



MEDICINAL PLANTS USED BY TRADITIONAL PRACTITIONERS IN TWO SELECTED VILLAGES OF RAMON MAGSAYSAY, ZAMBOANGA DEL SUR

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ABSTRACT

Traditional healers such as “*manghihilot*” or “healers/shaman” have been an important source of traditional knowledge particularly on the uses of medicinal plants. This study documented the use of various plants by *manghihilots* from the two villages of Ramon Magsaysay, Zamboanga del Sur. The ethnobotanical research was conducted through purposive sampling where target respondents were asked a series of questions regarding the medicinal plants they utilized. Forty-two (42) medicinal plants were recorded which corresponded to 29 families in which Asteraceae Family was the most represented. Most of the documented plant species were cultivated by the respondents. Leaves were the most utilized plant part for the treatment of ailments, and were commonly prepared through decoction. The identified plant species were used to treat several ailments such as gastrointestinal ailments, skin conditions, body pains, high blood, and urinary ailments. Remedies were mostly administered orally, and the rest were applied topically. The respondents believed that plants are nature’s gift which aid in the treatment of diseases. The documented medicinal plants have been of cosmopolitan distribution and can be good prospects for future pharmacological research.

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Introduction

Nature has endowed us a great diversity of medically useful plants. The use of herbal remedies has coexisted with man and been considered as the oldest form of health care known to humankind. The trend of using plants both in a traditional and modern way is still popular and practiced worldwide for the prevention and treatment of certain illnesses. For centuries, people have turned to natural remedies to cure common ailments shifting the trend from synthetic to herbal medicines. The medicinal properties of plants have caught the attention of many researchers worldwide which have led to scientific investigations and discoveries of novel compounds [1]. Plants have not only been useful as a remedy for different diseases that affect humans and animals, but also a good starting point for drug development [2]. Natural products from plants have provided the boundless potential for pharmaceutical drugs because of the unequalled availability and diversity of chemical constituents [3].

In the Philippines, traditional healing practice involves a combination of mysticism, superstition, and religion. Even in this modern time where information and advance science have greatly progressed, traditional medicine is still popular and largely practiced especially in rural areas. Philippine’s common traditional medicine practitioners have included *hilot* or *manghihilot* which employed various alternative medical techniques like herbal medication, chiropractic, and acupressure that have promoted health and healing [4]. Their approach has involved the use of natural/organic medications such as medicinal plants that are now scientifically proven to cure certain types of ailments. *Manghihilots* have been popularly known to have an immense and practical botanical knowledge which involves different plants to counter medical conditions [5]. Many of them have no formal training; rather, their skills and ways are passed down from generation to generation. While modern medicines are highly recommended, many Filipinos remain faithful in the traditional way of healing through a *manghihilot*. Several ethnobotanical surveys have been conducted in many parts of the Philippines, but most of these studies were focused on ethnic groups and indigenous people [6-8]. Rural folks and traditional healers or practitioners should also be considered and can be an important source of information about the use of alternative medicine [9].

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Ethnobotanical research not only documents traditional knowledge of medicinal plants but also provides a scientific basis to identify plants with medicinal properties, especially for finding new drugs that can cure certain types of ailments. Hence, this paper aimed to document medicinal plants of importance to the traditional healers (manghihilot) in Ramon Magsaysay, Zamboanga del Sur.

Materials and Methods

The ethnobotanical study was conducted in two selected villages of Ramon Magsaysay, Zamboanga del Sur. The respondents were chosen through the purposive sampling method in which the target respondents were *manghihilot/mananabang*. The respondents were asked a series of questions related to the medicinal plants they knew, their effectiveness, and uses. Data on the ethnobotanical knowledge were collected through a series of informal interviews, semi-structured questionnaire, and discussions among traditional practitioners. The data obtained included medicinal plants with their local name, parts of the plants being used, the illness or disease they would cure and details about the mode of preparation and application. The plants were shown through a field walk interview with the respondents. The ethnobotanical information and field description of the medicinal plant were recorded in a field notebook. Photographs of the plants' habits and their different parts were also taken. A voucher specimen of unfamiliar plants was collected and preserved for future reference. The medicinal plant species mentioned by the informants were taxonomically identified using available published literature, taxonomic keys, Pictorial keys, and Phytoimages website.

