Ethnopharmacological Survey of Medicinal Plants Used in Treating Skin Diseases in the Province of Laguna, Philippines

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Abstract - *This study inventoried the medicinal plants used in the treatment of skin diseases. The ethnopharmacological information was obtained from 300 locals with experience and knowledge in using medicinal plants in treating their skin diseases in different areas in the province of Laguna, Philippines. Field survey was carried out from March to May 2018. The data was collected through interviews and evaluated using use value (UV) and informant consensus factor (ICF). The results indicated that 34 medicinal plants belonging to 26 families largely represented by Lamiaceae were reported in the study. Leaves are harvested and prepared through crushing or pounding and employed externally by direct application on the affected area. The dosages are based on the number of leaves and it is used from three to seven days. The knowledge of the respondents about medicinal plants came from the experience of others and they gave an excellent rating on the phytotherapy of the plants. The most important plant species according to UV was Cassia alata L. ICF values of this study indicated that there were high agreements in the use of plants in the treatment of jock itch, psoriasis and warts. The study revealed that the ethnomedicinal knowledge and practices are still remained in the province and it has a considerable number of plants to support the local health care and it contributes in the improvement of alternative systems of medicine. This finding gave initial information on the importance and used of such plants that can be tested for future use leading to the discoveries of new drugs in curing many skin diseases.*

Keywords*: Ethnopharmacological survey, medicinal plants, skin diseases.*

INTRODUCTION

Medicinal plants are indispensable in the health care system of every community [1]. They are being used for medicinal purposes [2] as source of active compounds [3] for treating various sickness and diseases [4] and making them ideal raw materials in the production of new drugs [5]. The use of medicinal plants is readily available and affordable [6] compared to synthetic drugs which are costly and gives more side effects [7]. For this reason, people are shifting on medicinal plants with fewer side effects [7] as a substitute in medicines that can be brought on different stores [6].

In the Philippines, medicinal plants have an integral part of their culture [8]. Their knowledge about the use of medicinal plants is being passed in every generation [9]. The country is bounded by medicinal plants [10] which are mostly being utilized for both health and trade [11]. These past few years, the curative effect of medicinal plants has been gaining popularity [11] because people are aware on the gentle strength brought by these natural remedies [12]. The expensive cost of pharmaceutical drugs also drives the scientific community to explore and test the full potentials of medicinal plants for curing diseases [10].

On-going recognition of medicinal plants as a principal source of drugs [13] has essential contributions in treatment and prevention of diseases [14]. The scientific study of medicinal plants which can be developed and utilized to create new drugs is called Ethnopharmacology [15]. The ethnopharmacological survey is one of the positive approaches to document the traditional knowledge about medicinal plants [16]. Ethnopharmacology is significant in natural and synthetic drug discovery and production [17].

For this study, it will focus on medicinal plants used in treating skin diseases. Skin is the largest of all the human body organs [18]. It serves as protection from heat, light, injury, and infection [13] yet it receives less care and attention [19]. Improper caring of the skin may lead to some diseases [19] caused by bacteria, fungi, virus, and parasites [13]. They can affect both infants and elders, either male or female [18] [20]. And it has a

psychological and social impact on every individual, causing lost in productivity and efficiency at work [19].

OBJECTIVES OF THE STUDY

The study aims to document the essential plants in the province of Laguna, the Philippines which are commonly used by the people of the community for the treatment of skin diseases. It examined the frequency, duration of used and dosage and manner of how plants are prepared and administered.

MATERIALS AND METHODS

Study Area

Laguna (14°10′N 121°20′E) is a 175,973-hectare province in the CALABARZON Region. The province composed of 6 component cities and 24 municipalities. Five municipalities were sampled according to class and these were Santa Cruz (1st class), Bay (2nd class), Pila (3rd class), Santa Maria (4th class) and Mabitac (5th class). The five municipalities were represented each by 3 poblacion barangays and 3 non-poblacion barangays.

Data Collection

Data collection was carried out from March to May 2018. Chain referral sampling was utilized in the study. Identification of informants began from the referral of the barangay leaders. These informants were the locals of the barangay who were known to be experienced and knowledgeable on the uses of medicinal plants in treating their skin diseases. Using a semi-structured questionnaire informants were asked a series of questions on their traditional health knowledge and practices: (1) medicinal plant they used in treating skin disease and plant parts used, (2) source of information, (3) reason for choosing medicinal plants, (4) preparation method, (5) methods of administration, (6) dosage and frequency of consumption, (7) duration of used, and (8) adverse effect they experience in using medicinal plants. Interviews were done in conjunction with a field visit accompanied by the informants to collect and take photographs of recorded medicinal plants. All specimens were identified down to species level based on taxonomic accounts available in published references and websites including stuartxchange.com and philippineplants.org.

