

ETHNOMEDICINE OF NANENG HERITAGE VILLAGE

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ABSTRACT

Objective The aim of this study is to document the existing knowledge of medicinal plants and healthcare practices among the local inhabitants of Naneng Heritage Village, Tabuk City, Philippines. Naneng is one of the remote barangays in Kalinga. It is declared as a heritage village by the local government of Tabuk City.

Methods: An ethnobotanical survey was carried out to collect information on the utilization of medicinal plants from the adult members and traditional healers of the heritage village. Data were acquired using semi-structured interviews and participant observations.

Results: The people of Naneng Heritage Village utilized 36 plant species in preventing and treating various ailments: 27 plant species were used as medicine; 6 for rituals, ceremonies and practices linked to superstitious beliefs and 3 for both purposes. The study found out that *Vernonia cinerea* and *Oldenlandia herbacea*, which are not previously reported in other studies, have medicinal value in curing mouth sore. This study also found out that the people of Naneng Heritage Village use *Basella alba* as an alternative medicine for urinary tract infection.

Conclusion: The study of traditional knowledge of plant utilization in curing various ailments can generate promising medicinal advances.

Keywords: Ethnomedicine; Naneng Heritage Village; Medicinal plants; Traditional medicine

INTRODUCTION

The connection of man to plants is exceptionally indispensable. This relationship is very significant as plants affect every feature of man's survival by supplying a continuous source of diverse materials such as food, housing equipment, clothing, medicine and many others (Balangcod et al., 2011; Gruca et al., 2014; Bortolotto et al., 2015; Ari et al., 2015; Ferrier et al., 2015; Mekonen et al., 2015; Nergard et

al., 2015; Zizka et al., 2015). Medicine is an important feature of this relationship (Balangcod et al., 2011; Tantiado et al., 2012; Molare et al., 2014; Araya et al., 2015; Kefalew et al., 2015). Plants play a major role in the treatment of diseases and remain the foremost alternative for some groups (Malan et al., 2015). Gerard Bodeker (2000) stated in his manuscript that 80%-90% of the countries in the world utilize traditional forms of medicine. Some of the reasons identified are the following: (a) affordable; (b) it is related to the patients' beliefs (Obata & Aigbokhan, 2012; Armijos et al., 2014; Kabir et al., 2014; Gruca et al., 2014); (c) can generate income (Yang et al., 2014; Wangchuk & Tobgay, 2015) and; (d) effective (Luitel et al., 2014). It is also demonstrated worldwide that traditional medications are proven efficient in various aspects such as mental, prevention of diseases and enhancement of quality of life as stated by Raymond Obomsawin (2007) in his study.

Seventy-five percent (75%) of modern synthetic drugs created by the wealthy and leading pharmaceutical industries have given rise to harmful side effects that are more damaging than the diseases they claim to cure (Kurian, 2010 and Phillipson et al., 1989). This is the primary reason why the world's attention is again on the use of traditional medicine. A return to natural healing, the use of organic medicine, is the need of our time. We need practical remedies for our common ailments.

Recently, the usage of traditional medicine has increased worldwide and has advanced its acceptance (Obomsawin, 2007). The World Health Organization (WHO) estimated that 80% of the Asians and Africans depend on traditional medicine for primary healthcare (United Nations, 2010).

People have been using plants to cure diseases for many centuries. The use of ethnomedicine or traditional medicine to growing number of families has become more than alternative (Shetty, 2010). Traditional medicine is used globally and has a rapidly growing economic importance. Indeed, traditional medicine is gaining more respect and consideration from national government and health practitioners.

In developing countries like the Philippines, traditional medicine is frequently the only existing and affordable treatment among barangays in coastal and rural areas, where there are no drugstores and there is difficulty in transportation (Balangcod et al., 2011). Access to commercial drugs and modern medical treatment is in fact difficult in some areas of the country. Twenty-four percent (24%) of Filipino families cannot afford basic physiological needs like food and medicine (Herrera et al., 2010). Because of poverty, most Filipinos tend to use traditional healthcare methods. Republic Act 8423 (also known as the Traditional and Alternative

Medicine Act of 1997) was made to deal with the lack of access to commercialized and modern medicine.

A variety of researches has described the quality of knowledge present in the different groups of people with regard to their practices in the utilization of flora as well as fauna acquired from the environment. In a study made by Robert A. Voeks in 2007, he found out that women in a particular group are more knowledgeable with both field identities and medicinal importance of a local plant than men. This result has something to do with the role of mothers as the healthcare giver of the family. A separate study by Anggoro (2010) shows that children of the community learn the biological concepts of plants, animals and the environment from their experiences in the natural environment.

Ethnomedicinal researches involve two or more scientific areas of knowledge. It employs the techniques of ethnobotany and health anthropology. Ethnomedicinal studies are often significant and vital in revealing significant plant species especially for the discovery of drugs. In a worldwide perspective, Ethnomedicinal researches have increased in the past years (Balangcod et al., 2011; Albuquerque et al., 2013; Hidayati et al., 2015). The study of traditional knowledge of plants and remedies could draw out promising herbal medicinal leads if wisely utilized and supported. In the Philippines, there are few studies concerning ethnomedicine and most of them are performed in recognized indigenous people of the country (Balangcod et al., 2011). In the province of Kalinga, there is a dearth of studies relative to ethnomedicine hence the inspiration to conduct the same study.

