Local Knowledge of the People of Tayum on Medical Plants

Maria Digna T. Bose
Abra State Institute of Sciences and Technology
dignabose1@gmail.com

Abstract

The people of Tayum believe in the usability and importance of medicinal plants. This study used the descriptive research design. There were 164 key informants selected through purposive sampling. This research was undertaken to document the local knowledge of the people of Tayum on existing undocumented medicinal plants. A validated questionnaire was used to elicit the knowledge of the key informants about the medicinal plants. The Informant Consensus Factor was calculated to determine the level of agreement of the informants on a particular species of medicinal plant. The Use Value was computed to quantify the importance of medicinal plant species. It was found that there are thirty-three undocumented medicinal plants. Young leaves are generally used for medicine. A decoction is the most common way of preparation and the most dominant mode of administration is oral. Glass is used mostly when medicinal plants are administered orally and for topical application, the number of leaves, length of stems, and vines is used to estimate the number of plant parts. There is a high level of agreement among the informants on four (4) undocumented medicinal plants. The *Ziziphus talanai (Blanco) Merr* is the most used medicinal plant and the least used is *Mallotus philippensis* (Lam.) Müll.Arg. A brochure was developed and validated as an output of this study and shall be used to enhance the instructional material for Botany and Ecology subjects and the community.

Keywords: knowledge, undocumented, medicinal, use, consensus

Introduction

A traditional medical or folk medicine practice known as herbalism relies on the use of various plant components and plant extracts. Herbs and plants are one of the primary forms of life on earth, and they constitute the key component of traditional materia medica around the world, according to (Pan *et al.* ,2014). Growing numbers of people have turned to herbal medications or products in the past and in the present to better their health situations, either on their own or in combination with other treatments. Nowadays, many "conventional" health professionals do not hesitate to suggest to their patient herbs, herbal products or complementary and alternative therapies (ACD) for the successful management of certain disorders. As stipulated by the (World Health Organization, 2004) and cited by (Ekor ,2013), the usage of herbal medicines continuously and rapidly expands worldwide. Four billion people, or roughly 80% of the world's population who live in developing countries, rely on herbal medicinal products as their primary source of healthcare, and traditional medical practice—which involves the use of herbs and has become an integral part of the culture in every community—as a means of treating a variety of health challenges. People primarily utilize herbal remedies because they think they are safer and more potent than conventional medications bought from drugstores or pharmacies. The (World Health Organization, 2019) stressed that indigenous traditional medicine is the total of all the knowledge and practices used in diagnosing, preventing, or eliminating physical, mental, and social diseases wherein the knowledge or practice may rely exclusively on past experiences and observations handed down orally or in writing from generation to generation.

Research on equity and health is one of the themes that make up the National Unified Health Research Agenda (NUHRA) 2017–2022, with an emphasis on producing evidence to enable the health system to respond to health needs and develop new solutions for at-risk populations and disparate sectors of society. This is because medicinal plants have a significant impact on everyone's lives. The Cordillera Administrative Region's Regional Unified Health Research Agenda (CAR-RUHRA) 2017–2022, which prioritizes the conduct of research to strengthen medicinal development from locally available plants and other sources, has contextualized this theme into alternative and traditional medicine. Anchored to this, research should be conducted for the realization of the said theme. Exploration of the medicinal plants available in our surroundings must be done for proper documentation and be utilized for the making of new drugs. The researcher has an ardent desire to conduct research on medicinal plants, particularly in the municipality of Tayum. The municipality of Tayum belongs to the 27 municipalities of the province of Abra. It is politically divided into 11 barangay that are: Bagalay, Basbasa, Budac, Bumagcat, Cabaroan, Deet, Gaddani, Patucannay, Pias, Poblacion, and Velasco. The town has vast forestland, mossy forest, grassland, and brushland where different flora grows. The richness of vegetation has become an integral part of the lives of the people because it is where they obtain their basic needs such as food, livelihood resources, medicinal herbs, and shelter. The diversity of plants in the place is a blessing to the people. Based on the (Philippine Atlas, 2021), the town is classified as a fifth-class municipality. As reflected on the records of the unit head of the Department of Social Welfare and Development (DSWD) of the said town, among the 3,709 households, there are 1,175 are indigent. Many of the households could hardly cope with the high cost of living. As a result, they could also hardly buy medicines for a sick family member or bring him to the hospital. Instead, they seek the help of a traditional doctor or the "albularyo". Others may resort to a suitable remedy using herbal plants around them to cure their various ailments. People just utilize either the leaves, barks, roots, branches, fruits, flowers, or the whole plant to cure their ailments. The people rely on plants as a cure for their diseases. They find it convenient to use plants as medicines rather than going to their Rural Health Unit (RHU) or hospitals because these are readily found in their locality. This is a reason why most of the residents of this town believe in the medicinal property of plants found in the environment. Based on literature study conducted by the researcher, there is no available data or research on the study of ethnomedicinal plants in the province of Abra including the municipality of Tayum. This lack of research on ethnomedicinal plants in Abra province, including the town of Tayum, would justify the need for this research. Thus, this study will be carried out by documenting undocumented medicinal plants in the municipality of Tayum. It will produce data on the informants' knowledge of medicinal plants based on the method of production, the method of administration, the condition it treats, the particular components of the plant to be used as medication, and the dosage. At the same time, people's traditional knowledge is a very important resource that needs to be preserved.