In this study, Relative Frequency was used as a statistical tool in getting frequency distribution of the plant part used, mode of preparation and route of administration. Where Relative frequency (RF) was the rate of recurrence.

$$\text{Relative Frequency (RF)} = \frac{\text{Frequency}}{\text{Total Frequency}} \times 100\%$$

Results and Discussion

The interviews and discussions among the six respondents (*mananabang /manghihilot*) from the two villages of Ramon Magsaysay recorded a total of 42 medicinal plant species to belong to 23 families (Figure 1). The most represented families were Asteraceae (6 species), Euphorbiaceae (4 species) and Malvaceae (4 species). Almost all the recorded medicinal plant species were of cosmopolitan distribution and were commonly found and encountered in the community. Asteraceae showed the highest frequency of medicinal species. This can be because Asteraceae has been one of the largest and most widespread families of flowering plants that have colonized a wide variety of habitats. Aside from its ornamental and economic importance, the members of the family Asteraceae have been extensively used for medical purposes. Phytochemical investigations of this family have shown that many of its constituents are highly bioactive [10]. Several of its species have been noted for its anti-inflammatory properties which are attributed to their active components such as flavonoids, sterols, triterpenoids glycosides and sesquiterpenes [11]. Species under this family have also been popular and commonly used in traditional medicine such as the herb *Artemisia vulgaris* which is used by the respondents as a remedy for nausea and as a menstrual regulator [12, 13]. In another part of the Philippines, *A. vulgaris* is used as a treatment for cough and fever [6], abdominal pain and body pains [14]. Another representative species under family Asteraceae is *Blumea balsamifera* which has been used as a remedy for cough. Similar studies also pointed out the use of *B. balsamifera* for cough and other ailments such as high blood pressure, headache, Renal stones, fever and rheumatism [15-17].

Other noteworthy families were Euphorbiaceae, Malvaceae, Poaceae and Fabaceae which consisted of species that have been known for having bioactive properties. Medicinally important plants from Euphorbiaceae possessed secondary metabolites such as phenolics, steroids, and alkaloids detected through phytochemical screenings [18]. The extracts from Euphorbiaceae species like *Euphorbia hirta*, *Acalypha hispida*, and *Jatropha gossypifolia* were also found to contain antibacterial, anti-inflammatory and antioxidant Properties [19-21]. Members of the family Malvaceae that were included in the list of this study have also been studied for their therapeutic properties which were shown in a study conducted by Purnomo et al. [22] in which *Urena lobata*, a species under this family, exhibited anti-diabetic potential through inhibition of dipeptidyl peptidase IV activity. Furthermore, an assessment conducted by Adewale et al. [23] on the antioxidant, antibacterial and antifungal activities of *U. lobata* revealed that the presence of flavonoids along with other compounds in the extract was responsible for its biological activity. *Sida acuta* is another familiar species of Malvaceae which has been recorded in other ethnobotanical studies as a remedy for painful muscles [24], boils [25], wounds, headache, cold, flu, dysentery, and stomach pain [26, 27]. Also, Several phytochemical screenings resulted in the isolation of various compounds from *S. acuta* involving alkaloids and steroidal compounds which are responsible for its antiplasmodial, antibacterial and antioxidant activities [28].