Data Analyses

The study utilized frequency and percentage to summarize the data and quantitative analyses in calculating the use-value (UV) and informant consensus factor (ICF). The use-value (UV) was calculated using the formula: UV = Nur/Ni, where Nur is the number of plant use-reports in the study area and Ni is the total number of informants. Informant consensus factor (ICF) was calculated using the formula: ICF = (Nur-Nt)/(Nur-1), where Nur is the number of citations in the category of ailment and Nt is the number of plant species utilized by all informants for that particular plant-use category. ICF gave values ranging between 0 and 1, with '1' as the highest level of informant consent.

RESULTS AND DISCUSSION

Medicinal Plants Used in Treating Skin Diseases

Thirty-four medicinal plants belonging to 26 families were reported in the study (Table 1). The families most represented were Lamiaciae with four species, followed by Fabaceae with three species and Zingiberaceae, Malvaceae and Compositae with two species. Balinado and Chan [8] also reported that Lamiaceae was the most common plant family utilized by the people in District 7, Province of Cavite, Philippines.

Plant Part/s Used

Leaves (64.33%) recorded as the most utilized plant parts by the informants (Figure 1). The high utilization of leaves revealed that it contains a high amount of active ingredients [21]. Leaves are the main photosynthetic part of plants [22] which manufactures and store a wide range of chemical compounds that are useful for treating diseases [23]. Pereira et al. [24] pointed out that the leaves were the most useful part because of its availability. Furthermore, following the leaves were the bulb (15%), rhizome (12.66%), flower (5.33%), fruit (1.00 %), seed (0.33%) and vine (0.33%). However, there are plants that are utilized using at least two of its parts, this account to 1% of a total number of documented plants.

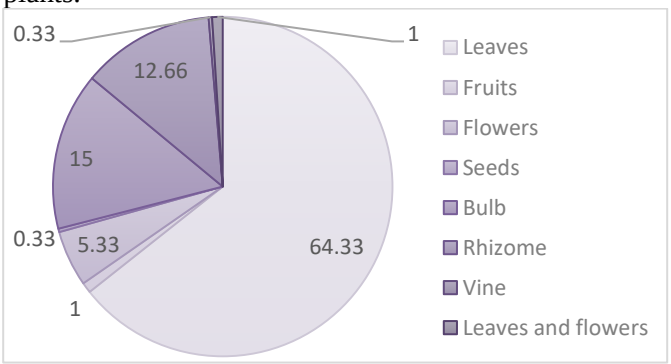

Fig. 1. Plant part/s used by the informants.

Table 1. Medicinal Plants Used in Treating Skin Diseases in the Province of Laguna, Philippines

Scientific Name	Common Name	Skin Disease	Plant Part Used	Preparation	Administration	Dosage	Frequency and Duration of Used
Cassia alata L.	Akapulko	Athlete's Foot	Leaves	Crush the leaves and get the extract	Apply the extract on the affected area	5-10 leaves	Twice a day, One week
		Tinea Versicolor, Ringworm and Jock Itch	Leaves	Crush the leaves or apply directly (some adds a pinch of salt)	Rubbing	3-5 leaves	Twice a day, five to seven days
Cassia fistula Linn.	Kanya Pistula	Skin Itchiness and Athlete's Foot	Leaves	Crush the leaves and get the extract	Apply the extract on affected area	6-10 leaves	Twice a day, three to seven days
Lycopersicum esculentum Mill.	Kamatis	Pimples	Fruit	Wash the tomato then chop it in half and squeeze it. Using cotton balls get the juice	Apply the juice on affected area	1 fruit	Once a day, two- four days
		Wound	Leaves	Crush the leaves and get the extract	Apply the extract on affected area	10 leaves	Once a day, five to seven days
Allium sativum L.	Bawang	Athlete's Foot, Tinea Versicolor and Ringworm	Bulb	Chop the cloves of garlic	Rubbing	2 cloves	When needed, three to five days
		Impetigo	Bulb	Crush the garlic and mix it with coconut oil or any oil.	Apply the mixture on affected area	1 whole garlic and 10 tablespoons of oil	Three times a day, five days
Curcuma longa Linn.	Luyang Dilaw	Scabies	Rhizome	Wash the turmeric, grind it and apply directly	Poultice	1 turmeric	Three times a day, three days
		Shingles and Impetigo	Rhizome	Crush and sauté on coconut oil	Apply the mixture of turmeric and coconut oil on the affected area	1 turmeric, and half teacup of coconut oil	Twice a day, one week
		Psoriasis	Rhizome	Grind the turmeric and cooked it on coconut oil or any oil	Apply the mixture on affected area	1 turmeric, oil (baby oil)	Three times a day, five days
		Boils	Rhizome	Grind the turmeric and mix it on one teacup of vinegar	Apply the mixture on affected area	1 turmeric, 1 teacup of vinegar	Once a day, three to five days
Basella alba Linn.	Alugbati	Wound	Leaves	Crush the leaves	Poultice	10 leaves	Twice a day, one week
Psidium guajava Linn.	Bayabas	Rashes	Leaves	Decoction	Bath	20-25 leaves	Once a day, one week