This study aimed to document the local knowledge of the people of Tayum on medicinal plants. Specifically, it sought answers to the following questions:

1. What are the different undocumented medicinal plants?
2. What is the knowledge of the informants about medicinal plants based on:
    a.) the specific structure of the plant used as medicine;
    b.) mode of preparation;
    c.) mode of administration;
    d.) ailment it cures; and
    e.) dosage?

3. What is the level of agreement of the informants on a particular species of medicinal plant?

4. What is the level of utilization of medicinal plants by the key informants?

5. What IEC material could be developed as an output on the study of the local knowledge on medicinal plants of the people of Tayum?

The research used the input-process-output model. The contribution of this initiative was the local knowledge of medicinal plants in the town of Tayum. The researcher documented the undocumented medicinal plants based on the mode of preparation; mode of administration, ailments it cures; plant part used as medicine; and dosage. The level of agreement and the level of utilization were determined. The process used actual interviews of key informants using survey questionnaires. It also includes data analysis and the documentation of therapeutic plants. The result of this research was a print IEC brochure for use in teaching and by the public. The interconnectedness of the different variables is presented in figure 1 below.
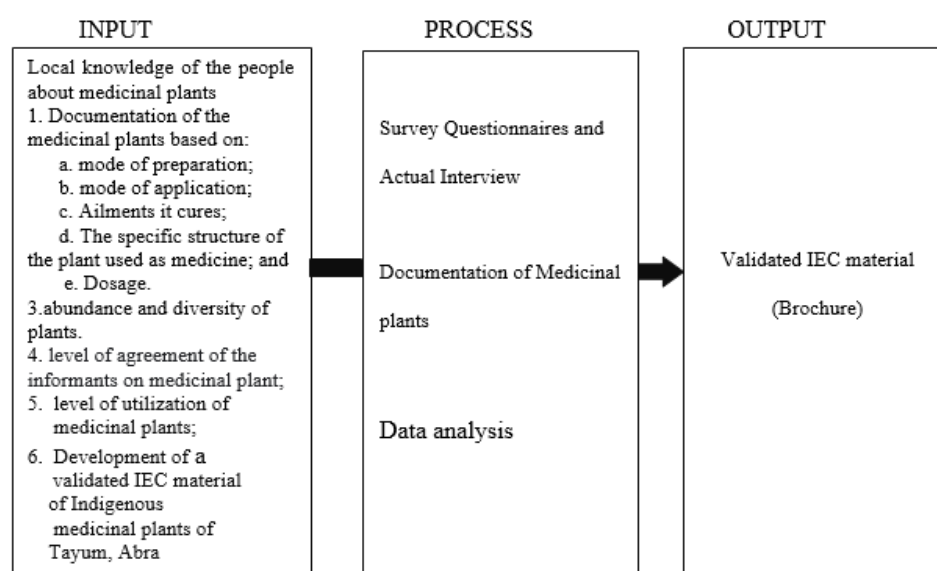

Fig. 1. *The Paradigm of the Study*

The descriptive research design was employed in this study. According to (Gall *et al.,* 2007) as cited by (Nassaji. 2015), descriptive research is more concerned with the "what" rather than the how and why something has happened. Thus, the usual tool to be used in gathering data are observations and survey. As described by (Creswell,2009), surveys used questionnaires or structured interviews for data collection, with the content of generalizing a sample of the population. This study focused on the various unrecorded medicinal herbs that the Tayum people used and they were documented using questionnaires and interviews to find out the knowledge of the informants based on the mode of preparation, mode of administration, the ailment it cures, the specific part of the plant used, and the dosage. The medicinal plants mentioned by the key informants during the interview that were already documented are no longer included as data in the study. The final output of the study was a validated IEC material in the form of a brochure which shall be utilized as instructional material in Botany and Ecology subjects and the community. The study was conducted from June 2021 to December 2021 in the eleven barangays of the municipality of Tayum which are: Bagalay, Basbasa, Budac, Bumagcat, Cabaroan, Deet, Gaddani, Patucannay, Pias, Poblacion, and Velasco.