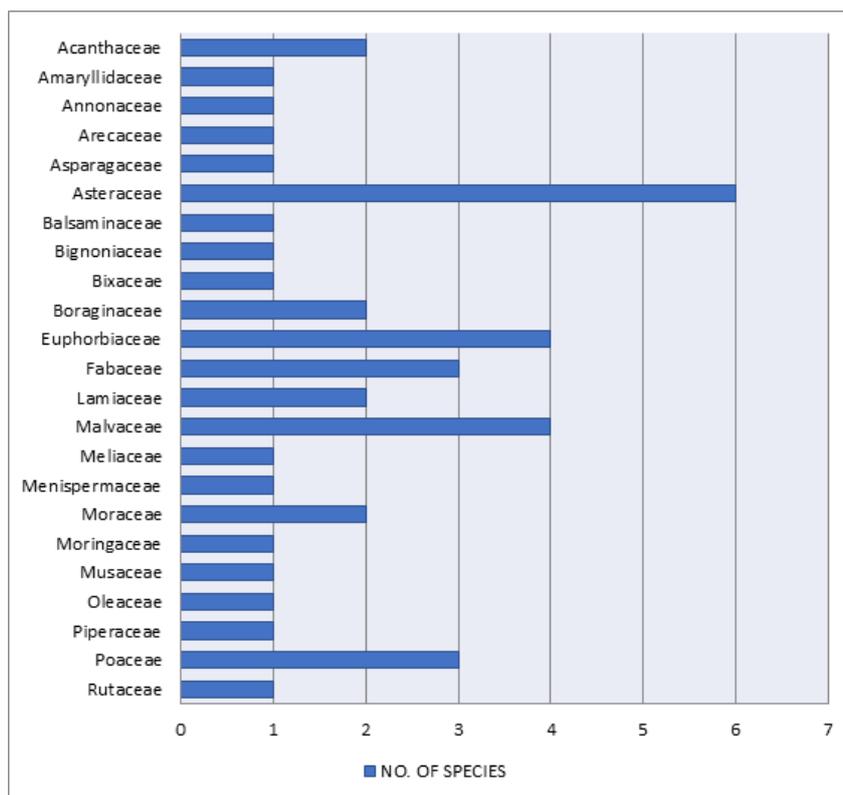


Figure 1. Frequency Distribution of medicinal plant species by family

The respondents cultivated 69% of the plant species while 31% of the recorded medicinal plants harvested in the wild which were often found growing on roadsides, thickets, forest, and grassland (Figure 2). This finding was in agreement with previous studies by Mesfin et al. [29] and Ahmad et al. [30]. Domesticated medicinal plants like *Cordyline fruticosa*, *Impatiens balsamina*, and *Jasminum sambac* were grown in house gardens for their ornamental value. Other commonly cultivated species were also consumed as food, and used in culinary dishes such as *Annona muricata*, *Bixa orellana*, *Theobroma cacao*, *Moringa oleifera*, *Musa acuminata* × *balbisiana*, *Cymbopogon citratus*, and *Citrus micrantha*. *Urena lobata*, *Mimosa pudica*, *Senna tea*, *Synedrella nodiflora* and *Clinopodium umbrosum* species that were collected in the wild and have been considered as invasive weeds which were found growing abundantly in most agricultural areas.

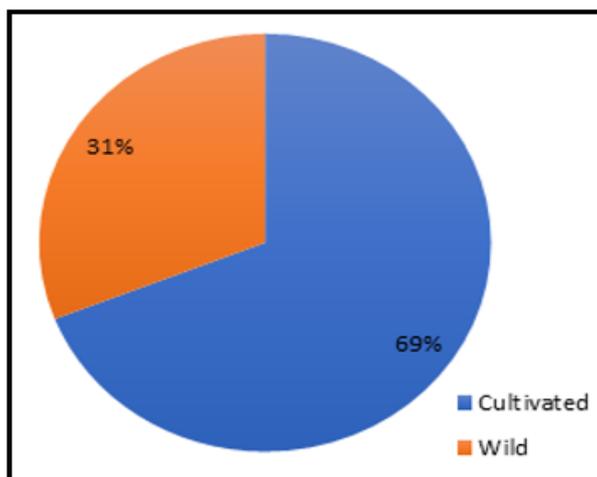


Figure 2. Sources of Medicinal Plants

Data analysis showed that the most utilized part of the plant was the leaves constituting 49 % of the relative frequency, followed by stem (13%), roots (11%) and whole plant (11 %) (Figure 3). Other parts such as fruit, seeds, flower, bark, frond, and mucilage were also mentioned to be used by the respondents. Leaves were often available and more accessible to collect than the other parts of the plant, no wonder that most of the herbal preparation frequently utilized leaves as the primary ingredient for most herbal preparation. Also, the utilization of leaves had a minimal impact on the survival and continuity of medicinally important plants. However, the use of other parts such as stem, roots and the whole plant itself highly affected

its survival and ecological aspects [13]. Several ethnobotanical surveys also reported similar findings on the high frequency of plant leaf usage [7, 31, 32]. Leaves have been the main and vital source of energy production for the plants and have evolved to produce chemical compounds as protection against competitors, predators, or pathogens [33]. Secondary metabolites found in most of the plants' parts like alkaloids, flavonoids, terpenoids, and phenols possessed therapeutic properties that have been considered for their health benefits and potential as medicine or drug [34, 35]. These compounds have also been active components of most herbal preparation in high dosage [36].

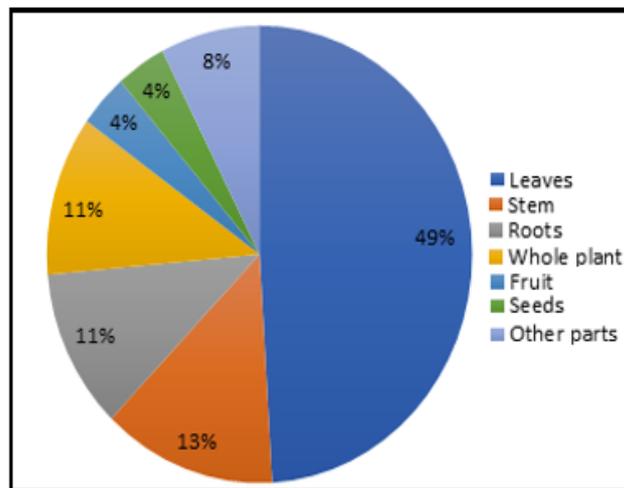


Figure 3. Plant parts utilized for the remedies of the ailments

The recorded medicinal plants were used in treating a variety of human ailments ranging from wounds to cancer. According to the respondents, these medicinal plants have been nature's gift which can heal several diseases that affect human and animals. The illness treated by these plant species reflected the prevalence of those conditions that have been commonly encountered by traditional practitioners. These included diseases which are gastro-intestinally related (18 species), skin infection (10 species), fever and body pain (8 species), urinary ailments (6 species) and respiratory illness (4 species) (Figure 4).

