Knowledge, Attitude, Perception and Level of Awareness on the Used of Herbal Plants among MSU-IIT CED Students: Basis for STEM Lesson Plan

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Abstract

Chemically synthesized medication development and mass production have undergone a transformation during the past century. Despite this, many communities in developing countries still rely on traditional medicine and herbal medicines for their primary care. The purpose of this study was to identify the medicinal plants used by college students and to assess young people's knowledge, attitudes, views, and level of awareness regarding the use of herbal plants as medicine. The study employed a descriptive quantitative and qualitative design. The study made use of a questionnaire that had been adopted and modified. 80 specifically chosen students from the MSU-IIT College of Education's Department of Science and Mathematics Education. The majority of responses were female, unmarried, and Cebuano, with an average age of 20 to 21. Furthermore, Barangay Tibanga was where the bulk of the respondents called home. The respondents knew about the use of herbal medicine and had generally favorable opinions and perceptions about it. Additionally, it was shown that the leaf was the most frequently utilized component in herbal plant preparation while decoction was the most frequently used method. Malunggay, Calamansi, and Guava were the most frequently used herbal plants, according to the ethnobotanical study, while Watsisaw was the least frequently used herbal plant noted by the students. In addition, respondents had noted more therapeutic plants utilized in their neighborhood. Thus, it can be said that the younger generations living in Iligan City are still aware of the presence and applications of herbal plants in their neighborhood. Implementing a STEM lesson will also contribute to the preservation and appreciation of herbal plants and their long history of use.

Keywords: Game based learning, digital game, typhoon preparedness

1. Introduction

One of the Southeast Asian nations that uses herbal plants as alternative treatments for common diseases is the Philippines. Spanish missionaries gathered, researched, and documented Philippine medicinal plants and herbs that Filipino traditional healers, or herbolarios, had been prescribing from the precolonial era during the seventeenth and nineteenth centuries (Planta, 2017). This is the reason why many Filipinos are still patronizing the use of herbal plants as it is rooted to the country's rich history.

The babaylans were the first healers in the tribal groups of the ancient Philippines. Folk doctors started to appear, and as Philippine history progressed, real medical professionals were trained and sent out into the field. Currently, medical professionals educated in Western medicine, such as Filipino nurses, doctors, physical therapists, pharmacists, and surgeons, coexist with a still-vibrant group of traditional healers who have not received formal training in scientific medicine and frequently treat residents of the Philippines specially in poorer regions (Dayrit, Santos-Ocampo, and de la Cruz, 2002). The need for medicinal plants comes with the demand for an immediate cure for specific diseases and discomfort. This is more evident in remote areas which lack medical support and far from the urban community. Moreover, going to clinics and hospital require money for travel, appointment, and medicine. The "parahilot" in the Philippines greatly helps the locals by giving alternative solutions through medicinal plants to aid diseases and discomfort.

Over the past century, chemically synthesized drug development and mass production have undergone a revolution. Despite this, vast populations in underdeveloped nations continue to rely on herbal remedies and traditional doctors for their primary care. Africa, India, and China are among the nations that heavily rely on traditional medicine to assist satisfy their healthcare demands (World Health Organization, 2005). In the Philippines, the country was classified by WHO where traditional medicine has remained a vital element of the health care system despite having a well-established health care system (Birhane et al. 2011).

The use of traditional medicine has significantly increased in industrialized nations. About 38% of adults and 12% of children in the US used traditional medicine in 2007 (Ernst, Schmidt, and Wider 2005; Barnes, Bloom, and Nahin 2008). In a study conducted by the National Center for Complementary and Alternative Medicine, herbal therapy and the use of natural products other than vitamins and minerals were shown to be the most often utilized alternative treatments (Barnes, Bloom, and Nahin 2008). In addition, 40% of the participants had much more faith in traditional Chinese medicine (TCM) than in Western medicine according to a survey done in Hong Kong in 2003 (Chan et al. 2003). Furthermore, 12.8% reported taking at least one herbal supplement in a survey of 21,923 adults in the US (Harrison et al. 2004). 42% reported using dietary or nutritional supplements at the time of the interview, with multivitamins and minerals being the most popular supplement, followed by saw palmetto, flax, garlic, and Ginkgo (Qato et al. 2008).