Visitation, coordination, and consultation in the eleven barangays were done to identify the key informants and they were selected through purposive sampling. The number of key informants was identified from each barangay during the initial survey. The key informants were determined with the help of the Barangay Captain and barangay health workers. The informants were selected based on their experiences of using medicinal plants and able to give sufficient information about those plants. The residency of these key informants in the community was considered. They were the informants aged 50 – 75 and living in that community from birth up to the present to establish their credibility. The number of key informants comprised 10% of the total community folks based on the identified age bracket and qualifications. After they were selected, their willingness to participate and be interviewed was considered. The local healers, commonly called "albularyos" were automatically qualified informants as being knowledgeable and considered guardians of indigenous knowledge on medicinal plants. The instrument used in gathering the data was a structured interview which is adopted from Philippine Council for Health Research and Development prepared in English, translated, and written in the Ilocano Language question guide. The questionnaire consisted of three parts namely: (1) informed consent of informants where they signify their willingness to participate in this research; (2) the knowledge of the key informants regarding the undocumented medicinal plants particularly the name of the plant, the ailments cured by the plants, part to be used as medicine, how the parts are prepared and administered and the dosage; and (3) the answer sheet with a matrix where answers of the key informant were filled in. The research instrument was validated as to content by five experts in science education of the Abra State Institute of Sciences and Technology. The research instrument was piloted to 30 community folks of Patiao, Peñarrubia, Abra who were knowledgeable about medicinal plants. Before the actual conduct of the interview, a letter was given to the barangay captain asking permission the conduct pilot testing. With the help of the barangay captain and barangay health workers, the 30 respondents were identified. The respondents were chosen based on the following criteria; (1) they are residing in the place since birth; (2) aged 50 -75 years; (3) knowledgeable and have experience of using medicinal plants; and 4) are willing to be interviewed. When the respondents were identified, house-to-house interviews were done following IATF protocols since the time of the study was conducted during the COVID-19 pandemic. In the conduct of the pilot test, the researcher explained the purpose of the interview. Then each respondent was allowed to read part one (informed consent) on the questionnaire after which he wrote his or her name on the space provided and then affixed his/her signature. For those who are illiterate, the researcher read each statement for them and translated it into Ilocano. The researcher wrote the name of the respondent/s and then the respondent/s affixed his/her thumb mark. For the part two of the questionnaire, the researcher asked questions in Ilocano to gather data on medicinal plants. The researcher filled in the answers of the respondents in the prepared matrix. Before the actual conduct of the study, a request letter was forwarded to the National Commission on Indigenous People (NCIP) provincial office requesting to allow the researcher to conduct her study on the undocumented medicinal plants in the municipality of Tayum. A similar letter was also forwarded to the Municipal Mayor of Tayum, Abra. Upon its approval, a letter of request was given to the barangay captains to allow the researcher to interview the key informants. A similar procedure during the pilot testing was followed during the actual conduct of the study. All the needed data in the study were documented. Based on the data collected, the researcher developed an IEC material in the form of a brochure on the local knowledge of the people of Tayum on medicinal plants. The IEC material was submitted to the ASIST Curriculum and Instructional Material Development Office for validation and approval to be used in enhancing the instructional materials for Botany and Ecology subjects and the community. The developed IEC material was validated by three experts in the field.

Results and Discussions

There are thirty-three (33) undocumented medicinal plants mentioned by the respondents. The local names of the undocumented medicinal plants mentioned by the respondents is reflected on table 1.

Table 1: List of undocumented medicinal plants

LOCAL NAME	SCIENTIFIC NAME
Am-amboligan	*Clerodendrum minahassae* Teijsm. & Binn.
Amolong	*Epipremnum pinnatum* (L.) Engl.
Anona	*Ziziphus talanai* (Blanco) Merr.
Ar-arusip	*Antidesma ghaesembilla* Gaertn.
Aritos	Plumbago zylanica L.
Barinatnat	*Cissus* trifoliata
Barsik	*Gmelina philippensis* Cham.
Bayating	*Anamirta cocculus* (L.) Wight & Arn.
Bayog	*Bambusa* merrilliana
Bugbugayyong	*Adenanthera pavonina* L.
Buko-buko	*Asystasia gangetica* (L.) T.Anderson
Camara	*Piper* retrofractum
Dalaw Langkin	homalemena rubescens
Dalunip	Quercus glauca
Darekdek	*Ceropegia cumingiana*
Gagpayan	*Mallotus philippensis* (Lam.) Müll.Arg.
Kagpayan	Justicia gendarusa
Kariwawi	*Bridelia stipularis* (L.) Blume
Kuleng	*Ardisia* elliptica
Kumpitis	*Clitoria ternatea* L.
Kuripattong	*Centrosema molle* Mart. ex Benth.
Langkwas	*Curcuma longa* L.
Ngarusangis	Merculiales perennis
Pannarien	*Tacca leontopetaloides* (L.) Kuntze
Partaan	*Melodinus orientalis Blume*
Pedped	*Engheldria spicata*
Pingka pingka	*Opuntia cochenillifera*
Puypuyot	*Pericampylus glaucus* (Lam.) Merr.
Palatang	*Saribus rotundifolius* (Lam.) Blume
Sili Sili	*Andrographis paniculata (Burm. f. Wall. ex Nees)*
Tabtabbako	*Pseudelephantopus spicatus* (Juss.) Rohr
Taltallikod	*Breynia androgyna* (L.) Chakrab. & N.P.Balakr.
Tulla-tullang	*Glycosmis parviflora*