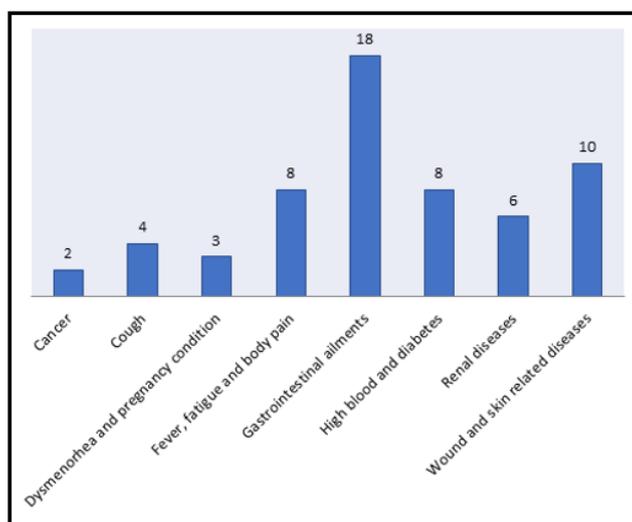


Figure 4. Ailments treated by medicinal plants

Several of the listed plant species have been used specifically for certain ailments. For gastrointestinal disorder such as stomachache, nausea, flatulence, and gastritis, most of the respondents cited *Andrographis paniculata*, *Pseudelephantopus spicatus* Juss., *Piper betle* Linn. and *Jatropha gossypifolia* Linn. For high blood pressure, *Tinospora cordifolia*, *Cynodon dactylon*, and *Cymbopogon citratus* have been frequently used species. For skin ailments, *Impatiens balsamina*, *Euphorbia neriifolia*, *Gliricidia sepium*, *Urena lobata*, and *Moringa oleifera* were used. For the relief of cough, the most cited plants were *Origanum vulgare*, *Blumea balsamifera*, and *Cordia dichotoma*. Other plant species utilized by the respondents in more than one ailment was *Crescentia cujete* also called the "miracle fruit" has been used as a remedy for various ailments such as high blood pressure, kidney stones, diabetes, and even cancer by utilizing the fruits or the leaves (Table 1).

The mode of preparation and route of administration of medicinal plants varied based on the type of ailments to be treated. The decoction was observed to be the most applied method constituting 32.52% of the plant preparation (Figure 5). Through this method, fresh plant parts were boiled for a longer period to soften the harder woody material and release their active constituents; thus, adding to its efficacy. This result corresponded to other ethnobotanical studies in the Philippines [8, 14, 16, 37]. Another usual method was through poultice where plant materials, preferably fresh, ground, crush or pound were applied directly to the affected area. The respondents also mentioned another method of preparing the remedy which involved heating or roasting the plant part over flame and infusion. Plant leaves were commonly heated in a process called "halob". In infusion, plant materials were allowed to steep into a solvent in most cases warm water just like preparing a tea. Also, some plant parts (seeds or mucilages) were taken raw, and used directly depending on the type of ailment being cured or treated. The majority of the plant preparation involved only single species of plant.

Table 1. Medicinal Plants used by *Manghihilots* in Brgy. Bobongan and Brgy. Wakat, Ramon Magsaysay, Zamboanga del Sur

Family	Local Name	Scientific Name	Part/s Used	Ailments Treated	Mode of Preparation	Route of Administration
Acanthaceae	Chinese plant	<i>Andrographis paniculata</i> (Burm.f.) Wall. Nees.	Leaves	Stomach-ache /Nausea	Infusion	Taken orally
	Viola	<i>Barleria cristata</i> Linn.	Leaves	Bloody Vomit	Decoction	Taken orally
			Stem			Taken orally
Amaryllidaceae	Ganda	<i>Allium tuberosum</i> Rottler ex Sprengel	Whole plant	Stomach-ache	Poultice	Topical application
Annonaceae	Sabana	<i>Annona muricata</i> Linn.	Leaves	UTI	Decoction	Taken orally
Arecaceae	Buli	<i>Corypha elata</i> Roxb.	Fron	Relapse	Decoction	Taken orally
Asteraceae	Kanding-kanding	<i>Cyanthillium cinereum</i> (L.) H. Rob.	Leaves	Sprain	Poultice	Topical application
	Busi-busi	<i>Synedrella nodiflora</i> (L.) Gaertn.	Whole plant	Wound	Poultice	Topical application
	Dila-dila sa iro	<i>Pseudelephantopus spicatus</i> Juss.	Roots	Flatulence	Decoction	Taken orally
				Stomach-ache	Decoction	Taken orally
	Herbas	<i>Artemisia vulgaris</i> Linn.	Leaves	Nausea	Infusion	Taken orally
	Chinese miracle	<i>Gynura procumbens</i> (Lour.) Merr.	Leaves	Sore Eyes	Poultice	Topical application
				Nausea	Decoction	Taken orally
	Gabon	<i>Blumea balsamifera</i> (Linn.) DC	Leaves	Cough	Infusion	Taken orally
Asparagaceae	Kila	<i>Cordyline fruticosa</i> (L.) A. Chev.	Leaves	Strain	Heated over flame	Topical application
Balsaminaceae	Kalamantigue	<i>Impatiens balsamina</i> Linn.	Leaves	Eczema	Poultice	Topical application
Boraginaceae	Elepante2x (puti ang bulak)	<i>Heliotropium indicum</i> Linn.	Roots	Relapse, Headache	Decoction	Taken orally
	Anonang	<i>Cordia dichotoma</i> G. Forst.	Roots	Cough	Decoction	Taken orally
Bignoniaceae	Miracle tree	<i>Crescentia cujete</i> Linn.	Fruit	High Blood	Decoction	Taken orally
				Kidney		
				Cancer		
			Leaves	Diabetes	Decoction	Taken orally
				Cancer		
Bixaceae	Atsuete	<i>Bixa orellana</i> Linn.	Leaves	Dysuria	Applied directly	Topical application
Euphorbiaceae	Tahebo	<i>Acalypha hispida</i> Burm.f.	Leaves	Flatulence	Infusion	Taken orally
			Stem	Arthritis		Taken orally
				Gastritis		
	Tuba-tuba	<i>Jatropha gossypifolia</i> Linn.	Leaves	Stomach-ache	Heated over	Topical