Statement of the Problem

This study aimed to document the existing knowledge of medicinal plants and healthcare practices among the local residents of Naneng Heritage Village, Tabuk City, Philippines.

Specifically, this study sought to answer the following:

1. What are the plant species used by the people of Naneng Heritage Village as medicine?
2. What are the sources of medicinal plants in Naneng Heritage Village?
3. What plant parts are commonly used for various medicinal practices?
4. How do the people of Naneng Heritage Village prepare their plants for medicine?
5. What are the common modes of administration performed by the people of the heritage village with regard to the use of plants as medicine?
6. What ailments do the identified plant species cure?

7. What are the plant species utilized in rituals, ceremonies and activities linked in superstitious beliefs in curing a variety of ailments?

Significance of the Study

The findings of this study contributed greatly to the knowledge in the utilization of various plant species as medicine. It also aimed to promote cultural belief on traditional healing practices carried out by the people of Naneng Heritage Village. This study also intended to document people's beliefs and practices in healing various types of diseases and to offer practical help in everyday health related concerns. Outcomes of this study would also open avenues for future researches especially on the development of a probable pharmaceutical product.

Literature Review

Historical Development of Ethnomedicine

The study of plants with medicinal properties was initiated by the Sumerians, the ancient people of Southern Mesopotamia, over 5,000 years ago (Sumner, 2000). Ethnobotany as an academic discipline rose in the 19th century, originally named 'Aboriginal Botany' by Powers in 1874. Today, the scientific study of the way plants and animals are used encompasses a wide range of sub-disciplines such as ethnobotany, ethnozoology, ethnopharmacology, ethnomedicine, and ethnoveterinary, with often no definite boundaries (Hidayati et al., 2015). Ethnobiological studies at present show the connection of linguistic, cultural and biological diversity to give shape to the concept of biocultural diversity (Wayland et al., 2014; Gruca et al., 2014; Hidayati et al., 2015). The increase in number of publications related to this area of knowledge in recent years reveals the significant development of ethnobiology as a science (Albuquerque et al., 2013).

Traditional Medicine and Healthcare Practices

The World Health Organization defined "traditional medicine" as the sum of knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses (UN to develop first-ever information standards for traditional medicine, 2010). Now, traditional medicine is widely used around the world and valued for a number of reasons (Mecham et al., 2009). Ethnobiological and Ethnomedicinal studies around the world have documented variety of plants (Nordeng et al., 2013; Pieroni et al.,

2014; Molares et al., 2014; Zank et al., 2015; Tugame et al., 2016), animals (Ashad et al., 2014; Hernandez et al., 2015; Vats et al., 2015) and other organisms like algae (Narch et al., 2015) used as treatment for different ailments. In malaria-prone areas in Tanzania, plants like *Azadirachta indica* (locally known as “mwarobaini”) and *Psidium guajava* are even utilized to control insects, including mosquitoes (Innocent et al., 2014). These studies revealed important plant species especially for the discovery of promising drugs and other health related products. There is a worldwide demand for this kind of research to let healthcare providers, researchers and policy-makers to monitor the various features, like safety, efficacy, use, spending and trends, in health care (UN to develop first-ever information standards for traditional medicine, 2010).

Traditional medicine is not only a fundamental source of healing, but also an important source of income for some social groups. In a study conducted in Bhutan, it was found out that medicinal plants generate income to the farmers improving their economic status (Wangchuk & Tobgay, 2015). In Yunnan, China, farmers maintained approximately 90% of the medicinal plants in their home gardens for commercial reasons (Liu et al., 2013). The medicinal plants indeed play significant role in the economic and non-economic well being of the people of the community.

Utilization of Plants for Medicinal Purposes

The utilization of traditional medicine is more extensive and important in developing countries (World Health Organization). According to statistics presented to WHO, in India 70% of the population (Upadhyaya et al., 2014) and in Ethiopia more than 90% of the population (Kefalew et al., 2015; Araya et al., 2015; Chekole et al., 2015; Mekonen et al., 2015; Kidane et al., 2014; Abera, 2014) depend on traditional medicine for primary health care. There is also an increase in the number of publications related to ethnobiology and ethnomedicine in Latin America in the recent years (Albuquerque, 2013). In China, traditional medicine accounts for approximately 40 percent of all health care delivered. China also has the greatest over all percentage of ethnomedicinal therapies (Mecham & Schley, 2009). Plants are not only employed to humans for health reasons. Some social groups, like the people of Sharti Samre and Libo Kemkem district in Ethiopia, use various plant parts to cure livestock diseases (Kipkore et al., 2014; Araya et al., 2015; Chekole et al., 2015).

Numerous studies proved that plant utilization could be affected by various factors. In a study conducted in Brazil, it was found out that there is a significant correlation between plant use and the respondents’ age (Wayland et al., 2014). The study

also revealed that the length of residence in an area did not affect the way people utilize plant for medicinal reasons. Voeks (2007) found out that women are more knowledgeable in medicinal importance of a local plant than men. A number of studies proved that women are not only knowledgeable but they are also major users of plants for medicinal reasons (Nordeng et al., 2013; Razafindraibe et al., 2013; Sher et al., 2014). Seventy-nine percent of women in Mali used medicinal plants during pregnancy (Nergard et al., 2015). Thirty percent of these women believed that medicinal plants will not cause them any harm.