Table 1 (cont). Medicinal Plants Used in Treating Skin Diseases in the Province of Laguna, Philippines

Scientific Name	Common Name	Skin Disease	Plant Part Used	Preparation	Administration	Dosage	Frequency and Duration of Used
Plumeria acuminata W. T. Ait.	Kalachichi	Boils	Leaves and Flower	Crush, get the extract and mix it on coconut oil	Apply on affected area	10 leaves, 1 flower and six tablespoon of coconut oil	Twice a day, two to three days
Hibiscus rosa-sinesis Linn.	Gumamela	Rashes and Scabies	Leaves and Flower	Crush the leaves	Poultice	7 leaves and 1 flower	Twice a day, five to seven days
Gliricidia sepium (Jacq.) Steud.	Kakawate	Scabies	Leaves	Crush the leaves until extract came out	Poultice	5-10 leaves	Once a day, one week
Tagetes erecta L.	Amarillo	Boils	Leaves	Crush until extract came out	Apply the extract on the affected area	5 stalks of leaves, depends on what you need	Once a day, three to five days
		Boils	Leaves and Flowers	Decoction	Bath	5 stalk, 2 dipper of water	Twice a day, five days
Aloe vera (L.) Burm.f.	Sabila	Pimples	Leaves	Cut the leaves and get the gel-like extract	Apply the gel-like extract on the affected area	Cut leaves with a length same of the length of index finger	Once a day, five to seven days
Moringa oleifera Lam.	Malunggay	Wound	Leaves	Decoction	Bath	15-20 stalk, 5 glasses of water	Twice a day, one week
		Scabies	Fruits	Crush the fruits to get the extract	Apply the extract on affected area	4 young fruits	Three times a day, three days
Phyllanthus niruri Linn.	Sampa-sampalukan	Prickly Heat	Leaves	Crush the leaves to get the extract	Apply on the affected area	10 stalks	Once a day, three days
		Rashes	Leaves	Decoction	Bath	10-15 stalks, 1 dipper of water	Once a day, three to five days
Impatiens balsamina Linn.	Kamantigi	Athlete's Foot	Leaves and Flowers	Crush the leaves and flowers	Poultice	5 leaves and flowers	Once a day, one week
Blumea balsamifera (Linn.) DC.	Sambong	Boils	Leaves	Crush the leaves	Poultice	5 leaves	Twice a day, one week
Amaranthus spinosus Linn.	Uray	Scabies and Shingles	Leaves	Decoction	Bath	10-15 leaves and 8 glasses of water	Once a day, one week
Tinospora crispa (L.) Hook.f & Thomson	Makabuhay	Scabies	Leaves	Decoction	Bath	15 leaves, 2 dipper of water	Once a day, one week
		Rashes	Leaves	Crush the leaves then mix it with baby oil	Apply on affected area	10 leaves, baby oil	Three times a day, two weeks
Rauvolfia serpentine (L.) Benth. Ex Kurz	Serpentina	Allergy	Leaves	Decoction	Bath	4 leaves per 1 teacup of water	Three times a day, three days

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Table 1 (cont). Medicinal Plants Used in Treating Skin Diseases in the Province of Laguna, Philippines