					flame	application
	Tawa-tawa	<i>Euphorbia hirta</i> Linn.	Whole plant	Fever	Decoction	Taken orally
	Soro-soro	<i>Euphorbia neriifolia</i> Linn.	Stem	Athlete's Foot	Poultice	Topical application
Fabaceae	Mani-mani	<i>Senna tora</i> (L.) Roxb	Leaves	For Pregnant Women	Heated over flame	Topical application
	Hibi-hibi	<i>Mimosa pudica</i> Linn.	Whole plant	High Blood	Decoction	Taken orally
			Roots	Dysmenorrhea	Decoction	Taken orally
	Madre de cacao	<i>Gliricidia sepium</i> (Jacq.) Kunth ex Walp	Stem	Skin Itching	Decoction	Topical application
Lamiaceae	Baho-baho	<i>Clinopodium umbrosum</i> (M. Bieb.) K. Koch	Leaves	Stomach-ache	Decoction	Taken orally
	Kalabo	<i>Origanum vulgare</i> Linn.	Leaves	Cough	Decoction	Taken orally
Malvaceae	Dalupang	<i>Urena lobata</i> Linn.	Leaves	Allergy	Poultice	Topical application
	Cacao	<i>Theobroma cacao</i> Linn.	Young Fruits	Boils, Skin Inflammation	Poultice	Topical application
			Seeds	Gastritis	Heated over flame	Taken orally
	Marbas	<i>Abutilon indicum</i> (Link) Sweet	Leaves	Wound	Poultice	Topical application
	Eskubang mayawis	<i>Sida acuta</i> Burm.f.	Leaves	Stomach-ache	Heated over flame	Topical application
			Roots	Dysmenorrhea	Decoction	Taken orally
Meliaceae	Mahogany	<i>Swietenia macrophylla</i> King	Seeds	Kidney Stones	Used directly	Taken orally
				Lowers Blood Sugar		
Menispermaceae	Panyawan	<i>Tinospora cordifolia</i> (Thunb.) Miers	Stem	High Blood	Decoction	Taken orally
Moraceae	Lagnob	<i>Ficus septica</i> Burm.f.	Young leaves	Gastritis	Infusion	Taken orally
			Roots	Relapse	Decoction	Taken orally
	Balite	<i>Ficus benjamina</i> Linn.	Bark	Sprain	Poultice	Topical application
Moringaceae	Kamunngay	<i>Moringa oleifera</i> Lam.	Leaves	Boils, Skin Inflammation	Poultice	Topical application
Musaceae	Saging (tundan)	<i>Musa acuminata</i> × <i>balbisiana</i>	Mucilage	Canker Sore	Applied directly	Topical application
Oleaceae	Sampaguita	<i>Jasminum sambac</i> (L.) Aiton	Leaves	Cough	Decoction	Taken orally
			Flower			Taken orally
Piperaceae	Buyo	<i>Piper betel</i> Linn.	Leaves	Stomachache	Heated over flame	Topical application
Poaceae	Bermuda	<i>Cynodon dactylon</i> (L.) Pers.	Whole plant	High Blood	Decoction	Taken orally
	Tanglad	<i>Cymbopogon citratus</i> (DC.) Stapf.	Leaves	High Blood	Decoction	Taken orally
	Tubo-tubo	<i>Saccharum officinarum rubrum</i>	Stem	Kidney Stones	Decoction	Taken orally
				UTI	Decoction	Taken orally
Rutaceae	Byasong	<i>Citrus micrantha</i> Wester	Leaves	Heartburn	Infusion	Taken orally

