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Indigenous knowledge and ethnobotanical practices of community folks on medicinal plants in northwestern Cagayan, Philippines

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Abstract

This study documented the indigenous knowledge and ethnobotanical practices of the community folks in Northwestern Cagayan, Philippines particularly on the use of herbal plants in treating common illnesses and diseases. There are 14 common ailments and diseases identified by the respondents and are treated with the use of 58 identified medicinal trees, herbs, shrubs and vines. The most prevailing ailments and diseases of the community folks in the Northwestern Cagayan are respiratory and heart problems. Leaves are the most common part of the plant used for treatment prepared by concoction or decoction or freshly applied over the affected areas. The dosage and duration vary depending upon the ailment and the reaction of the body to the medicinal plants. Keeping in view the importance the medicinal flora in the study area, a conservation strategy is proposed before they face extinction due to natural and other anthropogenic activities that threat biological diversity.

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Introduction

Traditional medicine, the sum of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different culture, is used in the maintenance of health as well in the prevention, diagnosis, improvement or treatment of physical and mental illness (WHO, 2000). Barkatullah (2015) cited Ajose (2007) likewise quipped that plants are used as sustenance and medicine since the dawn of civilization, and statistics reflect that nearly 80% of the global population utilizes plants for their health care.

In many developing countries, a large part of the population, especially in rural areas, depend mainly on traditional medicine for their primary health care. The indigenous knowledge of medicinal plants has been well documented in some communities in the different parts of the globe. Traditional knowledge on medicine since the time of Great sage *Charak* has led to the discovery of many important drug of modern age (Uniya and Rawat, 2002). Today, still a part of the population depends on the traditional system of medicine.

Plants have traditionally served as man's most important weapon against pathogens. Medicinal plants are widely used by all section of the community, whether directly as folk remedies or the medicaments of the different indigenous system as well as in modern medicine (Kala, 2002).

In the Northwestern part of Cagayan province, Philippines, there are community folks who have an intimate and longtime association with the environment for fulfilling their daily needs and other forest produce. These people play a vital role in having knowledge about the properties of plants and how they can best be utilized. Thus, their knowledge must be considered as an essential component of all efforts to conserve and develop in rural areas. Failure to document this indigenous ethnobotanical knowledge would result in perpetual loss of this knowledge to humanity.

Viewed from the fact that there is a serious threat to the medicinal plant diversity in this region, it is reissuing to know that various research institutions and individuals have suggested cultivation practices and documentation of traditional knowledge of medicinal plants in the country for their long-term conservation. Thus, this study is conceptualized to determine the prevailing indigenous knowledge on the traditional uses of medicinal plants and the practices in treating certain ailments and diseases.

Statement of the problems

The study documented the indigenous knowledge and ethnobotanical practices of community folks on medicinal plants in Northwestern, Cagayan. Specifically, the study answered the following questions:

1. What is the profile of the community folks using medicinal plants in terms of age and sex?
2. What are the common medical conditions of the informants treated with medicinal plants?
3. What are the medicinal plants used in the treatment of common ailments and diseases?
4. What are the practices of the respondents on the use of these medicinal plants?

Materials and Methods

The study utilized descriptive design and the rapid rural ethnobotanical appraisal method in gathering the data from 601 informants among the local community folks of Northwestern Cagayan. A snowball sampling method was adopted to select key informants that could help gain information and data starting from one person in an identified remote barangay in each of the 7 municipalities until it reaches the saturation level. The questionnaire which consists of two (2) parts was utilized. Part I of the survey questionnaire elicited the sex and age profiles of the informants, while Part II identified the medicinal plants used by them, the common household ailments treated by these plants, and their practices on the use of medicinal plants in treating common ailments and diseases. Frequency counts and percentage distribution were used in treating the quantitative data. Also, frequency was used to

describe the common ailments and diseases of the respondents treated with medicinal plants; medicinal plants used in the treatment of the common ailments of the respondent's family; and the practices of the respondents on the use of herbal medicines. A semi-structured interview was also conducted to validate the findings in the survey. This method guided the researchers to obtain the necessary information on the indigenous knowledge and ethnobotanical practices of the respondents specifically on medicinal plants. As part of the inclusion criteria, only those informants who are at least 18 years of age, have tried and were willing to share their experiences on the use of medicinal plants were included.