Knowledge of the Informants about the Undocumented Medicinal Plants

Table 2 presents the knowledge of the informants on the different medicinal plants. It shows what specific parts of the plants they utilized, how they prepare and administer, what ailment it cures, and the dosage. It could be noted on the table that the most frequently used structure of the plant were the young leaves (13), matured leaves (5), young stem (3), young vine (3), matured vine (2), young whole plant (2), young bark (2), young culm (1), rhizome(1), and tuber (1).).   It came out in this study that the most utilized parts are the leaves.   This finding asserts the optimum defense theory that leaves are more likely to have qualitative defenses such as alkaloid and they are selected primarily for use as medicine. Ethnobotanical survey done by (Tantengco, *et al.,* 2018) reported similar results, with leaves being the most widely used plant parts. They emphasized that the primary reason for this is to protect and ensure sustainability in the utilization of the plants, harvesting the leaves are less destructive for the plants, easy to collect, and are the most abundant plant parts.

Table 2. Knowledge of the Informants about Indigenous Medicinal Plants

Name of the plant (local name)	Specific structure of the plant used	Mode of Preparation	Mode of Administration	Ailment/s it cures	Dosage
Am-amboligan	Matured leaves	Roll the leaves	Smoke the rolled leaves	asthma	Smoke 1 roll 3x a day for 5 days
Amolong	Young leaves	Heat over low flame	Placing on the affected area	sprain	Place on the affected area once a day for 3 days
Anona	Young bark	decoction	drinking	Relapse after giving birth	Drink 8 glasses a day for 1 month
Ar-arusip	Young leaves	washing	Placing on the forehead	Head ache	Take this remedy once only
Aritos	Young leaves	pounding	Applying a poultice	scabies	Apply 2x a day for 2 days
Barinatnat	Young leaves	pounding	Applying a poultice	boils	Applying 2x a day for three days
Barsik	Young leaves	squeezing	drinking	menstruation	Take 1 tsp 2x a day for 2 days
Bayating	Matured leaves	Heat over low flame	Placing on the affected area	sprain	Take this remedy once a day for 3 days

Bayog	Young culm	Collect the dripping liquid from the cut culm	drinking	asthma	Drink 1 glass a day for 3 days
Bugbugayyong	Young whole plant	decoction	drinking	cough	Drink 1 glass 3x a day for 5 days
Buko-buko	Young leaves	pounding	Applying a poultice	wounds	Take this remedy 2 times a day for 3 days
Camara	Young leaves	Crushing through the hands	Rubbing on the face, hands, feet	dizziness	Take this remedy once
Dalunip	Young stems	decoction	drinking	tuberculosis	Drink 1 glass 3x a day for 1 month
Dalaw Langkin	Young leaves	Soak overnight in 2 glasses of water	Washing	Sore eyes	Take the remedy every morning for 1 week
Darekdek	Young vine		Tying	sprain	Tie the vine on the affected area once a day for three days
Gagpayan	Young leaves	pounding	Applying a poultice on the affected area	Dog bite (rabies)	Take this remedy 3 times a day for 1 week
Kagpaayan	Young leaves	Heat over low flame	Placing on the affected area	sprain	Take this remedy once a day for 3 days
Kariwawi	Young vine	decoction	drinking	kidney	Take 1 glass 3x a day
Kuleng	Young leaves		Placing on the stomach	diarrhea	Take this remedy 2x a day for 3 days
Kumpitis	Young leaves		Placing on the affected area	sprain	Take this remedy 2x a day for 3 days
Kuripattong	Matured vine	Decoction	drinking	Relapse after giving birth	Drink 8 glasses a day for 1 month
Langkwas	rhizome	pounding	Applying a poul-	boils	Take this