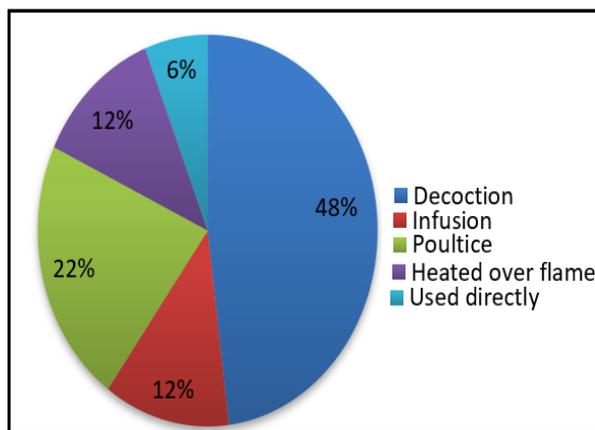


Figure 5. Mode of preparation of the remedies

Internal application has been the most common route of administration of the remedies. Plants that were prepared through decoction and infusion were usually taken internally. About 63% of the medications were administered orally since most of the ailments were related to the internal organs such as gastrointestinal ailments, respiratory diseases, renal diseases high blood and diabetes. These remedies have been taken until relieved from the symptoms of a certain disease or condition. The rest of the treatment was prepared usually by poultice, and applied topically or directly on the affected part of the body (Figure 6).

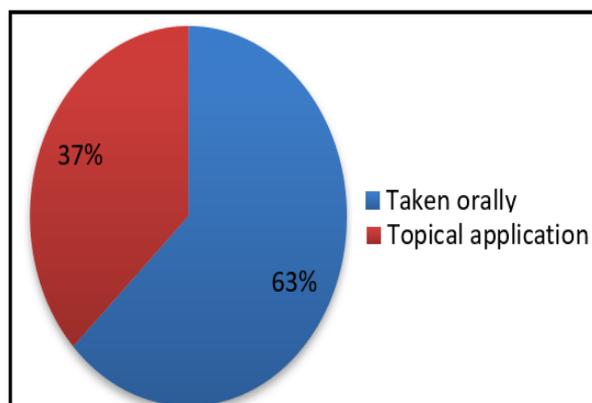


Figure 6. Route of administration of the treatment

The results of this study have shown the value of medicinal plants in the treatment of health problems in poor communities which mostly depend on traditional healers for the cure [1-40]. These plants can be potential sources of molecules with many therapeutic potentials [41] and can be included in the pool of resources for the identification of novel drugs not just focusing on libraries of synthetic compounds for drug discovery. With the decline of new drugs reaching the market, studies on the ethnopharmacological potentials of plants used by community healers would be a good avenue in discovering new and safe natural products for the treatment of many health problems.

Conclusion

Traditional medicine involving plants remains popular in the health care system among traditional healers in Ramon Magsaysay. The number of documented medicinal plants (42 species) and their uses exhibited the profundity of the local indigenous knowledge on medicinal plants and their applications. Additionally, the plants listed have been of cosmopolitan distribution which meant that most of these plants have been available in most parts of the country especially in Mindanao. This study has added more to the existing discoveries of relevant plant species that can be used in the treatment of different diseases. This could open an avenue for future pharmacological research works or serve as reference, especially for future quantitative ethnobotanical investigations.

References

1. Rana, P.K., Kumar, P., Singhal, V.K., Rana, J.C. 2014. "Uses of Local Plant Biodiversity among the Tribal Communities of Pangi Valley of District Chamba in Cold Desert Himalaya, India," *The Scientific World Journal*, 2014:1-15. <https://doi.org/10.1155/2014/753289>.