Scientific Name	Common Name	Skin Disease	Plant Part Used	Preparation	Administration	Dosage	Frequency and Duration of Used
Coleus acuminatus Benth	Mayana	Shingles and Rashes	Leaves	Crush the leaves to get the extract	Apply on affected area	5 leaves	Twice a day, one week Once a day, five days
		Wound	Leaves	Decoction	Bath	20 leaves and 1 dipper of water	Once a day, two days
Premna odorata Blanco	Alagaw	Skin Itchiness and Rashes	Leaves	Decoction	Bath	20 leaves and 1 dipper of water	Once a day, five to seven days
Averrhoa bilimbi L.	Kamias	Chicken Fox	Leaves	Decoction	Bath	50 leaves, 2 dipper of water	Once a day, one to two weeks
Plectranthus monachorum (L.) Spreng.	Sulasi	Eczema	Leaves	Put the leaves on a glass jar and a six tablespoon of coconut oil then mash it.	Apply the mixture on affected area	20 leaves, 6 tablespoon of coconut oil	Three times a day, one week
Citrus x microcarpa Bunge	Kalamansi	Prickly Heat	Fruit	Cut the fruit and get the juice through squeezing	Apply on affected area	1 fruit	Three times a day, two days
Plectranthus amboinicus (Lour.) Spreng	Oregano	Boils	Leaves	Crush the leaves	Poultice	5 leaves	Once a day, seven to ten days
Cocos nucifera Linn.	Niyog	Scabies	Roots	Crush the roots, heat it with coconut oil	Apply on the affected area	Not Specified	Three times a day, one week
Andropogon citratus (DC.) Stapf	Tanglad	Scabies and Wound	Leaves	Decoction	Bath	Not Specified	Once a day, seven to ten days
Artemisia vulgaris Linn.	Damong Maria	Wound	Leaves	Crush the leaves to get the extract	Apply on the affected area	10 leaves	Twice a day, four to seven days
Carica papaya Linn.	Papaya	Scabies	Leaves	Crush the leaves	Poultice	10 leaves	Once a day, one week
Theobroma cacao L.	Kakaw	Eczema	Seeds	Pound and roast the seeds	Poultice	15 seeds	Once a day, ten days
		Allergy	Leaves	Decoction	Bath	10 leaves in 2 dippers of water	Once a day, one to two days
Piper betle	Ikmo	Rashes	Leaves	Crush the leaves to get the extracts	Rubbing	5 leaves	Once a day, two to three days
		Rashes	Leaves	Cut the middle part of the leaf and put it on the boils	Poultice	1 leaf	Twice a day, five days
Kalanchoe pinnata (Lam.) Pers.	Kataka-taka	Boils and Scabies	Leaves	Crush the leaves to get the extract	Poultice	3 leaves	Once a day, five days
Table 1 continuation							
Kaempferia galanga Linn.	Dusol	Boils	Leaves	Cut the middle part of the leaf	Poultice	1 leaf	Twice a day, one week
Anacardium occidentale Linn.	Kasuy	Warts	Seeds	Get the sap on the shell of the seed	Apply the sap on the affected area	Just a minimal amount	5 days

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Source of Knowledge and Reason of Choosing Medicinal Plants by the Informants

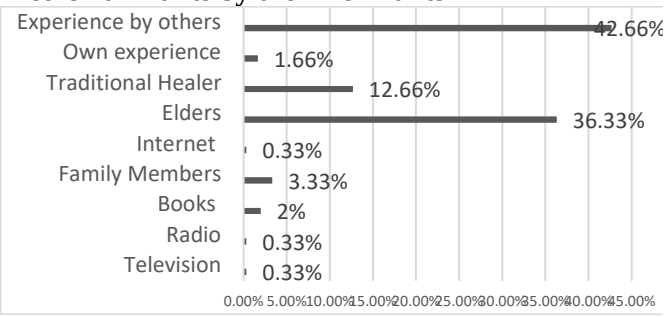

Figure 2. Source of knowledge of informants in using medicinal plants.

Most of the knowledge of informants in medicinal plants (Figure 2) were came from the experiences of others in using medicinal plants (42.66 %) followed by expertise came from the elders in the community (36.33%) and traditional healers (12.66 %). These findings show that the use of medicinal plants is being passed from one generation to the next generation [9].