Results and Discussion

Profile of the respondents medicinal plant users

As to age, out of the 601 informants , most of them representing 144 or 23.96 percent belong to the 41-50 age group; 133 or 22.13 percent are in the 51-60 age group, 111 or 18.47 percent are in the 61-70 age group, 60 or 9.98 percent are in the 71-80 age group, 54 or 8.99 percent are in 81-90 age group, 50 or 8.32 percent are in the 21-30 age group and 49 or 8.15 percent are in the 31-40 age group . The overall mean age is 55 which mean that the informants are in their middle adulthood according to Havighurst (1952). A similar finding is found in the study conducted by de Guzman *et al.* (2020) among the Visayans of Zamboanga Sibugay, Philippines, where the informants' age range from 19-65 which parallels the findings of the study whose informants range from 21-90. They are basically a group of early adults to late adult individuals.

As to sex, majority of the population are represented by females representing 433 or 72.05 percent of the population while 168 or 27.95 percent only are males. This could be due to the fact that females are more available than males because females usually are left in the house while males are working in the farm or away from home. A similar finding was documented in the study of Tantengco *et al.* (2018) among the Ayta in Dinalupihan, Bataan wherein the report stated higher number of female respondents than male respondents because females were more available than males. The findings also coincide with the study of de la Cruz, Alegado and Viloria (2023) who found that there are more female traditional healers in Northwestern Cagayan than that of males, a ratio of 3 females is to one male traditional healer using herbal plants among others.

Table 1. Common medical condition of the respondents treated with medicinal plants

Common ailments/Diseases	Frequency
Cough and colds/Respiratory problems	588
Hypertension	476
Fever	432
Toothache/Gum infections	416
Arthritis/Joint pains	351
Wounds and cuts/Inflammation/Swelling/Burns	362
Urinary tract infection (UTI)/Kidney stone/Problems	332
Pasma (Folk Illness)	312
Dysmenorrhea/Menstrual problems	283
Stomachache/Diarrhea/Indigestion/Ulcer	253
Fungal skin infections	241
Diabetes	215
Dengue	172
Asthma due to allergies	131

Common medical condition of the respondents treated with medicinal plants

Table 1 below shows the common medical condition of the informants treated with medicinal plants. The data show that 588 informants experienced cough and colds; 462 respondents experienced fever; 416 respondents suffered from toothache; 362 respondents had wounds and cuts, swelling or inflammation and skin burns; 332 respondents experienced urinary tract infections and kidney problems; 312 respondents experienced dysmenorrhea and other menstrual problems; 292

respondents experienced, stomachache, diarrhea, indigestion, and ulcer; 288 respondents suffered from pasma (folk illness); 241 respondents experienced fungal skin infections; 233 respondents had hypertension; 215 respondents have diabetes; 172 respondents experienced dengue; 168 respondents suffered from arthritis; and 152 respondents of the respondents experienced asthma due to allergies.

Generally, the informants experienced 14 common ailments and diseases and are treated with the use of medicinal plants. The most prevailing ailment of the community folks in the Northwestern Cagayan are respiratory and heart problems. As age increases, the muscles of the lungs weaken, thus, the immune system is compromised and the lung expansion is decreased causing difficulty breathing, cough and colds and fever (Sharma *et al.*, 2006). The lessened efficient function in the exchange of oxygen in the blood results to other chronic diseases such as hypertension. Added to these are pains that afflict such as arthritis and joint pains, and dental problems such as tooth decay and gum infections. Another common ailment being experienced by the respondents is "Pasma", a folk illness which occurs when a condition considered to be "hot" is attacked by a "cold" element and vice versa (Tan, 2008). Furthermore, as a person gets older the skin loses its elasticity, becoming drier, and more lined with wrinkles, thereby making the skin prone to infections, cuts, and injury (Chaudhary *et al.*, 2020).