2. Ifeoma, O., Oluwakanyinsola S. (2013). Screening of Herbal Medicines for Potential Toxicities, from New Insights into Toxicity and Drug Testing, Dr. Sivakumar Gowder (Ed.), InTech, DOI: 10.5772/54493. <http://www.intechopen.com/books/new-insights-into-toxicity-and-drug-testing/screening-of-herbal-medicines-for-potential-toxicities>.
3. Sasidharan, S., Chen, Y.Saravanan, D., Sundram, K.M., Yoga Latha, L. 2011. Extraction, Isolation, and Characterization of Bioactive Compounds from Plants' Extracts. *African J Traditional Complement Alternative Medicine*, 8(1): 1–10.
4. Harrison, F. (2006). Filipino Hilot Massage. <http://www.myhomespa.ph/filipinohilotmassage.html>.
5. Fajardo, B.S., Pansacol, M.A.V. (2013). The Science of the Ancient Filipino Healing Arts. n/a.192pp.
6. Gruyal, G.A., del Roasario, R., Palmes, N.D. 2014. Ethnomedicinal plants used by residents in Northern Surigao del Sur, Philippines. *Nat Prod Chem Res*, 2:140. doi: 10.4172/2329-6836.1000140
7. Olowa, L.F., Torres, M.A.J., Aranico, E.C., Demayo, C.G. (2012). Medicinal Plants Used by the Higaonon Tribe of Rogongon, Iligan City, Mindanao, Philippines. *Advances in Environmental Biology*, 6(4):1442-1449.
8. Pizon J.R.L., Nuñez O.M., Uy, M.M., Senarath, W.T.P.S.K. 2016. Ethnobotany of Medicinal Plants Used by the Subanen Tribe of Lapuyan, Zamboanga del Sur. *Bull. Env. Pharmacol. Life Sci.*, 5(5):53-67.
9. Prigge, V., Langenberger, G., Martin, K. (2005). Ethnobotanical Survey among Farmers in Leyte, Philippines, and in Comparison with indigenous Filipino Plant Lore. Conference on International Agricultural Research for Development. Deutscher Tropentag. <http://www.tropentag.de/2005/abstracts/full/587.pdf>.
10. Achika, J., Arthur D.I., Igelige G., Adedayo A. 2014. A Review on the Phytoconstituents and Related Medicinal Properties of Plants in the Asteraceae Family. *IOSR Journal of Applied Chemistry* 7(8):01-08.
11. Yasukawa, K. (2013). Bioactive Components From Asteraceae Flowers. *Environmental Research Journal*, 7(3):193-225.
12. Amiri, M.S., Joharchi, M.R. (2013). Ethnobotanical investigation of traditional medicinal plants commercialized in the markets of Mashhad, Iran. *Avicenna Journal of Phytomedicine*, 3(3):254-271.
13. Minh, V.V., Yen, N.T.K., Thoa, P.T.K. 2014. Medicinal plants used by the Hre community in the Ba to the district of central Vietnam. *Journal of Medicinal Plants Studies*. 2(3):64-71.
14. Ong, H.G., Kim, Y.D. 2014. Quantitative ethnobotanical study of the medicinal plants used by the Ati Negrito indigenous group in Guimaras Island, Philippines. *Journal of Ethnopharmacology*, 157: 228–242.
15. Abe R., Ohtani K. (2013). An ethnobotanical study of medicinal plants and traditional therapies on Batan Island, the Philippines. *Journal of Ethnopharmacology*, 145 (2): 554–565.
16. Pinarok, N.A., de Guzman, G.Q., Alejandro, G.J.D. (2015). Inventory and Ethnobotanical Study of Medicinal Plants at Samar Island Natural Park, Philippines. *Int. J. Pure App. Biosci.*, 3(4):101-108.
17. Balinado, L.O., Chan, M.A. 2017. An Ethnomedicinal Study of Plants and Traditional Health Care Practices in District 7, Cavite, Philippines. *International Conference on Chemical, Agricultural, Biological and Medical Sciences (CABMS-17)*. Jan. 23-24, 2017 Manila (Philippines). pp. 131-143.
18. Kothale, K.V., Rothe, S.P., Pawade, P.N. (2011). Phytochemical screening of some Euphorbiaceae members. *Journal of Phytology.*, 3(12): 60-62.
19. Okoh, S.O., Iweriebor, B.C., Okoh, O.O., Nwodo, U.U., Okoh, A.I. (2016). “Antibacterial and Antioxidant Properties of the Leaves and Stem Essential Oils of *Jatropha gossypifolia* L.,” *BioMed Research International*, 12:1-9.
20. Sharma, N., Samarakoon, K.W., Gyawali, R., Park, Y., Lee, S.D., Oh, S.J., Lee, T., Jeong, D.K (2014). Evaluation of the Antioxidant, Anti-Inflammatory, and Anticancer Activities of *Euphorbia hirta* Ethanolic Extract. *Molecules*, 19 (9),14567-14581.
21. Siraj, M.A., Shilpi, J.A., Hossain, M.G., Uddin, S.J., Islam, M.K., Jahan, I.A., Hossain, H. (2016). Anti-Inflammatory and Antioxidant Activity of *Acalypha hispida* Leaf and Analysis of its Major Bioactive Polyphenols by HPLC. *Advanced Pharmaceutical Bulletin*, 6(2): 275–283.
22. Purnomo, Y., Soeatmadji, D.W., Sumitro, S., Widodo, M.A. 2016. Incretin effect of *Urena lobata* leaves extract on the structure and function of rats islet β -cells. *Journal of Traditional and Complementary Medicine*, 24;7(3):301-306. doi: 10.1016/j.jtcme.2016.10.001.
23. Adewale, A.O., David A.A., Abiodun, O.O., Craig O.A. 2007). Studies on antimicrobial, antioxidant and phytochemical analysis of *Urena lobata*. Leaves extract. *Journal of Physical and Natural Sciences*, 1(2): 1-9.
24. Balangcod, T.D., Balangcod, A.K.D. (2011). Ethnomedical knowledge of plants and healthcare practices among the Kalanguya tribe in Tinoc, Ifugao, Luzon, Philippines. *Indian Journal Of Traditional Knowledge*. 10(2): 227-238.
25. Aniana, S.O., Usman, S.S., Ayodele, S.M. (2016). Ethnobotanical documentation of some plants among Igala people of Kogi State. *The International Journal of Engineering and Science (IJES)*, 5(4):33-42.
26. Bodele, S.K., Shahare, N.H. (2015). Ethnobotanical study of medicinal plants in the forest region of ChimurTahsil, Chandrapur District. *Asian Journal of Plant Science and Research*, 5(12):24-28
27. Muthu, C., Ayyanar, M., Raja, N., Ignacimuthu, S. (2006). Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu, India. *Journal of Ethnobiology and Ethnomedicine*, 2:43.