Leaves were the most regularly used plant part for medicine preparation (Abera, 2014; Ahmad et al., 2014; Kidane et al., 2014; Licata et al., 2016; Tugume et al., 2016). Other plant parts like stem, flowers, fruits (Li et al., 2015), seeds and roots (Zhang et al., 2015) were also utilized. Decoction and oral method of administration were dominantly used mode of preparation and administration (Ahmad et al., 2014; Tangjitman et al., 2015; Tugume et al., 2016).

Phytochemical Analysis of Some Plant Species in the Philippines

As a consequence to the increasing demands on food items and drugs that are labelled as “natural” or “organic,” many studies are conducted nowadays to examine the bioactive substances present in various plant species. Many of these products developed from plants provide numerous health and therapeutic benefits (Peteros & Uy, 2010; Bulatao et al., 2012).

Tongco et al. (2015) detected phytochemicals in *Basella alba*, locally known as “alugbati”. The chemicals detected contribute to the anti-cancer, antioxidant and anti-inflammatory properties of *B.alba*. Antibacterial substances are also detected in *Lagerstroemia speciosa*, locally known as “banaba” (Laruan et al., 2013). These compounds present in *L. speciosa* show a basis for traditional use of banaba as a local remedy in some indigenous communities in the Philippines. *Capsicum frutescens* (siling labuyo), *Mimosa pudica* (makahiya) and *Citrus maxima* (suha) are also detected with antimicrobial properties (Racadio et al., 2008; Sia Su et al., 2013; Barrion et al., 2014). On the other hand, *Diplazium esculentum* (pako) contain antimicrobial, antidiarrheal and antihelmintic substances (Tongco et al., 2014). This proves that a single plant species can provide multiple medicinal benefits.

Knowledge on Ethnomedicine

Social groups have knowledge related to gathering and preparing herbs, as well as knowledge on medicinal use. The main source of knowledge in the community

is its people (Haselmair et al., 2014). The dominant ways of medicinal plant knowledge acquisition and transfer is from parents to children via verbal means (Kidane et al., 2014; Haselmair et al., 2014; Semanya & Potgieter, 2014; Upadhya et al., 2014). Women in a particular group are more knowledgeable with both field identities and medicinal importance of a local plant than men (Voeks, 2007). This result has something to do with the role of mothers as the healthcare providers of the family. Age also shows a direct proportional connection with the individual's theoretical and practical knowledge on the use of plants. Older people (60 years and above) know more than the younger members of the community (Abera, 2014; Bortolotto et al., 2015; Turriera-Garcia et al., 2015). Traditional knowledge as well as its practices are deteriorating at a much faster rate in some areas. This is due to acculturation taking place in the society (Navaneethan et al., 2011). The preservation of theoretical knowledge on plant use is indeed so important nowadays.

Knowledge on traditional medicine may also be affected by the community's way of living and spiritual values. Plants were used for various purposes including medicine, talisman (luck charm), security, good fortune, romance, and miscellaneous uses in religious and cultural ceremonies (Obata & Aigbokhan, 2012). In Sub-Saharan Africa, palms play a central role as sacred objects in some rituals (Gruca et al., 2014). Palm fruits were utilized in prayers before the patient takes a drug to ensure the effectiveness of medicine and successful recovery of a patient. In Zambia, the red color of the mesocarp oil from *Elaeis guineensis* symbolizes supremacy, but it also negative symbolisms like murder and witchcraft (Turner, 1967).

The Philippines is not only rich in flora and fauna, it is also rich in terms of ethnomedicinal knowledge. Many Filipinos still value plants for their medicinal purposes because many still find it difficult to gain access to government clinics and hospitals (Blasco et al., 2014). The transfer of this kind of knowledge to the next generation is via verbal means and personal experiences (Balangcod et al., 2015). However, there is a rapid decline in the indigenous knowledge on the use of minor identified medicinal plants (Kala et al., 2006). Ethnobotanical documents in the Philippines are few and mainly focused on the indigenous groups in the Philippines (Balangcod et al., 2011). Knowledge of traditional agriculturists and forest dwellers is neglected (Langenberger et al., 2005). Farmers also use various plants and have obtained a high degree of knowledge on important medicinal plant species present in the surroundings (Prigge et al., 2005). Due to the mentioned challenges, the Department of Science and Technology and other related institutions are taking a lead in initiating ethnomedical researches (Balangcod et

al., 20015). Since, there is an insufficiency of literature on the subject of traditional knowledge on plant use in the country (specifically in CAR), the result of any ethnomedicinal undertaking will be a great input most especially in prospective researches on plant drug discoveries.