Worldwide, the use of herbal medicine is rising as one complementary and alternative medicine component. Little is known regarding the causes of and elements contributing to its use. Knowledge and awareness of indigenous herbal plants are essential for human wellbeing, particularly for the present and future generations. In order to determine the knowledge, attitude, perspective, and level of awareness among college students at the College of Education, MSU-IIT, with regard to the usage of herbal plants, this study will be conducted. This also includes the assessment of growing of plants for medicine found in Iligan City, Lanao del Norte. This study is also a basis for developing a STEM lesson plan for students to learn more about herbal plants and its application in treating deceases.

2. Significance of the Study

This research study will be a big effort to encourage young people to utilize herbal remedies in a responsible manner. By doing this, it will also be practiced throughout to preserve the traditional knowledge regarding the use of herbal plants as medicine. In order to gauge how far young people's interests can go, evaluations of their knowledge, attitudes, perception, and degree of awareness will also be made. The study's findings will also offer advice to the relevant authorities on how to develop strategies for passing down traditional knowledge across generations. As a result, this will also assist teachers and healthcare professionals in effectively disseminating knowledge about the medicinal herbs.

3. Methodology

A small number of studies have examined the knowledge, attitudes, perception and level of awareness relating to the used of herbal plants as medicine among the young generations.

The goal of this study is to assess the college student's knowledge, attitudes, perceptions and level of awareness on the use of herbal plants as medicine which is found in their community particularly in Iligan City, Lanao del Norte.

3.1 Participants

The respondents of the study will be 80 purposively chosen College of Education students in the Department of Science and Mathematics Education enrolled during the 2nd semester of the 2022-2023 from Mindanao State University-Iligan Institute of Technology, Lanao del Norte. High ethical standards were put into consideration when the students were invited to participate in this survey. The researcher of this study obtained permission and consent from the students for voluntary participation. The participants are aware that they can withdraw their participation from the study anytime. In addition, the confidentiality of their responses was also emphasized in the consent form prior to participation.

3.2 Research Method

To determine the respondents' knowledge, attitudes, perspectives, and level of awareness regarding native herbal plants, the study will use a descriptive survey approach. This will also assess growing of plants for medicine found in Iligan City, Lanao del Norte. Furthermore, this will also gain information on what are the most common herbal medicines identified by the respondents. The researcher will use questionnaires to gain the data necessary for the success of the study. This will be divided into five parts; Part 1 will be the demographic profile of the respondents, part 2 will deal with their knowledge on the use of herbal medicine, part 3 will deal with their awareness on the presences of herbal medicine in their area, part 4 will be their perception on the general use of the herbs and part 5 will determine their medicinal plant knowledge of the respondents which includes their identified medicinal plants.The collected data will be analyzed using frequency, percentage, ranking, average weighted mean, and rating scale.

3.3 Distribution of Questions and Research Instruments

In the study, questionnaires will be utilized to collect the necessary data. The survey used in the study will be modeled after the questionnaire used by Hadji Abas and Salic (2016) on their study on knowledge, awareness, and attitude of Meranao students of Lanao del Sur toward indigenous herbal plants in order to ascertain respondents' level of awareness regarding the use of herbal plants as medicine. The perceptions and level of awareness of respondents on the usage of herbal plants as medicine will also be modeled after Zaidi et al.'s cross-sectional survey from Western Saudi Arabia in 2022 on public knowledge, attitudes, and practices toward herbal medicines. The last part of the study

asked the participants to name any local herbal plants they knew about. Respondents are asked to provide the local name of the herbal plant, its preparation process, the plant portion that can be used as medicine, the herbal plant's intended application, the type of person it can cure, and the mode of administration.

3.4 Sampling Technique

Purposive sampling will be used to identify the responders. Students from the College of Education will therefore serve as the study's responders.

3.5 Data Gathering Procedure

Through an interview with the chosen respondents, the respondents will be informed and invited to complete the open-ended and close-ended questionnaires.

3.6 Data analysis

Mean of rating in each items was analyzed. And, then the mean of rating score will be interpreted into 6 cateagories. These included not aware (mean of rating score between 1.00 – 1.74), slightly aware (mean of rating score between 1.75 – 2.49), aware (mean of rating score between 2.50 – 3.24), and highly aware (mean of rating score between 3.25 – 4.00).