28. Karou, S.D., Nadembega, W.M.C., Ilboudo, D.P., Ouermi D., Gbeassor M., Souza C.D., Simpore, J. (2007). *Sida acuta* Burm. F.: A Medicinal Plant with Numerous Potencies. *African Journal of Biotechnology*, 6(25): 2953-2959.
29. Mesfin, K., Tekle, G. Tesfay, T. (2013). Ethnobotanical Study of Traditional Medicinal Plants Used by Indigenous People of Gemad District, Northern Ethiopia. *Journal of Medicinal Plants Studies*, 1(4):32-37.
30. Ahmad, M., Sultana S., Fazl-i-Hadi, S., ben Hadda, T., Rashid, S., Zafar, M., Khan, M.A., Khan, M.P.Z., Yaseen, G. (2014). An Ethnobotanical study of Medicinal Plants in the high mountainous region of Chail valley (District Swat-Pakistan). *Journal of Ethnobiology and Ethnomedicine*, 10:36.
31. Abaquita, M.L.P., Buot, I.E., 2013. " Ethnobotany of Medically Important Plants in Mt. Manunggal and Its Vicinity". 20pages. https://nanopdf.com/download/ethnobotany-of-medically-important-plants-in-mt-manunggal-and-its_pdf
32. Tantiado, R.G. 2012. Survey on Ethnopharmacology of Medicinal Plants in Iloilo, Philippines. *International Journal of Bio-Science and Bio-Technology*, 4(4):11-22.
33. Molyneux, R.J., Lee, S.T., Gardner, D.R., Panter, K.E., James, L.F. (2007). "Phytochemicals: the good, the bad and the ugly?". *Phytochemistry*. 68(22–24): 2973–85.
34. Savithramma, M., LingaRao, M. Suhrulatha, D. (2011). Screening of Medicinal Plants for Secondary Metabolites. *Middle-East Journal of Scientific Research*, 8 (3): 579-584.
35. Wink, M. (2015). Modes of Action of Herbal Medicines and Plant Secondary Metabolites. *Medicines*, 2 (3):251-286.
36. Okoewale, E.E., Omefezi, J.U. 2001. Some herbal preparations among the people of Isoko Clan of Delta State, Nigeria. *J. Appl. Sc.* 4: 2350- 2371.
37. Arquion, R.D., Galanida, C.C., Villamor, B., Aguilar, H.T. 2015. Ethnobotanical study of indigenous plants used by local people of Agusan del Sur, Philippines. *Asia Pacific Higher Education Research Journal*, 2(2): 1-11.
38. Das, T., Mishra, S.B., Saha, D., Agarwal, S. (2012). Ethnobotanical Survey of Medicinal Plants Used by Ethnic and Rural People in Eastern Sikkim Himalayan Region. *African Journal of Basic & Applied Sciences*, 4(1):16-20.
39. Hong L., Guo Z., Huang K., Wei S., Liu B., Meng S., Long, C. 2015. Ethnobotanical study on medicinal plants used by Maonan people in China. *J Ethnobiol Ethnomed.*,11:32. doi: 10.1186/s13002-015-0019-1.
40. Van, M.V., Yen, N.T.K., Thoa, P.T.K. (2014). Medicinal plants used by the Hre community in the Ba to the district of central Vietnam. *Journal of Medicinal Plants Studies*, 2(3): 64-71.
41. Atanasov, A.G., Waltenberger, B., Pferschy-Wenzig, E.M., Linder T., Wawroscha, C., Uhrine, P., Temml V., Wanga, L., Schwaigerb, S., Heissa, E.H., Rollingera, J.M., Schusterf, D., Breusse, J.M., Bochkovg, V., Mihovilovicd, M.D., Koppa, B., Bauerc, R. Dirscha, V.M., Stuppnerb, H. 2015. Discovery and resupply of pharmacologically active plant-derived natural products: A review. *Biotechnol Adv.*, 33(8): 1582–1614.