the land.

Unique to the Visayans is the practice of "toob" especially during fever which utilizes smoke from certain medicinal plants and that are inhaled by the patient in a closed compartment .[31] In the study of Bucol,[216] "toob" is practiced by folk healers or herbolarios in Siquijor Island in Central Philippines for curing toothache. Mansueto et al.,[212] showed that the management of certain diseases through "toob." Here a heated pot was placed under the chair and the person sits down covered with blanket including the head. Later, the pot would be slowly opened. The person uncovers his/her head from time to time during the treatment process. However, the practice of "*toob*" in treating diseases are not yet scientifically explored.[31] Figure 6 shows the ritual done by a Visayan *herbolario* (faith healer).

Figure 7 shows the materials used during the healing ritual with medicinal plants among the Bajaus of Ayuda Bajau Village, Maasin, Zamboanga City. Here, medicinal plants with liniment are applied to a patient's body. On the other hand, the use of kamangyan (incense) and a musical instrument made of goat's skin were utilized by the Bajaus during the healing ritual.

In summary, ethnolinguistic groups of the country play an essential role because they possess broad knowledge of their localities.[217]Exploring and documenting their knowledge and practices on ethnobotany may enlighten other people about their way of life and their customary beliefs or culture on

Table 4 Materials used in the traditional healing ritual of the Subanon of Sibuco and its symbolism.

Material (native term)	English term	Symbolism
Itlog bisaya	Native white egg	To attract spirits and serves as viand for the spirits. They are placed on top of a large leaf.
Bugas	Rice	This serves as the food to the spirits/gods/goddesses; A fistful of it is also placed on top of the leaf with the native egg.
Kamangyan	Incense	Used to call the attention of the spirits and transmit their messages to them; are lighted during the actual offering of prayers.
Sinsilyo	Coins	To return the favor asked, it should be hard as old coins; A cupful of coins is placed below the leaf as seen in Figure 5.
Tabako	Tobacco	To attract mercy and to strengthen the effect of herbal practice; they are placed on the sides of the rice and native egg.
Sulunsang (kahoy na ibugsok sa silangan)	- –	To provide a venue for praying which should be facing in the East direction (sun rises). In their tradition and belief, this direction is the creator. It is made up of 4 poles strategically placed.
Kilala plant	–	To recognize good spirits; a type of plant with leaves (Fig. 5 right image).
Puti nga tela	White cloth	To attract good spirits as they only recognize cleanliness.

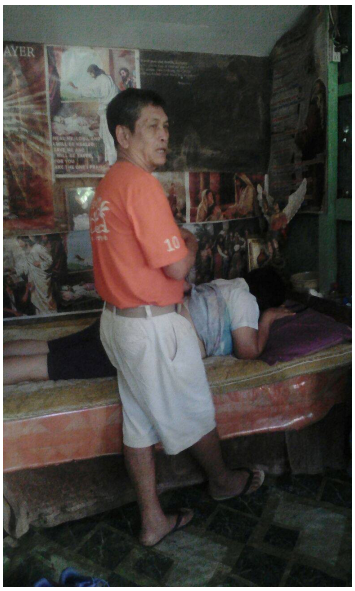

Figure 6 Ritual performed by a Visayan ***herbolario*** (faith healer).

Figure 7 Materials utilized during the ethnobotanical healing ritual among the Bajaus of Ayuda Bajau Village, Maasin, Zamboanga City.

folkloric medicinal plants. As supported by Elmedulan Jr.,[218] providing a platform to convey the information to the next ethnic generation is a way to preserve the culture. Further, the preservation of intangible cultural heritage provides a tribe with a sense of identity and continuity and promotes respect for cultural diversity.

Documentation of this traditional knowledge and practices will provide a framework for future drug discovery; opportunities for community biodiversity management; and promotes cultural preservation. Further, the process of identifying and appraising all published reviews allows researchers to describe the quality of the evidence-based practices, summarize and compare the strength of the conclusion.[219]

CONCLUSION

A total of 208 medicinal plant species belonging to 74 families were utilized by the ethnolinguistic groups, of which18 species belonged to Family Fabaceae. The Visayan tribe of Ipil and Siay, Zamboanga Sibugay, had the highest number of medicinal plants utilized based on ethnobotanical studies. While the Subanens of Lapuyan, Zamboanga del Sur recorded the more medicinal plants based on systematic reviews. Almost all ethnic tribes utilized one or more of the 10 DOH-approved medicinal plants, with *B. balsamifera* (sambong) as the most frequently utilized herbal plant (100%) in treating common diseases such as cough and colds. Leaves are the topmost utilized plant parts through the process of decoction. Physical relapse (*bughat*) is the commonly cited illness among the locally termed diseases of the different ethnolinguistic groups. Having documented some tribal rituals related to ethnobotanical practices preserves intangible cultural heritage. Field samplings attested the availability of medicinal plants as the second topmost health-seeking behavior of the key informants to ethnobotanical practices.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest.

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