Similarly, the findings of de Guzman *et al.* (2020) would tell us that the medicinal plants found in their study site were treatment for cough, colds and fever, as well as in the treatment of fracture or dislocation of nerves or tissues and in treating physical relapse. Also, in the study of Olowa and Demayo (2015) among Muslim Maranaos in Iligan City, the top five most frequently uses of the medicinal plants available in their community is treatment of cough and stomachache, fever and UTI, diarrhea, hypertension and cuts/wounds and muscle pain or overfatigue. In another study conducted by Pucot and Demayo (2021), most of the herbal plants identified representing 45% of which were treatments for relapse, fatigue, headache, body pain, fever and migrain.

Medicinal plants used in the treatment of the common ailments and diseases

Table 2 below presents the medicinal plants used by the informants in the treatment of common ailments and diseases. There are fifty-eight (58) identified medicinal plants used by the informants in the treatment of common ailments and diseases. Most of these medicinal plants are trees and herbs.

There are twenty-two (22) identified trees that are used by the informants in treating common ailments and diseases. These are avocado (*Persea americana*), banaba (*Lagerstroemia speciosa*), banana (*Musa acuminata*), banai-banai (*Radermachera pinnata*), guava (*Psidium guajava)* or known as bayabas, calacuchi *(Plumeria rubra*), calamansi (*Citrofortunella microcarpa*), coconut (*Cocos nucifera)*, cacao (*Theobroma cacao)*, eucalyptus (*Eucalyptus)*, guyabano (*Anona muricata)*, ipil-ipil *(Leucaena glauca),* madre de cacao (*Gliricidia sepium)* or kakawate, malunggay (*Moringa oleifera)*, mango (*Mangifera indica),* papaya (*Carica papaya)*, rose apple (*Syzygium samarangense)* or macopa, star apple (*Chrysophyllum caimito)* or kaimito, santol (*Sandoricum koetjape)*, sugar apple (*Anona squamosa L.)* or atis, tamarind (*Tamarindus Indica)*, and vegetable hummingbird (*Sesbania grandiflora)* or katurai. Northwestern Cagayan is located in areas where trees are abundant. Industrial and orchard tree plantations for narra, mahogany, banana, mango, citrus and other fruit-bearing trees, cacao and others are viable endeavors in Cagayan (www.cagayan.gov.ph). Therefore, they mostly rely on trees in treating various ailments and diseases.

A total of twenty herbs (20) were identified by the community folks of Northern Cagayan in treating common ailments and diseases which includes mugwort (*Artemisia vulgaris* L.*)* or arbaaka, basil (*Ocimum basilicum)*, chamomile (*Chamaemelum nobile)*, carabao grass (*Paspalum conjugatum)*, garlic

(*Allium sativum)*, garlic chives (*Allium tuberosum)* or kutsay, ginger (*Zingiber officinale roscoe)* or laya, horseradish (*Armoracia rusticana)*, insulin plant (*Chamaecostus cuspidatus)*, kataka-taka (*Bryophyllum pinnatum)*, lagundi (*Vitex Negundo* L.*)* or dangla, lemon grass (*Cymbopogon flexuousus)* or baranibod, makahiya (*Mimosa pudica)*, mayana (*Coleus blumei)*, onion (*Allium cepa)*, oregano (*Origanum vulgare)*, goose grass (*Eleusine indica)* or paragis, pineapple (*Ananas Comoscus)*, ulasimang bato (*Pepperomia pellucida)* or pansit-pansitan and yerba buena (*Menthe arvensis* Linn.*)*.