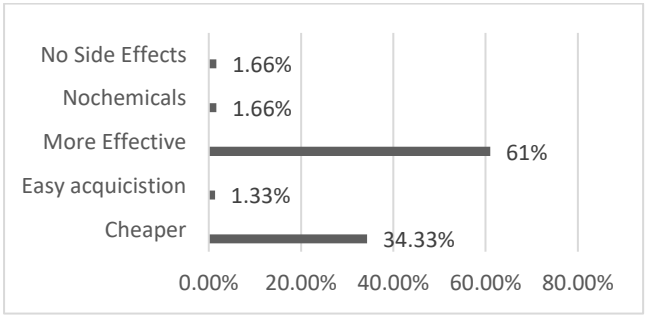

Figure 3. Reasons of the informants in choosing medicinal plants

Figure 3 show that the informants chose medicinal plants instead of commercial drugs because it is more effective (61%) followed by it is cheaper (34.33%), no synthetic chemicals (1.66%), no side effects (1.66%), and easy acquisition (1.33%). The informants claimed that the plants used in treating skin diseases have a faster healing duration. On the study of Dhama et al. [25], they concluded that herbs and traditional medicine is safe as well as economical. Traditional medicine has fewer side effects as compared to commercial drugs [7].

Rating of the Informants in the Phytotherapy of Medicinal Plants

Most of the informants gave an excellent rating (61%) on the medicinal plants they have used in curing their skin diseases followed by good (34.66%), average (3.33%), and variable (1.2%). Various reasons can affect the given ratings of the informants such as the inconsistency of the healing time and the approximation of dosage on the use of plants.

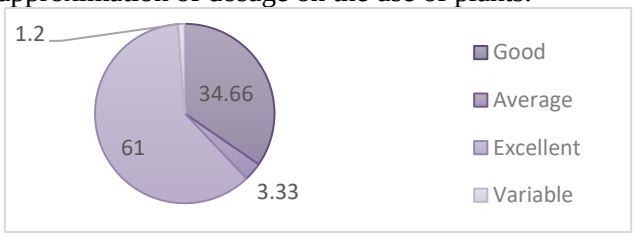

Figure 4. Phytotherapy of medicinal plants

Methods of Preparation and Mode of Administration

The most common method of preparing plants (Table 1) was through crushing or pounding (45.65%) followed by decoction (26.09%), consumed directly or as raw (8.7%), grinding (6.5%), a combination of crushing and heating (6.5%), squeezing (4.34%) and mashing (2.17%). Choosing the method of crushing or pounding and decoction could be attributed to the greater likelihood of extracting pure active compounds of the plants [4].

In terms of mode of administration medicinal plants were administered externally. External administration includes applying the extract, poultices, rubbing, and for bathing.

Dosage, Frequency, and Duration of use of Medicinal Plants

The most stated dosages were based on the number of leaves used by the informants (Table 1). The informants used dipper, teacup, glass, and casserole in measuring the amount of water, oil, vinegar, and salt.

In terms of frequency of used, most of the informants applied the prepared medicinal plants once a day (45.65%), followed by twice a day (32.6%), three times a day (19.57%), and when needed (2.17%).

The duration of used of medicinal plants was not specific defended on the severity of the skin disease but most of the disease healed in three to seven days.

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Use Value (UV)

Use-value (UV) was calculated to determine the commonness of used of each plant in the study areas. Based on the findings, *Cassia alata* L. (0.21), *Allium sativum* L. (0.15), *Curcuma longa* Linn. (0.13) *Psidium guajava* Linn. (0.13) and *Hibiscus rosa-sinesis* Linn. (0.06) have the highest UV (Table 2). This indicated that these plants are widely utilized and have great

importance [8]. Plant species with high UVs were critical because of harvesting pressure and it needs more attention on conservation [26]. However, it was reported that in the study area, most of the medicinal plants are cultivated which could not threaten their growth and numbers.

Informant Consensus Factor (ICF)

ICF values (Table 3) ranged from as low as 0.30 to as high as 1.00, with a mean value of 0.79. The highest ICF values was for jock itch, psoriasis and warts (1.00) followed by tinea versicolor (0.97), ringworm (0.96), impetigo (0.94), and wound and athlete's foot (0.90). Plants with high ICF values are associated with a small number of medicinal plants with high use-reports for a particular skin disease [27]. An ICF with a value of 1.00 was calculated exclusively for skin diseases with only one reported plant species used. However, plants with low ICF values indicated that there is no or little sharing of information between or among informants or their disagreement on the species to be employed in the treatment of skin diseases [8].