			tice		remedy 2x a day for 1 week
Ngarusangis	Matured leaves		Placing on the affected area	Sprain	Take this remedy 2x a day for 2 days
Pannarien	tuber	scraping	Applying on the affected area	wounds	2x a day for 2 days
Partaan	Matured vine	decoction	drinking	menstruation	Drink 1 glass 3x a day for 2 days
Pedped	Young bark		eating	tuberculosis	Eat 3 pieces match stick size 3x a day for 1 month
Pingka pingka	Stem segment	pounding	Applying a poultice	boils	Take this remedy 2x a day for 1 week
Puypuyot	Matured vine	cut the vine, collect the sap	Applying the collected sap on the affected area	scabies	Take this remedy once a day until it heals
Palatang	Young stalk	Soften-heat over low flame-squeeze	drinking	asthma	1 tablespoon 3x a day for 5 days
Sili Sili	Young whole plant	decoction	bathing	itchiness	3 liters added to a pail of water
Tabtabbako	Matured leaves	pounding	Applying a poultice	wound	Take this remedy 2x a day for 2 days
Taltallikod	Matured leaves	pounding	Applying a poultice	scabies	Take this remedy 2x a day for 2 days
Tulla-tullang	Young leaves	crushing	Inhaling/smelling	dizziness	Take this remedy once

On the other hand, in the study conducted by (Baddu, and Ouano,2018), the leaves were the most utilized parts for medicinal purposes and are prepared for concoction. Furthermore, (Karous *et al.,*2021) had a similar finding wherein the leaves are the most commonly used part of a plant to cure ailments of the Semi-Nomad descendants' Community in Ouled Dabbeb. They believed that the leaves are the best part to use in curing ailments because they are the main photosynthetic organs in the plants thereby considered rich sources of bioactive compounds. This is affirmed by (Yang *et*

al. (2020) in their scientific reports that secondary metabolites are commonly accumulated in epidermal cells of plant organs such as the leaves. Additionally, in the study on ethnobotany conducted by (Pholhiamhan *et al.,*2018), it came out that In comparison to other plant parts, leaves were employed the most frequently by the Phu Thai in the production of remedies, and the majority of investigations carried out in Thailand demonstrate the supremacy of the leaf in usage. . Likewise, (Fathir *et al.,*2021) affirmed that the high use of leaves for herbal medicine is accounted for its easy handling and extraction in a certain amount and do not disturb plant growth as compared to when using stem, root, and whole plant. (Jadid *et al.,*2020) also found that leaves were the most used plant part in Ngadisari village.   The leaves also contain more diversified plant secondary metabolites. (Junsongduang *et al.,*2020) conducted a similar study and found that the most widely used part of the plant was the stem. In almost every ethnomedicinal research, details of the plant parts used as medicines are provided. The most frequent parts used were stems and leaves, followed by roots and whole plants, according to (Phumthum *et al.,*2018) in a meta-analysis of 64 ethnomedical studies from throughout Thailand. However, there were some variants, such as in Nakhon Phanom where the leaves were the most commonly used part (Pholhiamhan *et al.,*2018). (Ashraf *et al.,* 2018) remind us all that when estimating the effects of medicinal plants on plant populations, consideration should be given to the use of various plant parts, particularly because the use depends on variations in phytochemical compounds quantities in various parts of a plant. All of these findings run counter to those of (Jima and Megersa ,2018), who stated that the roots of medicinal plants are the most commonly used section because they are thought to contain the highest concentration of active chemicals. In addition, (Aziz *et al*., 2018) mentioned that in Traditional Chinese Medicines (TCM), roots have been indicated as the dominant part of recipe preparation.   In addition, (Lulekal *et al*., 2013) are promoting the collection of leaves as a more sustainable method since in most cases at least many leaves are left over on the parent plant. In plant phytochemistry, the secondary metabolites such as alkaloids, saponins, and phenolic compounds that are present in the leaves of plants exhibited antimicrobial and antifungal activities, which could be attributed to the pharmacological effects experienced by the people of Tayum. The informants also identified eleven (11) modes of preparation. The most common way of preparation is decoction followed by pounding, heating over the flame, crushing, washing, collecting the dripping liquid, scraping, rolling the leaves, soaking in water, squeezing, collecting the sap, and a combination of softening and squeezing. This finding is similar with the result of research conducted by (Kumar *et al.,* 2019) where they documented that the most common method of preparing the medicinal plants was decoction, followed by crushing the plant material for making a poultice, broth, and soaking in alcohol. Similarly, (Uzon, and Kaya,2016) mentioned that the most commonly used preparation method was decoction in which the plant material was boiled in water for 5–10 min.   In addition, (Jadid *et al.,*2020) and (Junsongduang *et al*.,2020) found out also that among all the medicinal plants they documented, most were used in the form of decoction. Contrary to these findings, (Jima, and Megersa, 2018) reported that crushing was the primary method of preparing remedies, followed by pounding, powdering, squeezing, and decoction. According to (Demie *et al.,* 2018) findings, crushing was the primary way of remedy preparation, hence the most prevalent mode of preparation makes sense. Similar to this, (Gonfa, *et al.,*2020) noted that residents in the Gera district most frequently cited crushing as the method for preparing herbal remedies. Moreover, (Tefera and Yihune, 2018) found that local communities of Tenta District, South Wollo, Ethiopia employed several methods of preparation of traditional medicines from plants wherein herbal medications were prepared mostly by squeezing whereas only a few species were used as medicine without being processed. Medicinal plants were applied through different modes of administration. The respondents of this study identified 10