Table 2. Practices on the use of the medicinal plants

SL	Local/Common name	Scientific name	Common ailments/Diseases treated	Part of medicinal plant used	Method of preparation	Route of administration	Dosage	Duration
1	Aloe Vera/Sabila	*Aloe barbadensis* Miller	Wounds and cuts	Stem	Wash and extract the gel.	Topical	Apply the gel over affected area as needed.	Until the condition subsides.
			Burns	Stem	Wash and extract the gel.	Topical	Apply the gel over affected area as needed.	Until the condition subsides.
2	Andadasi/Akap ulko	*Cassia alata*	Fungal Skin Infections	Leaves	Crush to extract the juice and apply directly on the area affected.	Topical	Apply the juice at least two times a day.	Until the condition subsides.
			Wound and cuts	Flowers and Leaves	Decoction	Topical	Apply the decoction on the wound or cuts.	All throughout the day or as needed.
3	Arbaaka/Mug wort	*Artemisia vulgaris* L.	Irregular menstruation/dysmen Norhea	Leaves	Infusion. Sugar or honey may be added for a pleasant taste.	Oral	Take 1 to 2 mL three times a day.	Until discomfort subsides.
4	Avocado	*Persea American a*	Stomachace/Diarrhea	Leaves	Decoction	Oral	Drink 120 mL three times a	Until the condition subsides.
5	Bitter Gourd	*Momordica charantia*	For infants – cough	Leaves	Crush to extract the juice and mixed with coconut oil or with mother's milk.	Oral	One teaspoon three times a day.	Until cough subsides.
			Hypertension	Leaves and Fruits	Concoction	Oral	Taken as part of diet.	Thrice or four times a week.
6	Banaba	*Lagerstroe mia speciosa*	Urinary Tract Infection (UTI)/Kidney Problem	Leaves and Stem	Decoction	Oral	Drink 120 mL three times a day.	Consume for two to three weeks and stop for a week then resume if condition did not subside.
7	Banana	*Musa acuminata*	Fever	Young Leaves	Heat over low fire for a few seconds.	Topical	Apply overhead and armpit until patient perspires.	Repeat until condition subsides.
			Diabetes	Fruit (ripe)	Wash before eating.	Oral	Once daily taken before breakfast.	Daily
8	Busbusilak/Pan dakaki	Tabernaem ontana	Fever	Roots	Decoction	Oral	Drink 120 mL three times a day.	Until the fever subsides.
9	Banai-Banai	*Radermachera pinnata*	Pasma (folk illness)	Leaves	Decoction	Oral	Drink as many as you can.	Until patient perspires.
10	Bangbangsit/Stink Grass	*Lantana camara*	Wounds and cuts	Leaves	Decoction	Topical	Apply the decoction on the wound or cuts.	All throughout the day or as needed.
			Toothache	Leaves	Decoction	Oral	Gargle	All throughout the day until toothache subsides.
11	Basil	*Ocimum basilicum*	Indigestion	Leaves	Wash and chew the fresh leaves slowly.	Oral	Three to four leaves after meals.	Until the indigestion subsides.
12	Balbas Pusa/Cat's Whiskers	*Orthosiphon aristatus*	Urinary Tract Infection (UTI)/Kidney Problem	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.