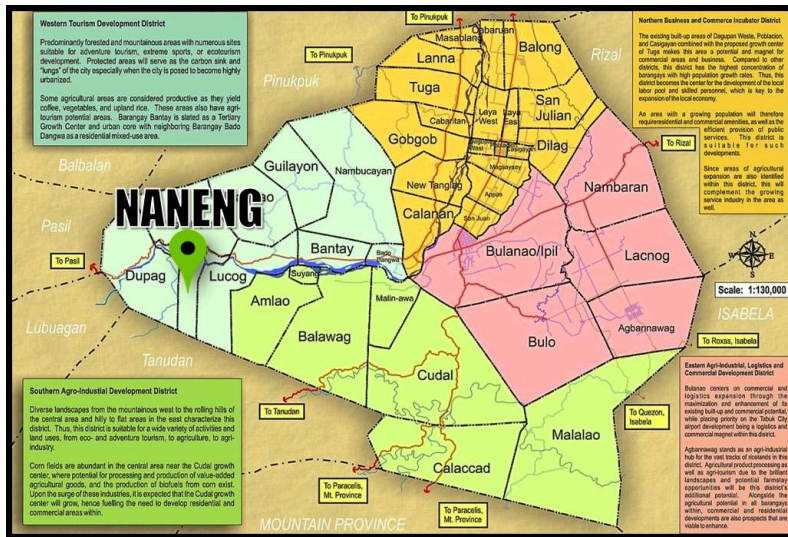
METHODS

Research Design

An ethnobotanical survey was conducted to collect information about medicinal plants used by the people of Naneng Heritage Village. Information was gathered from the adult members and traditional healers of the community with age ranged from 30 to 86 years old using an integrated approach of botanical collections and interview schedules. A semi-structured questionnaire that was composed of two parts was used. The first section (Section I) included the profile of the respondents like age, gender and occupation. The second segment (Section II) dealt with respondents' knowledge on ethnomedicinal plants. The information on Section II comprised of the local name of plant species, the plant part used, its preparation, mode of administration and the ailments treated. The questionnaire was printed in English but with Ilocano translation to adapt to local conditions. Plant samples were also collected and brought to the Philippine National Museum-Botany Division for verification.

Locale of the study

The study was conducted in Naneng Heritage Village a remote barangay in Tabuk City, Kalinga in the northern part of the Philippines. It is located 17° 27' 0" N latitude and 121° 27' 30" E longitude. Naneng is 56.7 kilometers away from Tuguegarao City in Cagayan. Naneng Heritage Village was build in 1920's by the ancestors of the town. Naneng in Kalinga means "delubyo" or flood caused by the over spilling of Chico River. The houses in this village were built using different trees like narra, lauan and guijo. Since the government already prohibits the use of the mentioned plant species, the local government of Tabuk declared Naneng as a heritage village (GMA News Online, 2012). The primary occupation in the heritage village is farming. Farmers have essential knowledge as regards plant utilization and cultivation. To date, no documentation has been prepared regarding the ethnomedicinal knowledge of the people of Naneng Heritage Village.



Map of Tabuk City, Kalinga

Informants

Information was collected from the adult members and traditional healers of the community with age ranged from 30 to 86 years old. The local officials of the heritage village identified the traditional healers and the key respondents.

Data Gathering Methods

A. Unstructured Interview

The questions asked were on the different rituals, beliefs and other healthcare practices as well as follow up inquiries and clarifications on responses.

B. Others

Focus group discussion, field observations on modes on plant preparation and administration were executed. Photography and specimen collection & preservation were also carried out. Plants with no local name or unfamiliar English name were collected. The specimens were pressed between newspapers that were sandwiched between wooden pressers, dried in an oven and mounted on herbarium sheets. The collected plant samples were brought for verification to the Philippine National Museum-Botany Division except for three species which were both identified and verified by the agency.

RESULTS

Table 2. List of medicinal plants used by people on Naneng Heritage Village, Tabuk City

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
Amaryllidaceae	<i>Allium tuberosum</i>	Kutsai	Garlic chives	Cultivated	Leaves	Crushed	Applied on affected area	Wound; Lump (<i>Bukol</i>)	6.25 %
							Applied on skin (superficial to the affected tooth)	Toothache	
Annonaceae	<i>Annona muricata</i>	Guyabano	Sourop	Cultivated	Fruit	Crushed	Taken in as liquid	Detoxification; Maintenance of good health	7.81 %
					Leaves	Decoction	Taken in as liquid	High blood pressure (Hypertension); Diabetes; Urinary	

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
								tract infection	
						Crushed	Aromatherapy	Dizziness/ <i>Manannan</i> (Jinxed)	
Arecaeae	<i>Cocos nucifera</i>	Niog	Coconut	Cultivated	Fruit (Oil)	Extracted	Applied on affected area	Hair fall	4.69 %
Asteraceae	<i>Ageratum conyzoides</i>	Kalidung	Goat weed	Wild	Leaves	Crushed; Wrapped in banana leaf with coconut oil (<i>lana</i>); Heated	Applied on affected area (2 x a day)	Burn; Wound	3.13 %
	<i>Bidens pilosa</i>	Borbotac	Beggar ticks	Wild	Leaves	Cooked; Decoction	Eaten; Taken in as liquid	Goiter	1.56 %
	<i>Blumea balsamifera</i>	Sambong	Blumea camphor	Cultivated	Leaves	Decoction	Taken in as liquid	Cough; Dry cough; Asthma	1.56 %

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
Basella ceae	<i>Basella alba</i>	Alugbati	Spinach vine	Wild	Leaves	Decoction; Cooked	Taken in as liquid; Eaten	Urinary tract infection	1.56 %
Carica ceae	<i>Carica papaya</i>	Papaya	Melon tree	Cultivated	Petiole	Crushed; Extracted	Taken in as liquid	Dengue; High fever	1.56 %
Crassulaceae	<i>Bryophyllum pinna tum</i>	Katakataka	Miracle plant	Cultivated/Wild	Leaves	Fresh	Applied on affected area	Fever	3.13 %
					Leaves Stem	Decoction	Taken in as liquid	Headache; Stomach-ache	
Euphorbiaceae	<i>Euphorbia hirta</i>	Tawatawa	Asthma weed	Wild	Entire plant	Decoction	Taken in as liquid	Dengue	3.13 %
	<i>Jatropha curcas</i>	Kalimbuwaya	Purging nut tree	Cultivated/Wild	Leaves	Fresh	Applied on affected area	Headache; Body pain; Arthritis	6.25 %
						Eaten	Snakebite		