modes of administration; these are drinking and topical or placing the medicinal plant parts on the affected area (9), poultice(8), rubbing(1), washing(1), tying(1), eating(1), bathing(1), inhaling(1) and smoking(1). Topical and oral are the most dominant mode of administration. In this study, the respondents place the medicinal plants on the affected area others applied a poultice where they feel relieved from the ailments after 2 to 3 days. Most medicinal plants are prepared through the process of decoction as most of the respondents believe that all the active components are extracted to treat their ailments. This result asserts the Doctrine of Signature Theory where one of the signatures of the plant is the taste which serves as a basis in medicinal plant selection. The mode of administration greatly depends on the kind of ailment. (Aziz, *et al.,*2018) reports that ethnomedicines were given orally with other additives. They stressed that the result is in line with other studies, in which ethnomedicines were utilized along with some solvents/additives to reduce the bitter taste of the remedy, mitigate the toxic consequences such as vomiting and diarrhea, and maximize drugs' efficiency. This is similar to the study of (Tefera and Yihune, 2018) who found that there were different routes of administration of medicinal plants prepared by indigenous people wherein the main routes of administration in their study area were oral, dermal, optical, nasal, anal and sometimes mixed. Of these routes of administration, most drugs were administered orally through the cutaneous route. In addition, (Gonfa *et al.,*2020) said that the oral method of administration was preferred in the Genera district, and this was also supported by (Jima, and Megersa,2018) and Demie *et al.*, 2018). Concerning the dosage, the people who served as respondents in this study used some units of measurement. For the medicinal plants that are prepared through decoction, usually a glass is used to measure the desired quantity to be taken orally while only one where teaspoon is used as a unit of measurement. On the other hand, for topical application, the number of leaves, length of stems and vines were used to estimate the number of plant parts to be used in curing the ailments. According to (Jima and Megersa,2018), 69% of plant treatments are consumed without a set dosage, while 31% of preparations were taken with known amounts that were typically measured by spoon, a cup of tea, palm, and other equipment. The length of the course of treatment, as reflected on the table, varied between 1 and 7 days except for anona and kuripattong which are taken orally for one month. Children were typically prescribed smaller dosages than adults. The duration of dosage administration was based on the patient's state of health, the remission of symptoms and warning indications, and the albularyo's decision to discontinue treatment. The respondents said that those medicinal plants are all effective and claimed they are healed. How people used herbs as medicine was greatly influenced by the knowledge of albularyo. The Social Network as a Driver of Knowledge Dynamic Theory confirmed the transmission of this knowledge from one generation to the next. It is important to note the limitations of medicinal herbs, such as improper dosing and preparation. Unawareness of the phytochemical components of the medical plants they are consuming contributes to adverse effects of the usage of medicinal plants. The people must then exercise caution in how they prepare and use medicinal herbs to treat their ailments, taking the necessary precautions to prevent toxicity or poising.

Level of Agreement of the Informants on a particular Species of Undocumented Medicinal Plants

The Informer Consensus Factor (ICF) is a technique designed to highlight species with healing potential for specific major purposes. The relative importance of each plant species in the treatment of different ailments as categorized is analyzed using this technique. The ICF values range from 0–1 where values close to one (1) indicate a high level of agreement (Faruque *et al.,* 2018).

The diseases identified by the informants were first classified in accordance with the International Classification of Diseases. From these categories, ICF values were calculated as indicated in

Table 4. Informants' consensus factor (ICF) was calculated for each disease category to identify the agreements of the informants on reported cures for the group of ailments. Table 3 reflects the informant consensus factor of the diseases cured by a particular medicinal plant. The very high ICF (1.00) value is reported for disorders of the neurological system, diseases of the digestive system, diseases of the eyes, and diseases of the genitourinary system. The ICD category with only one species used and with few use reports results into a high ICF value. Similarly, if there are more species used to cure ailment and more use reports the ICF value is high. This demonstrates that the knowledge of informants regarding the medicinal plants that have been used to treat diseases in these categories is very consistent. Many of the informants agreed on the usability of a plant in the treatment of a particular disease and also shows consistency in the utilization of a plant species for a certain disease. Furthermore, plants that are most utilized to cure diseases with high ICF values also have high use values.