13	Bayabas/Guava	*Psidium guajava*	Skin Diseases/ wound and cuts	Leaves	Decoction	Topical	Wash affected area.	Repeat as needed.
			Ulcer	Young Leaves	Wash and chew the fresh leaves.	Oral	Chew as needed.	Until condition subsides.
14	Betel Leaf/Gawed	*Chavica siriboa*	Wound and cuts	Leaves	Pound or crush	Topical	Apply affected area.	Until condition heals.
15	Calachuchi	*Plumeria rubra*	Fungal Skin infections	Leaves and flowers	Crush the leaves and flowers to extract juice or sap.	Topical	Apply affected area using a cotton ball.	Until condition heals.
16	Calamansi	*Citrofortunella microcarpa*	Cough and colds	Fruit	Concoction (Extract the juice of an 8 regular sized fruit, add warm water, sugar or honey to taste)	Oral	Drink 240 mL daily.	Until condition subsides.
17	Chamomile	*Chamaemelum nobile*	Diarrhea	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
18	Carabao Grass	*Paspalum conjugatum*	Fever	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until fever subsides.
19	Coconut	*Cocos nucifera*	UTI/Kidney Problem	Young fruit	Cut the coconut into half and collect the water.	Oral	1 liter, to be consumed daily	Drink until relieved.
			Muscle pain	Matured Fruit	Concoction (oil mixed with drops of kerosene)	Topical	Apply and massage over affected areas	Repeat as needed.
20	Cacao	*Theobroma cacao*	Wounds and cuts	Leaves and beans	Decoction	Topical	Wash affected area.	Repeat as needed.
21	Eucalyptus	*Eucalyptus*	Cough	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until cough subsides.
22	Garlic	*Allium sativum*	Toothache	Bulb	Crush the bulb to release the juice.	Oral	Apply the crushed garlic directly to the affected tooth and apply the juice. Leave for few minutes and rinse your mouth with warm salt water.	Until condition subsides.
23	Garlic Chives/Kutsay	*Allium tuberosum*	Cough	Leaves	Crush to extract the juice.	Oral	Take 1 to 2 mL three times a day.	Until cough subsides.
24	Ginger/Laya	*Zingiber officinale* Roscoe	Asthma	Roots	Extraction/ Concoction	Topical/ Oral	Apply to the chest if topical. Boil the roots and drink 120 mL as needed.	Until condition subsides.
			Cough and colds	Roots	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
25	Guyabano	*Anona muricata*	Diarrhea/Stomach Ache	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
26	Gumamela	*Hibiscus rosa-sinensis*	Swelling and Inflammation	Buds	Mashed	Topical	Apply affected area.	Until condition heals.
27	Horseradish	*Armoracia rusticana*	Cough	Leaves	Crush to extract the juice.	Oral	Take 1 to 2 mL three times a day.	Until cough subsides.
28	Insulin Plant	*Chamaecostus*	Diabetes	Leaves	Wash and chew the fresh leaves slowly.	Oral	Chew 1 to 2 leaves daily.	Until condition subsides.
29	Ipil-ipil	*Leucaena glauca*	Toothache	Stem	Decoction	Oral	Gargle as many times as you can.	Until toothache subsides.
30	Kataka-taka	*Bryophyllum pinnatum*	Fungal Skin	Leaves	Pound or crush	Topical	Apply affected area.	Until condition heals.
31	Lady's Fingers/Okra	*Abelmoschus esculentus*	Respiratory	Seeds	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.

32	Lagundi/Dangla	*Vitex Negundo* L.	Cough and colds	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until cough and colds subside.
			Fever	Leaves	Decoction	Topical	Bathe until fever subsides.	Until condition subsides.
33	Lemon grass/Barangibo d	*Cymbopogon flexuousus*	Hypertension/Kidney Problems	Leaves	Concoction (with garlic clove and ginger, add calamansi and honey to taste)	Oral	Drink 1 liter per day for 3 days.	Until condition subsides.
34	Madre de cacao/Kakawat e	*Gliricidia sepium*	Wound and cuts	Leaves	Decoction	Topical	Wash affected area.	Until condition heals.
35	Makabuhay	*Tinispora rumphii*	Fungal Skin Infections	Leaves and Stem	Decoction	Topical	Wash affected area.	Until condition heals.
36	Makahiya	*Mimosa pudica*	Wounds and cuts	Leaves and Stem	Pound or crush	Topical	Apply to affected area.	Repeat as needed.
37	Malunggay	*Moringa oleifera*	Wounds and cuts	Leaves	Pound or crush	Topical	Apply to affected area.	Repeat as needed.
			Compromised immune system	Leaves	Concoction (cooked with other leafy vegetables and use as viand)	Oral	Eat one cup daily.	Three days or as desired.
38	Mango Tree	*Mangifera indica*	Hypertension	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Repeat as needed.
39	Mayana	*Coleus blumei*	Swelling and inflammation	Leaves	Pound or crush the leaves.	Topical	Apply to affected area.	Repeat as needed.
40	Onion	*Allium cepa*	Cough and colds	Leaves and bulb	Concoction (add coconut oil)	Topical	Massage to the chest of the patient.	Until condition heals.
41	Oregano	*Origanum vulgare*	Cough	Leaves	Concoction	Oral	1 tablespoon three times a day	Until cough subsides.
42	Pandan	*Pandanus odorata*	Cough and UTI	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Repeat as needed.
43	Paragis/Goose Grass	*Eleusine indica*	Diabetes	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Repeat as needed.
44	Papaya	*Carica papaya*	Indigestion	Fruits	Wash and eat.	Oral	Eat 1 medium sized fruit.	Repeat as needed.
45	Patani/Lima Bean	*Phaseolus lunatus*	Toothache	Leaves and Stem	Crush	Oral	Apply over affected tooth.	Until condition subsides.
46	Pineapple	*Ananas comoscus*	Cough	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
47	Rose Apple/Macopa	*Syzygium samarangense*	Urinary Tract Infection (UTI)/Kidney Problem	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
48	Sambong/Subu sub	*Blumea balsamifer*	Cough/Pasma	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.
49	Star apple/Kaimito	*Chrysophyllum cainito*	Diarrhea	Ripe fruits	Wash and eat	Oral	Eat at least 3 medium sized fruit three times a day.	Until condition subsides.
			Stomach ache	Leaves	Decoction	Oral	Drink 120 mL three times a day.	Until condition subsides.