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
					Leaves Stem	Extracted	Applied on affected area	Snake bite Toothache	
					Bark	Poultice (<i>Dinadangdang</i>)	Applied on affected area	Body pain; Arthritis; Fracture	
	<i>Phyllanthus niruri</i>	Taltali kud	Seed- and er-leaf	Wild	Entire plant	Decoction	Taken in as liquid	Hyperacidity	3.13 %
	<i>Racinus communis</i>	Taoataoa	Castor oil plant	Wild	Seeds	Burned	Steam Inhalation (via mouth)	Toothache; Cavities	6.25 %
Fabaceae	<i>Gliricidia sepium</i>	Kakawate	St. Vincent plum	Cultivated	Leaves	Decoction	Bath	Scabies (on <i>Canis familiaris</i> , <i>Homo sapiens</i>)	1.56 %
	<i>Mimosa</i>	Bain bain;	Basiful	Wild	Roots	Decoction	Taken in as liquid	Kidney ailments ;	3.13 %

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
	<i>podica</i>	Maka hiya	mimosa					Stomachache	
						Crushed; Added in Gin	Taken in as liquid (1 spoon/day)	Contraceptive	
Lamiaceae	<i>Plectranthus aromaticus</i>	Oregano	Oregano	Cultivated/Wild	Leaves	Decoction	Taken in as liquid	Cough (of babies)	1.56%
	<i>Vitex negundo</i>	Dangla; Lagundi	Five-leaf chaste tree	Cultivated	Leaves	Decoction	Taken in as liquid	Fever; Cough; Body pain; Headache	6.25%
							Steam inhalation	Cough; Asthma	
							Bath; <i>Suob</i>	Fever; Body pain	
Lauraceae	<i>Persea americana</i>	Abukado	Avocado	Cultivated	Leaves	Decoction	Taken in as liquid (w/ sugar)	Diarrhea; Stomachache	3.13%

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
Malvaceae	<i>Ceiba pentandra</i>	Gaddal; Kapok	White silk cotton tree	Cultivated	Leaves	Crushed	Applied on affected area	Boil	1.56 %
	<i>Hibiscus rosasinensis</i>	Gumamela	China rose	Cultivated/Wild	Flower	Crushed	Applied on affected area	Boil	1.56 %
Moringaceae	<i>Moringa oleifera</i>	Marungai	Ben oil tree	Cultivated	Bark	Scraped	Applied on affected area	Toothache	1.56 %
Musaceae	<i>Musa paradisiaca</i>	Saging	Banana	Cultivated/Wild	Leaves	Fresh	Compress	Various diseases/ Not specific	1.56 %
Myrtaceae	<i>Psidium guajava</i>	Bayabas	Guaava	Cultivated/Wild	Fruit	Fresh	Eaten	Diarrhea	6.25 %
					Leaves	Decoction	Taken in as liquid	Diarrhea	
							Applied on affected area; Bath	Maternal postpartum care (wounds ,	

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
								bleeding)	
						Crushed	Applied on affected area	Wound; Circumcision cuts	
Myrtaceae	<i>Syzygium cumini</i>	Lumbui	Javaplum	Cultivated	Leaves	Decoction	Taken in as liquid	Urinary Tract Infection	1.56 %
Poaceae	<i>Andropogon citratus</i>	Baraniw	Lemon grass	Wild	Leaves	Decoction (with <i>Vitex negundo</i>)	Taken in as liquid	Cough; UTI; Fever; Headache	4.69 %
	<i>Oryza sativa</i>	Pagai; Palai	Rice	Cultivated	Rice straw	Ashed; Soaked; Filtered	Applied on hair as conditioner	Dandruff	3.13 %
MANGKUKULIT (MIXTURE)									
Asteraceae	<i>Vernonia cinerea</i>	Mangkukulit	Ash-colored fleabane; Ironweed	Wild	Entire plant	Decoction	Taken in as liquid; Gurgled	Mouth sore (singaw)	4.69 %

Family	Species Name	Local Name	English Name	Source	Plant Part Used	Mode of Preparation	Mode of Administration	Ailments Cured/ Medicinal Value	Frequency (%)
Rubiaceae	<i>Oldenlandia herba cea</i>		Flat top mill e grains	Wild					

Table 2. List of plants used by the people on Naneng Heritage Village in rituals, ceremonies and practices linked to superstitious beliefs

Species Name	Family	Local Name	English Name	Source	Plant Part Used	Process	Purpose
<i>Mangifera indica</i>	Anacardiaceae	Manga	Mango	Cultivated	Leaves	Hanged on stove in dirty kitchen	To cure sebaceous cyst (butlig or kamiling); Skin ailments
<i>Kaempferia rotunda</i>	Zingiberaceae	Dutur/Dutul	Resurrection Lily	Cultivated	Leaves	Placed inside the pocket	For possessed (controlled by a supernatural)