4. Results and Discussion

4.1 Demographic Profile of the Respondents

Table 1 shows the demographic profile of the respondents. A total of 80college students from the Department of Science and Mathematics Education, College of Education, Mindanao State University – Iligan Institute of Technology. The respondents of the study who answered the questionnaire are residing at Iligan City, Lanao del Norte. Out of these, 13.75% (11) were males and 86.25% were females. When it comes to civil status, 97.5% (78) were single and only 2.5% (2) were married. The respondents' age was between 18-25 years old and most of them were 20-21 years old. Complete details of the respondents' demographic profile are shown in Table 1.

Table 1. Demographic profile of the respondents.

Social Group	Variable	Frequency	Percentage
Age	18-19	5	6.25
	20-21	61	76.25
	22-23	14	17.5
Sex	Male	11	13.75
	Female	69	86.25
Civil status	Single	78	97.5
	Married	2	2.5

Barangay Address of the Respondents

Figure 1 discloses the barangay address of the respondents of the study. As shown on the figure, barangay Tibanga has the highest number of respondents as it goes to the fact that the campus where the study was conducted is located at near barangay Tibanga. This

was followed by barangay San Miguel the nearest barangay in MSU-IIT. Complete details of the respondents' barangay address profile are shown in Figure 1.

Address

Figure 1. Barangay Address of the Respondents of the Study

Year Level of the Respondents

Figure 2 reveals the year level of the respondents. As shown in the graph, there are 62 participants who belong to 2nd year level. A total of 37 students that are 3rd year and only 1 in 4th year level.
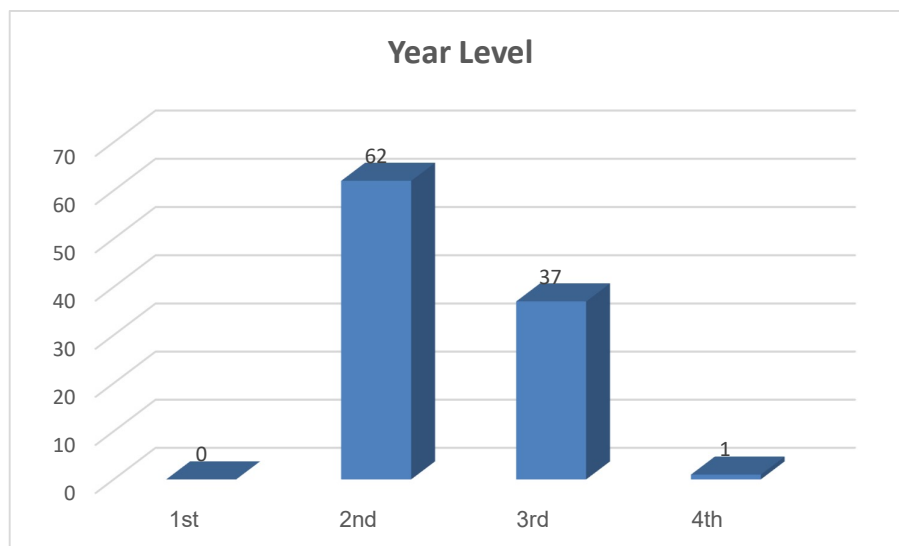
Year Level

Figure 2. Respondents' Year Level

Ethnicity of the Respondents

The data in figure 3 shows the respondents ethnicity. It can be observed that 73.75% (59) were coming from Cebuano tribe. This is followed by 23.75% (19) from the Meranao ethnicity. Furthermore, there are only 2.5% (2) coming from Higaonon. It can be observed

from the data the the majority of respondents' were Cebuano followed by Meranao. Hence it goes to show that MSU-IIT is mainly resided by mixed ethnicity from different places.
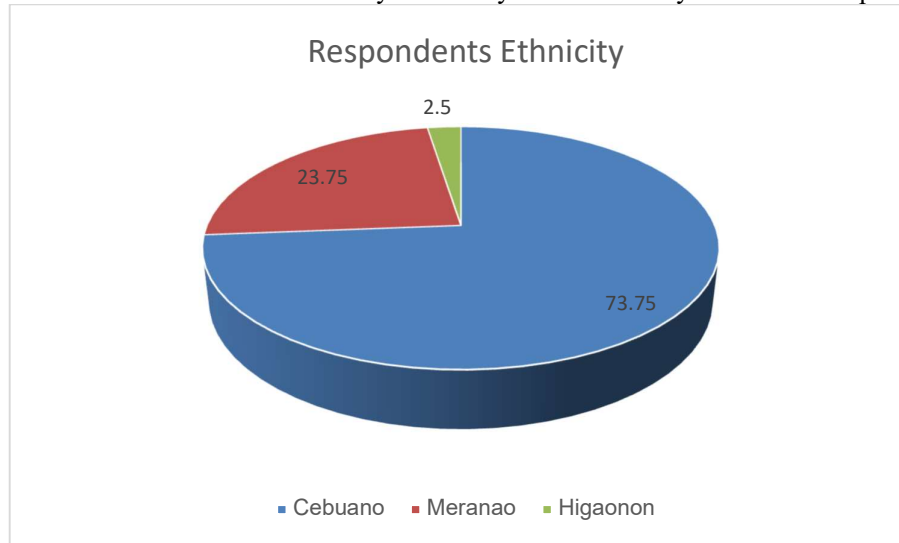