About twelve (12) shrubs and four (4) vines were also identified by the respondents in treating common ailments and diseases. For the shrubs, the following medicinal plants are: aloe vera (*Aloe barbadensis* Miller*)* or sabila; akapulko (*Cassia alata)* or andadasi; busbusilak (*Tabernaemontana pandacaqui)* or pandakaki; stink grass (*Lantana camara)* or bangbangsit; cat's whiskers (*Orthosiphon aristatus)* or balbas pusa; gumamela (*Hibiscus rosa-sinensis)*; lady's fingers or okra (*Abelmoschus esculentus)*; pandan (*Pandanus odorata)*; sambong (*Blumea balsamifera)* or subusub; serpentina (*Androgaphis paniculate)* or tawa-tawa; tuba-tuba (*Jatropha curcas)* and wild tea (*Carmona retusa*)or tsaang gubat. The vines that are used by the respondents in treating common ailments and diseases include bitter gourd (*Momordica charantia)* or ampalaya, betel or gawed (*Chavica siriboa)*, makabuhay (*Tinispora rumphii)*, and lima bean (*Phaseolus lunatus)* or patani.

The findings of the current study is different to what Cordero and Alejadro (2021) found in their studies that most of the plants used in treating

illnesses registering 39% are herbs; followed by trees 32%; shrub 22% and vine/ climber 7%. A similar finding with the previously presented findings is reported in the study of Ullah *et al.* (2020) where herbs, subshrub, trees and shrub are the most commonly type of plant used to treat illnesses with 41%, 22%, 21% and 6% respectively of the 96 species found.

As to the most cited part of the plant for their medicinal preparation, it is the leaves of the medicinal plant. There were 47 of the 58 identified medicinal plants where leaves are prepared for treating illnesses. The use of leaves of the identified medicinal plants ensures sustainability in the utilization of the plants; hence, the survival and continuity of these medicinal plants are generally protected by the traditional folks of northwestern Cagayan, Philippines. As mentioned by Olowa and Demayo (2015) in their study, they cited Lulekal *et al.* (2008) who said that harvesting roots as a medicinal part of the plant has a negative influence on the survival and continuity of the medicinal plant; thus, it affects its sustainable utilization.

The use of stems, barks, roots, flowers and fruits; however, were also used in the herbal preparations of the traditional folks of Northwestern Cagayan. The findings of the study is similar to the findings on the study of Olowa and Demayo (2015) who found the same parts that are used in the preparation of medicine. The use of leaves in majority of the plants identified implies that the traditional medical practice in the area does not threaten biological diversity (Bekalo *et al.*, 2009). Also, in the study of Cordero and Alejandro (2021) among the Ati tribes of Antique Philippines, they found out that of the medicinal plants identified leaves received a percentage of 40%, meaning leaves are the most commonly plant part used in treating illnesses. Though, it was also found out that these Ati tribes also used other parts of the plant like its roots, stem, bark, fruit, see, latex, flower, rhizome, shoot among other parts.