Species Name	Family	Local Name	English Name	Source	Plant Part Used	Process	Purpose
							being) patients
					Entire Plant	Planted in front of the house	Snake repellent
<i>Jatropha curcas</i>	Euphorbiaceae	Kalimbuwaya	Purging nut tree	Cultivated/Wild	Entire Plant	Planted on the yard/in front of the house	Snake repellent
ATANG							
<i>Areca catechu</i>	Areaceae	Bua	Betel nut	Cultivated	Seeds	Offered to supernatural beings	For skin ailments; unexplained health conditions (usually caused by "kulam" or a curse)
<i>Piper betle</i>	Piperaceae	Gawed/Lawod	Betel leaf	Wild	Leaves		
<i>Oryza sativa</i>	Poaceae	Palai (Dekot)	Rice	Cultivated	Grains	Offered to supernatural beings	For skin ailments; unexplained health
<i>Saccharum officinarum</i>	Poaceae	Unas (Basi)	Sugarcane	Cultivated	Stem		

Species Name	Family	Local Name	English Name	Source	Plant Part Used	Process	Purpose
<i>Nicotiana tabacum</i>	Solanaceae	Tabaku	Tobacco	Cultivated	Leaves		conditions (usually caused by "kulam" or a curse)
<i>Cocos nucifera</i>	Areaceae	Niog	Coconut	Cultivated	Leaves (plus native chicken or pig)		
DAWAK							
Plants mentioned in "Atang" (plus any black animal like chicken, pig or carabao or depending on the request of the spirit)						Offered to supernatural beings (facilitated by a Dadawakan/Man dadawak); Dancing; Gong playing	For skin ailments; unexplained health conditions (usually caused by "kulam" or a curse)
TAKU							

Species Name	Family	Local Name	English Name	Source	Plant Part Used	Process	Purpose
<i>Cocos nucifera</i>	Areaceae	Niog	Coconut	Cultivated	Fruit	Coconut oil (<i>lana</i>), water at two (2) one peso coins are placed in a bowl; Oil can be applied to affected body part/s and coins can be used as lucky charms after the ritual	Identification of the cause of a disease ; Prognosis; Search for lost property

The ethnobotanical survey showed that there were 36 plant species utilized by the people of Naneng Heritage Village in treating various ailments, represented by 27 plant species used as medicine; six for rituals, ceremonies and practices linked to superstitious beliefs and three for both purposes. These plant species belong to 23 families. Plant families Asteraceae and Euphorbiaceae are the most represented families with four species each, followed by Fabaceae and Poaceae with three plant species. The plant species identified were either cultivated (52.78%), wild (30.55%) or both cultivated and wild (16.67%).

Annona muricata has the highest citation frequency of 7.81%. The informants identified *A. muricata* as an effective alternative medicine for hypertension, diabetes, urinary tract infection and being jinxed (Maanannung) by supernatural beings. *Psidium guajava*, *Jatropha curcas*, *Allium sativum* and *Vitex negundo* have a citation frequency of 6.25% and they ranked second.

The result of this study also demonstrated that *Jatropha curcas* has the most number of ailments being cured (six ailments). These ailments are headache, body pain, arthritis, fracture, toothache and snakebite. *Jatropha curcas* is followed by *Vitex negundo* with five ailments (fever, cough, asthma, body pain and headache). *Andropogon citratus* (cough, fever, urinary tract infection and headache) and

Annona muricata (hypertension, diabetes, urinary tract infection and “anannung” or being jinxed) are tie in third with four ailments.

Some of the ailments that were treated by the plant species in the heritage village are burns, wound, urinary tract infection, dengue, diarrhea, snakebite, hypertension, diabetes, goiter, hyperacidity, helminth infection, mouth sore and others. Pain related ailments (i.e. headache, body pain, toothache), respiratory system ailments (i.e. cough, colds), skin ailments (i.e. scabies, boils) and fever in consecutive order, rank the first four ailments with the most number of plants species that can cure them (Table 3).

Table 3. Ailments with the most number of plant species that can cure them

Rank	Ailment	Medicinal Plant	
1	Pain-Related Ailments (Headache, Toothache, Stomach-ache and Body pain)	✓ <i>Allium tuberosum</i> ✓ <i>Andropogon citratus</i> ✓ <i>Bryophyllum pinnatum</i> ✓ <i>Jatropha curcas</i> ✓ <i>Mimosa pudica</i>	✓ <i>Moringa oleifera</i> ✓ <i>Persea americana</i> ✓ <i>Racinus communis</i> ✓ <i>Vitex negundo</i>
2	Respiratory System Ailments (Colds, Cough and Asthma)	✓ <i>Andropogon citratus</i> ✓ <i>Blumea balsamifera</i> ✓ <i>Citrus maxima</i>	✓ <i>Plectranthus ambionicus</i> ✓ <i>Tamarindus indica</i> ✓ <i>Vitex negundo</i>
3 (TIE)	Skin Ailments (Scabies, Boil, Dundraff)	✓ <i>Ceiba pentandra</i> ✓ <i>Gliricidia sepium</i> ✓ <i>Hibiscus rosa-sinensis</i>	✓ <i>Mangifera indica</i> ✓ <i>Oryza sativa</i> *Plant species mentioned in "Atang" in Table 2
3 (TIE)	Fever	✓ <i>Andropogon citratus</i> ✓ <i>Bryophyllum pinnatum</i> ✓ <i>Carica papaya</i>	✓ <i>Citrus maxima</i> ✓ <i>Vitex negundo</i>

All plant parts such as flowers, fruits, seeds, stem, roots or leaves are usable in curing various ailments. Leaves are the most useful plant parts with a citation frequency of 70.77%. The leaves of *Ageratum conyzoides*, *Allium tuberosum* and *Psidium guajava* are crushed and applied on wounds and burns. The utilization of *P. Guajava* leaves as an alternative medicine for wounds is a conventional practice in the Philippines. Preparations for cough and other respiratory system-related ailments are made by boiling the leaves with water and the patient takes in the decoction. In using *Euphorbia hirta* and *Phyllanthus niruri* in curing dengue and hyperacidity respectively, the entire plant is needed to prepare a decoction. Mothers in the heritage village utilize *Mimosa pudica* roots (mixed with gin) as contraceptive.