Table 2. Use value (UV) of medicinal plants used in treating skin diseases

Plant Species	Common Name	No. of Plant Use Report	Use Value (UV)
Cassia alata L.	Akapulko	64	0.21
Cassia fistula Linn.	Kanya Pistula	2	0. 01
Lycopersicum esculentum Mill.	Kamatis	2	0.01
Allium sativum L.	Bawang	45	0.15
Curcuma longa Linn.	Luyang Dilaw	39	0.13
Basella alba Linn.	Alugbati	2	0.01
Psidium guajava Linn.	Bayabas	40	0.13
Plumeria acuminate W. T. Ait.	Kalachuchi	2	0.01
Hibiscus rosa-sinesis Linn.	Gumamela	18	0.06
Gliricidia sepium (Jacq.) Steud.	Kakawate	13	0.04
Tagetes putula L.	Amarillo	2	0.01
Aloe vera (L.) Burm.f.	Sabila	2	0.01
Moringa oleifera Lam.	Malunggay	6	0.02
Phyllanthus niruri Linn.	Sampa-sampalukan	1	0.003
Impetiensbalsamina Linn.	Kamantigi	1	0.003
Blumea balsamifera (Linn.) DC.	Sambong	3	0.01
Amaranthus spinosus Linn.	Uray	1	0.003
Tinospora crispa (L.)	Makabuhay	13	0.04
Rauvolfia serpentine (L.)	Serpentina	1	0.003
Coleus acuminatus Benth	Mayana	7	0.02
Premna odorata Blanco	Alagaw	6	0.02
Averrhoa bilimbi L.	Kamias	6	0.02
Plectranthus monachorum (L.) Spreng	Sulasi	1	0.003
Citrus x microcarpa Bunge	Kalamansi	4	0.01
Plectranthus amboinicus (Lour.) Spreng.	Oregano	4	0.01
Cocos nucifera Linn.	Niyog	1	0.003
Andropogon citratus (DC.) Stapf	Tanglad	3	0.01
Artemisia vulgaris Linn.	Damong Maria	1	0.003
Carica papaya Linn.	Papaya	1	0.003
Theobroma cacao L.	Kakaw	2	0.01
Piper betle	Ikmo	2	0.01
Kalonchoe pinnata (Lam.) Pers.	Katataka	3	0.01
Kaempferia galangal Linn.	Dusol	1	0.003
Anacardium occidentale Linn.	Kasoy	1	0.003

Table 3. Informant consensus factor (ICF) of medicinal plants used in treating skin diseases

Skin Disease	No. of Use Citations	No. of Species	Informant Consensus Factor (ICF)
Athlete's Foot	31	4	0.90
Tinea Versicolor	45	2	0.97
Ringworm	27	2	0.96
Jock Itch	1	1	1.00
Boils	32	7	0.81
Wound	62	7	0.90
Skin Itchiness	17	3	0.86
Pimples	3	2	0.50
Scabies	26	10	0.64
Shingles	4	3	0.33
Psoriasis	2	1	1.00
Rashes	20	7	0.68
Allergy	5	2	0.75
Prickly Heat	3	2	0.50
Eczema	3	2	0.50
Warts	2	1	1.00
Impetigo	17	2	0.94

CONCLUSION AND RECOMMENDATION

The study revealed that there are about 32 species of medicinal plants surveyed in five municipalities in the province of Laguna, Philippines and grouped into 26 families. The study documented that these plants used with medicinal values are prepared using leaves, bulbs, rhizomes, flowers and fruits through pounding, decoction, grinding and squeezing. They applied the plants externally by applying the extracts, poultices, rubbing and bathing. Their dosage are based on the number of the leaves and frequently used at least once a day for about three to seven days. Their knowledge about medicinal plants came from the experience of others and they gave an excellent rating on the phytotherapy of the plants. Furthermore, these plants are used to treat various skin diseases such as jock itch, psoriasis and warts. Ethnomedicinal knowledge and practices are still remained in the province and it has a considerable number of plants with medicinal values. This findings gave initial information on the importance and used of these plants to support the local health care. It also contributes in the improvement of alternative systems of medicine. This study therefore, provides wide range of information on the plants that can be tested for future use. Any claims documented in this study need clinical studies for prospective new drugs in curing many skin diseases. However, one of the major weaknesses of this study is limited only on the five municipalities in the province therefore it is recommended to include all the municipalities including cities in the future studies.

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