In other country like in the Kingdom of Saudi Arabia, in a study conducted by Ullah *et al.* (2020), leaves representing 29% of the plants identified were also the most used plant part in treating illnesses. The seeds of the plant, the aerial parts as well as the whole plant are the identified parts that they used in the preparation of the medicinal plant.

As to the manner of preparation on these medicinal plants, concoction and decoction were the most common practice by these traditional folks in Northwestern Cagayan. These are taken orally and the others are applied topically. The findings of the current study is similar to that of Bahadur *et al.* (2020) among the local communities in Pakistan where decoction is the most frequent mode of preparation on the identified 71 plant species that are medicinal, and oral route of administration was the preferred mode of administration.

In the study; however, of Pucot and Demayo (2020), they have another method, and roasting was a popular method used by people of Aurora, Zamboanga del Sur on the medicinal plants. They roast the corn, coconut shells, and rice and they mix it with hot water as it is believed to promote postprandial glycemic or insulineric responses, lipid metabolism, colon health, and mineral absorption (Ai and Jane, 2020).

With this, we could surmise that these medicinal plants are prepared differently, taken orally or applied topically to the affected part of the body. The dosage and duration in taking the medicinal plants shall all depend upon the severity of the ailment and the reaction of the body to the medicinal plants.

Conclusion

From the above findings of the study the following conclusions are made:

Medicinal plants play a significant role in the health delivery system among the community folks of Northwestern Cagayan as they provide readily available, accessible, effective and less expensive healthcare to the community.

Not only late adults or old aged, but also young individuals of Northwestern Cagayan rely on the therapeutic value of medicinal plants to cure common ailments and diseases.

The Ilokano folks of Northwestern Cagayan exhibited the same pattern of their traditional healthcare practices with the other ethnic groups in the country due to the inherent quality of this indigenous knowledge which has been practiced for several decades now.

Recommendations

Based on the conclusions, the following are recommended:

Researchers could continue documenting indigenous knowledge and ethnobotanical practices of medicinal plants in different communities in the country as it is is essential in preserving traditional knowledge and sharing it with future generation.

Traditional healers and modern medical practitioners could collaborate to development of evidence-based medicines that can be used to treat various illnesses.

Governments could provide additional funding for research on indigenous knowledge and ethnobotanical practices to support the development of traditional medicine and the preservation of cultural heritage.

References

Awoyemi O, Abiodun OO, Babalola OO, Sam-Wobo S. 2012. Ethnobotanical assessment of herbal plants in Southwestern Nigeria. Academic Research International **2**, 50–57.

Bahadur A, Khan Z, Ali A, Ahmed M, Khan B. 2020. Traditional usage of medicinal plants among the local communities of Peshawar valley, Pakistan. Acta Ecologica Sinica **40**(1), 1–29.

Balangcod T, Balangcod A. 2011. Ethnomedical knowledge of plants and health care practices among the Kalanguya tribe in Tinoc, Ifugao, Luzon, Philippines. Indian Journal of Traditional Knowledge **10**(2), 227–238.

Barkatullah MI, Ibrar M, Hussain F. 2015. Quantitative ethnobotanical survey of medicinal flora thriving in Malakand Pass Hills, Khyber Pakhtunkhwa, Pakistan. Journal of Ethnopharmacology **16**, 335–346.

Bekalo T, Woodmatas S, Woldemariam Z. 2009. An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, southern nations, nationalities, and peoples regional state, Ethiopia. Journal of Ethnobiology and Ethnomedicine **5**, 1–26.

Boncalon R, Arugay M, Ramos R. 2009. A preliminary study on the efficacy of *Plumeria acuminata* (Kalachuchi) bark extract ointment versus Clotrimazole cream in the treatment of otomycosis. Philippine Journal of Otolaryngology Head and Neck Surgery **24**(1), 5–8.