Table 3. Informant Consensus Factor (ICF) values

ICD CATE-GORY	CATEGORIES	AILMENT/DISEASE	Nur	Nt	ICF
XVIII	symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	nausea, vomiting, dizziness, fever	127	2	0.99
XII	disease of the skin and subcutaneous tissues	skin irritation, itchiness, boils, scabies	415	7	0.98
XIV	disease of the genitourinary system	UTI, menstruation, kidney	48	1	1.00
VI	disease of the nervous system	headache, fever	29	1	1.00
XI	disease of the digestive system	Stomach ache, diarrhea, tooth ache	44	1	1.00
I	Infectious and parasitic disease	Tuberculosis, rabies	173	3	0,99
XV	disease during postpartum period	relapse after giving birth, menstruation	249	4	0.99
XIX	injury and poisons of external causes	wounds, cuts, sprains	442	9	0.98
X	disease of the respiratory system	common colds, asthma, acute upper and lower respiratory infections	167	4	0.98
VII	diseases of the eye	sore eyes	37	1	1.00

Legend: **Nt** is the number of species used for a particular category **Nur** is the number of used reports in each category

The higher value indicates the uniformity of the community in terms of plant selection for use in the disease category. On the other hand, ICF values ranging from 0.98 to 0.99 are recorded

for the other disease categories which show lower an ICF values as compared to the other disease categories with ICF value of 1 but it is described as a high level of agreement. The ICF values are all near or equal to 1, indicating that informants strongly agree that a particular species may cure a particular disease. This finding confirms the claim made by (Faruque *et al.*,2018) that a high value (close to 1) indicates that relatively few taxa (or, more usually, species) are used by a greater number of informants, while a low value indicates that informants differ on the taxa to be used in treatment within a category of illness. As a result, if informants use few taxa, a high level of consensus is achieved. In many ethnobotanical studies, high or low ICF values were recorded differently as compared to the result of this study. (Islam *et al.* 2020) found that the highest ICF value was found in the ailment categories are gastrointestinal complaints and subsequently followed by a cut, wound, and bleeding. The lowest informant consensus factor value was reported for the evil eye, eye trouble, rabies, kidney, colic, amoeba, ectoparasite, and bloating, while the greatest value was noted for disease connected to fibril illness, diarrhea, snake poison, fungus, and malaria (Gonfa *et al.,* 2020). Additionally, (Uzon and Kaya,2016) found that the highest ICF value was related to diseases of the respiratory system. Also, according to the findings of the study by (Jima and Megersa,2018), disorders related to gonorrhea and syphilis had the highest ICF values, whereas boils, dandruff, eczema, hemorrhoids, scabies, Tinea versicolor, and wounds had the lowest values. In addition, the high value of the CIF reflects that the medicinal plant is effective in curing a specific ailment as claimed by the people. As noted by (Uddin and Hassan ,2014), the efficacy and safety of all reported medicinal plants need to be assessed through phytochemical and pharmacological screening. Moreover, plants with high informant consensus factor, should be given priority to carry on bioassay and toxicity studies. Furthermore, (Tumoro and Maryo,2016) emphasized the need for a bioactivity analysis for individuals with low-value scores to support their use in the treatment of a particular disease. To prove their use, the medicinal plants listed in this study must also undergo pharmacological investigations and phytochemical analysis.

Level of Utilization of Undocumented Medicinal Plants

Table 4 shows the use value (UV) of the different medicinal plants. Use values are close to zero (0) when there are few use reports for a plant and are high when there are numerous use reports, suggesting that the plant is significant. However, the use-value does not make a distinction between single-use and multiple-use uses of a plant. Plant use values are calculated to quantify the importance of a specific plant depending on how frequently it is cited by a specific number of people. The study revealed that 33 plant species named by the key informants have not been documented. The species value index illustrates the importance of a species of medicinal plant that the Tayum people use. The findings showed that the reported plants' UV ranged from 0 to 1. 1585 to 0.7439. The medicinal plant with high use value implies the probable presence of phytochemical compounds. Table 5 shows that the most important medicinal plant in Tayum is *Ziziphus talanai (Blanco) Merr.* with a computed use value (UV) of 0.7439 which is described as a high level of utilization. Out of the 164 informants, there were 122 informants,cited the importance of this plant. This demonstrates that the use value increases as the number of use reports increases. Thus, if more informants use a particular plant to cure an ailment, it resulted to a high UV value. The decoction of the bark *of Ziziphus talanai (Blanco) Merr.* is used to cure relapse after giving birth. In this study, this medicinal plant was recorded as one of the rarest among the 33 medicinal plants in the locality. In other ethnobotanical studies, it was mentioned that *Ziziphus talanai (Blanco) Merr.,* has been traditionally used by folks as herbal plant to treat parasitic infections caused by ringworms and mites, as well as diseases caused by bacteria, like urinary tract infections. Previous phytochemical screening of the ethanol leaf extract of this plant revealed the presence of alkaloids, glycosides, and