Decocting (49.28%) and crushing (23.19%) are the most common modes of preparation. The decoction of *Andropogon citratus*, *Annona muricata* and *Basella alba* leaves are taken in by patients suffering from urinary tract infection. *Vitex negundo* and *Citrus maxima* decoctions are used in bathing and also the main material for “suob” in curing fever. Eight plant species are prepared through crushing. Majority of the plant species prepared through crushing were identified to treat wound, including circumcision cuts and burns.

For the mode of administration, most of the medicinal plants identified by the respondents were “taken in as liquid” (40%) after decocting, crushing or cooking. These plant species were identified as treatment for cough, fever, various types of pain and urinary tract infection. Moreover, the fruits of *Citrus maxima* and *Psidium guajava* and the leaves of *Jatropha curcas* were eaten fresh to cure helminth infection, snakebite and diarrhea respectively. In external mode of administration, “application on affected area” (32.86%) is the most frequently utilized method.

Nine plant species were utilized in rituals, ceremonies and practices linked to superstitious beliefs in curing various ailments. *Kaemferia rotunda* and *Jatropha curcas* were planted by the informants in their yard to prevent snakes from entering their homes. While, *Areca catechu*, *Piper betle*, *Nicotiana tabacum* and *Cocos nucifera* were used by the people as offerings to supernatural beings. *Oryza sativa* and *Saccharum officinarum* will still undergo processes before being offered. The community members will cook the *O. Sativa* grains with other binding substances to become rice cake, locally known as “dekot”, and *S. officinarum* will still undergo the process of fermentation to become the local alcoholic beverage called “basi”. *Mangifera indica* were utilized by mothers in the community if one of the members of the family is suffering from sebaceous cyst (“butlig” or “kamiling”). The leaves are hanged on the stove. The drying of the mango leaves, they believe, will result

into the drying and healing of their sebaceous cyst. The local ritual called “taku” makes use of coconut oil (“lana”) in identifying the cause of a particular ailment, prognosis and in searching for a lost possessions.

DISCUSSION

It can be gleaned from the result of the study that the plant families Asteraceae and Euphorbiaceae are the most represented plant families with four species each. Asteraceae, also known as Compositae, is the largest and a widespread family of Angiosperms or flowering plants (Jeffrey, 2007) while Euphorbiaceae (spurge family) is also in the list of the most diverse angiosperm families (Stevens, 2011). In other studies, Asteraceae (Obata & Aigbokhan, 2012; Chekole et al., 2015; Clement et al., 2015; Licata et al., 2016) and Euphorbiaceae (Obata & Aigbokhan, 2012; De Guzman et al., 2014) are also the most represented plant families in terms of herbal medicinal usage.

Majority of the plant species identified by the informants were cultivated (52.78%). The people of the heritage village still demonstrate high reliance on plants as their source of primary health care, which includes prevention and treatment of ailments, even with the existence of modern medicine and healthcare practices. They cultivate these plants in their yards due to their dependence on herbal medicinal plants. This is affirmed by Prigge (2005) who stated in his study that farmers possess vital knowledge with regard to plant utilization and cultivation. Farmers’ ethnobotanical and ethnomedicinal knowledge are results of their effort to meet their needs (Balangcod et al., 2005). The plants identified as wild are mostly weeds, in this case “beneficial weeds”. *Ageratum conyzoides*, *Vernonia cinerea* and *Oldenlandia herbacea* are some of the weeds identified by the respondents.

Annona muricata’s high citation frequency (7.81%) compared to other plant species identified by the informants can be associated to its various medicinal properties. A number of studies reported that *Annona muricata* have anti-diabetes (Adewole & Caxton-Martins, 2006; Florence et al., 2014), anticancer (Ragasa et al., 2012), antimicrobial (Pathak et al., 2010) and antioxidant (Baskar et al., 2007) properties. These biochemical properties contributed to its efficacy in curing the identified ailments it was able to cure. *Psidium guajava* and *Vitex negundo*, both with a citation frequency of 6.25%, are very popular herbal medicinal plants in the Philippines. The Department of Health of the Philippines identified *P. guajava* and *V. negundo* as two of the ten medicinal plants approved and endorsed of the said government agency.

Several plant species identified by the informants are used similarly by other social groups in the different regions in the world. For instance, *Jatropha curcas* is utilized due to its many medicinal values in other locale in the Philippines. The people of Kalanguya tribe in Ifugao also use *J. curcas* as an alternative first aid for snakebite and relieving body pain (Balangcod et al., 2011). They also apply its bark (or leaves) on hematoma for faster healing. People in Bayabas, Sablan, Benguet use the leaves and bark of *J. curcas* to remove milk deposits on babies tongue (Balangcod et al., 2015). In Surigao del Sur, *J. curcas* is utilized to relieve flatulence, the presence of too much gas in the stomach and intestines (Blasco et al., 2014).