Cajuday L, Bañares E. 2019. Analysis of traditional knowledge of medicinal plants from residents near Kalikasan Park, Albay, Philippines. Bicol University R & D Journal **22**(2).

Chaudhary M, Khan A, Gupta M. 2020. Skin ageing: Pathophysiology and current market treatment approaches. Current Aging Science **13**(1), 22–30.

Cordero C, Alejandro G. 2021. Medicinal plants used by the indigenous Ati tribe in Tobias Fornier, Antique, Philippines. Biodiversitas **22**(2), 521–536.

De Guzman A, Apawan N, Reyes R, Sanchez E. 2020. Ethnobotany and physiological review on folkloric medicinal plants of the Visayans in Ipil and Siay, Zamboanga Sibugay, Philippines. International Journal of Herbal Medicine **8**(3), 8–16.

De la Cruz A, Alegado R, Viloria R. 2023. Folk healing practices and folkloric modalities of traditional healers in Northwestern Cagayan, Philippines. Journal of Biodiversity and Environmental Sciences **22**(6), 234–239.

Fissema M. 2007. An ethnobotanical study of medicinal plants in Wonago Oreda, SNN Ethiopia [M.Sc Thesis, Addis Ababa University, Ethiopia].

Havighurst R. 1952. Developmental tasks and education. New York: David McKay.

Kala C. 2002. Medicinal plants of Indian Trans-Himalaya. Bishen Singh Mahendra Dehradun, India. Science and Education Publishing **5**, 24–34.

Moreira D, Texiera S, Monteiro M, Abreu R. 2014. Traditional use and safety of herbal medicines. Brazilian Journal of Pharmacognosy **24**, 248–257.

Nakashima D, Roue M. 2002. Indigenous knowledge, peoples and sustainable development. In: Social and economic dimension of global environmental change **5**, 314–324.

Olowa L, Demayo C. 2015. Ethnobotanical uses of medicinal plants among the Muslim Maranaos in Iligan City, Mindanao, Philippines. Advances in Environmental Biology **9**(27), 204–215.

Ong H, Chua S, Millow P. 2011. Ethno-medicinal plants used by the Temuan villagers in Kampung Jeram Kedah, Negeri Sembilan, Malaysia. Ethno Med **5**, 95–100.

Pucot J, Demayo C. 2020. Ethnomedicial documentation of polyherbal formulation and other folk medicines in Aurora, Zamboanga del Sur, Philippines. Biodiversitas **22**(12), 5331–5343.

Saks M. 2023. Complementary and alternative medicine. Encyclopedia Britannica. https://www.britannica.com/science/complementary-and-alternative-medicine

Shahzad M, Ahmed N. 2013. Effectiveness of Aloe Vera gel compared with 1% silver sulphadiazine cream as burn wound dressing in second degree burns. The Journal of the Pakistan Medical Association **63**(2), 225–230.

Sharma G, Goodwin J. 2006. Effect of aging on respiratory system physiology and immunology. Clinical Interventions in Aging **1**(3), 253–260.

Tan M. 2008. Revisiting usog, pasma, kulam. Quezon City: The University of the Philippines Press.

Tantengco O, Jacinto S, Reyes J, Manalo M. 2018. Ethnobotanical survey of medicinal plants used by Ayta communities in Dinalupihan, Bataan, Philippines. Pharmacognosy Journal **10**(5), 859–870.

Tantiado R. 2012. Survey on ethnopharmacology of medicinal plants in Iloilo, Philippines. International Journal of Bio-Science and Bio-Technology **4**(4).

Ullah R, Alqahtani AS, Noman OM, Alqahtani AM. 2020. A review on ethno-medicinal plants used in traditional medicine in the Kingdom of Saudi Arabia. Saudi Journal of Biological Sciences **27**, 276–278.

World Health Organization. 2000. General guidelines for methodologies on research and evaluation of traditional medicine. World Health Organization.