triterpenes in minimal quantities, sterols in moderate levels, and flavonoids, saponins, and tannins in abundant concentrations (Reyes *et al.,* 2018). Furthermore, (Silva, *et al.,*2019) mentioned that species with the highest use values are potentially important to the community, and also important to consider in strategies for local biological conservation. On the other hand, the least important medicinal plant is *Mallotus philippensis* (Lam.) Müll.Arg. with a computed use value (UV) of 0.1585. The pounded young leaves of this plant are applied as a poultice to cure dog bite (rabies). This medicinal plant is the rarest medicinal plant and this could be the reason why few have mentioned its significance. The majority of the medicinal plants have low use value that ranges from 0.2134 to 0.2927 and are described as having low level of utilization which implies that there are few reports related to their uses.

Table 4. The Use Value Index of the Indigenous Medicinal Plants of Tayum

MEDICINAL PLANT	Ailment it cures	Number of Use Reports	UV
Am-amboligan	Asthma	44	0.2683
Amolong	Sprain	48	0.2927
Anona	Relapse after giving birth	122	0.7439
Ar-arusip	Head ache	29	0.1768
Aritos	Scabies	53	0.3232
Barinatnat	Boils	67	0.4085
Barsik	menstruation	47	0.2866
Bayating	Sprain	40	0.2439
Bayog	Asthma	39	0.2378
Bugbugayyong	Cough	47	0.2866
Buko-buko	Wounds	62	0.3780
Camara	Dizziness	68	0.4146
Dalaw Langkin	Sore eyes	37	0.2256
Dalunip	tuberculosis	46	0.2805
Darekdek	Sprain	39	0.2378
Gagpayan	Dog bite (rabies)	26	0.1585
Kagpaayan	Sprain	48	0.2927
Kariwawi	Kidney	48	0.2927
Kuleng	Diarrhea	44	0.2683
Kumpitis	Sprain	43	0.2622
Kuripattong	Relapse after giving birth	37	0.2256
Langkwas	Boils	37	0.2256
Ngarusangis	Sprain	49	0.2988
Pannarien	Wounds	39	0.2378
Partaan	menstruation	43	0.2622
Pedped	tuberculosis	101	0.6159
Pingka pingka	Boils	28	0.1707
Puypuyot	Scabies	35	0.2134
Palatang	Asthma	37	0.2256
Sili Sili	Itchiness	64	0.3902
Tabtabbako	Wounds	82	0.5

| Taltallikod | Scabies | 83 | 0.5061 |
| Tulla-tullang | Dizziness | 59 | 0.3598 |

And as reflected in table 3, the lower the number of use reports, the lower the use value. The low use value, however, does not negate the significance of these plants. The low use value is attributed to the strict implementation of different environmental laws RA No. 3701, an act to deter forest destruction, as amended by Section 2751 of the Revised Administrative Code. It is stipulated in this section that any unlawful destruction of public forest is punishable by law. In addition, the presidential decree 705 article 68 stipulates that anyone who must cut, gather, collect or remove wood or other forestry products must be guilty of robbery. Furthermore, the enforcement of Republic Act 7586 otherwise known as the "National Integrated Protected Areas System Act of 1992" may also be one of the reasons for the low use value of the different undocumented medicinal plants. On the contrary, as referred to by (Musa, et al.,2011), plants with low-use values are not necessarily unimportant, but the low-use values indicate that traditional knowledge about these medicinal plants is at risk of not being transmitted and that it may be gradually disappearing. Furthermore, the low use value of some plant species may be due to scarcity rather than extinction. There is a need to document knowledge about these plants since it will serve as a foundation for future research on their medicinal value. Also, this would contribute towards the realization of one of the priorities of the Cordillera Administrative Region - Regional Unified Health Research Agenda (CAR - RUHRA) 2017-2022 and at the same time as compliance with the mandates of the Traditional Medicines Act of 1998.

Development of IEC Material

The output of this study is a brochure that contains information about the 33 medicinal plants. It was submitted to the ASIST Curriculum and Instructional Materials Development office and was validated by three science professors. The validation was based on the following criteria; a.) content, b.) format, c.) presentation and organization, and d.) accuracy and up-to-datedness of information as established by the office and has obtained a "Very Satisfactory "rating and highly recommended for use. The brochure shall be used to enhance the instructional materials in the study of medicinal plants in areas of Botany and Ecology and for the community.

Conclusion

There are thirty-three undocumented medicinal plants identified. The people of Tayum are very much knowledgeable about the use of undocumented medicinal plants. There is a strong consensus among informants regarding the uses of herbal medicines. There is a low level of utilization of the different undocumented medicinal plants. An IEC material on the undocumented medicinal plants can be developed and used to enhance the instructional materials for Botany and Ecology subjects and the community.

Acknowledgement

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