The data obtained in the study show that there are plant species that are not previously documented as medically important, e.g., *Vernonia cinerea* and *Oldenlandia herbacea*. These plants were identified by the informants as effective herbal medicines for mouth sore. They also mentioned in the interview that most of the times they mix *V. cinerea* and *O. herbacea* to produce a decoction to treat mouth sore. The decoction of the combined plant species is locally called as “mangkukulit”. In a study conducted by Iwalewa et al. (2003), they found out that *V. cinerea* contains antipyretic, analgesic and anti-inflammatory substances. While, Sridhar et al. (2012) discovered anti-bacterial phytochemicals in *O. herbacea*. These identified phytochemicals are the reasons why *V. cinerea* and *O. herbacea* are effective in curing mouth sores. However, it is still highly recommended to conduct more ethnobotanical and phytochemical studies on these two plant species to know more on their other uses and to verify their medicinal value.

Another important outcome of this study is on the utilization of *Basella alba*, locally known as alugbati. *B. alba* is usually used in the Philippines as an alternative medicine for skin ailments like boil and acne (Tantiado, 2012; Gruyal et al., 2014; Balangcod et al., 2015). The people of Naneng identified alugbati as an effective alternative medicine for urinary tract infection by drinking its decoction. Tongco et al. (2015) detected phytochemicals in *Basella alba*. These chemicals are saponins, diterpenes, phenols, tannins, and flavonoids. The anti-cancer, antioxidant and anti-inflammatory properties of *B. alba* are attributed to these substances. Its anti-inflammatory properties make *B. alba* an effective alternative remedy for urinary tract infection.

Leaves are the most commonly used plant parts due to its high availability and ease in gathering and preparation. When gathering the leaves, the entire plant is

not ripped down, hence can still provide a continuous supply of medicine (Balangcod et al., 2015). As seen in the results, other plant parts are also utilized for various health reasons.

The methods of preparing the medicinal plants in the heritage village are also similar to other social groups in the Philippines (Balangcod et al., 2011). It was revealed in the results of the ethnobotanical surveys that decoction and “taken in as liquid” were the most commonly used methods of herbal medicine preparation and administration respectively. In the preparation of herbal medicines, decoction is regularly carried out to extract fluids from plant materials such as leaves, roots and bark. This procedure will make the entry of the curative substances easier into the human body. Decoction is the most suitable method of preparation in treating ailments that originate internally.

The people of Naneng Heritage Village also practice various superstitious beliefs. These ways of life are likewise practiced by the other social groups in Kalinga. Many of these beliefs are associated with their desire to cure or prevent various types of ailment (Table 2). The seeds of *Areca catechu* and the leaves of *Piper betle*, usually mixed with apog (powdered river-shell lime), are not only chewed due to its stimulant and psychoactive effects (Song et al., 2013). These plant species were also identified as options to be offered to the supernatural beings (i.e. nature spirits or “aran”, “anitos” or spirits of dead ancestors or a deity). The offered items, usually food, are locally known as “atang”. The most popular “atang” to ward off diseases is rice cake also known as “dekot”. The “dekot” is made from sticky rice (*Oryza sativa*). *Nicotiana tabacum* and *Cocos nucifera* leaves and “basi”, a fermented alcoholic beverage made from *Saccharum officinarum*, are also utilized as “atang” in the heritage village.

It was stated in the interviews that the people of Naneng Heritage Village also practice “dawak”, a healing ceremony for prolonged or mysterious illnesses. The “dawak” is facilitated by a “dadawakan” or “mandadawak”. The procedure includes a sacrificial ceremony of an animal (a native chicken, pig or carabao), dancing and merrymaking, gong (also known as gangsa) playing and offering of “atang”. These practices are still very popular nowadays in the heritage village despite the existence of the modern medicine and different ways in treating various ailments.

CONCLUSION

The study of traditional knowledge of plant utilization in curing various ailments can generate promising medicinal advances. Our present condition demands discoveries of new and affordable plant-made drugs. This study has documented thirty-six (36) plant species used in curing a variety of ailments in Naneng Heritage

Village. Based on related studies, many of these plant species had similar usage with other communities in the Philippines. However, there are plant species that are not previously documented as medically significant. *Vernonia cinerea* and *Oldenlandia herbacea* were identified by the respondents as an effective herbal medicine for mouth sore. *Basella alba* is utilized in a different way in the heritage village. The informants identified it as a treatment for urinary tract infection by eating its leaves.

RECOMMENDATIONS

It is suggested that future researchers who will conduct a similar undertaking should include in the documentation the exact dosage of medicinal plants in treating ailments efficiently. It is also highly recommended to conduct bioassay, toxicity test and phytochemical screening on *Vernonia cinerea*, *Oldenlandia herbacea* and *Basella alba*. These scientific procedures will validate the identified medicinal value of these plants species.

Generally, there is still a need to conduct more studies related to ethnomedicine, ethnobotany and the like, especially in other social groups in Kalinga. The Department of Science and Technology of the Philippines, through its “Tuklas Lunas Program”, promotes the execution of any related studies especially on the discovery of new drugs out of the readily available plant species in various locations in the country (BAYANIHAN, 2012). The study of indigenous knowledge of plants and health remedies could draw out promising herbal medicinal advancement, if wisely utilized and supported.

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