Figure 3. Respondents' Ethnicity

Table 2 shows the respondents' level of awareness on the use of herbal plants. As the table indicates, respondents generally said highly aware on the following statements: i) I know that there are herbal plants in our area; ii) I know that some plants can cure ailments; iii) I know that not all plants are herbal plants; iv) I know some herbal plants and the ailments it cure; v) I know some herbalist in our area. On the other hand, the respondents of the study said that they are aware of the following statements: i) I know what herbal plants are; and ii) I know how to prepare herbal plants to cure ailments. However, they are slightly aware on the process of preparing herbal plants to cure ailments.

Table 2. Respondents' Level of Awareness about Herbal Plants

STATEMENT	Mean	Description
I know what herbal plants are.	3.14	Aware
I know that there are herbal plants in our area.	3.46	Highly Aware
I know that some plants can cure ailments.	3.76	Highly Aware
I know that not all plants are herbal plants.	3.62	Highly Aware
I know some herbal plants and the ailments it cure.	3.36	Highly Aware
I know what are those parts of herbal plants are used to cure ailments.	2.2	Slightly Aware
I know how to prepare herbal plants to cure ailments.	2.76	Aware
I know some herbalist in our area.	3.4	Highly Aware
Mean	**3.2125**	Aware

Table 3 reveals the respondents' perception towards herbal plants. As the data shows, the respondent's generally have moderately positive perception towards herbal plants as indicated in the grand weighted mean of 3.06. The below indicates that respondents' claim

to be highly positive on the following statements: i) Herbal plants have value in treating diseases; ii) Herbal plants are less expensive than modern/synthetic medicine; iii) Herbal plants are used as influence by our inherited culture; and iv) Herbal plants are made from plant source. Consequently, four statements were rated moderately positive by the respondents. This includes the following: i) Herbal plants are more accessible than medical drugs; ii) Herbal plants makes people dispense with the use of modern/synthetic drugs; iii) Herbal plants is safer as medicine than modern drugs; and iv) Herbal plants are preferred because of few side effects. On the other hand, the study revealed that the respondents are slightly positive when it comes to the notion that herbal plant can cure or prevent all diseases.

Table 3. Perceptions towards the Use of Herbal Plants.

STATEMENT	Mean	Verbal Interpretation
1. Herbal plants have value in treating diseases.	3.48	Highly Positive
2. Herbal plants are less expensive than modern/synthetic medicine.	3.7	Highly Positive
3. Herbal plants are more accessible than medical drugs.	3.16	Moderately Positive
4. Herbal plants are used as influence by our inherited culture.	3.42	Highly Positive
5. Herbal plants makes people dispense with the use of modern/synthetic drugs.	2.96	Moderately Positive
6. Herbal plants is safer as medicine than modern drugs.	3.06	Moderately Positive
7. Herbal plants can prevent all diseases.	2.14	Slightly Positive
8. Herbal plants can cure all diseases.	2.12	Slightly Positive
9. Herbal plants are preferred because of few side effects.	2.98	Moderately Positive
10. Herbal plants are made from plant source.	3.6	Highly Positive
Mean	**3.06**	Moderately Positive

Attitude towards Herbal Plants
In the table 4, the respondents' attitudes towards herbal plants are shown. Generally, the respondents of this study have a moderately positive attitude towards the use of herbal plants as indicate the general weighted mean of 3.09. Furthermore, respondents' claimed to be highly positive on the following statements: i) Herbal plants can be used as medicine to help maintain and promote health; ii) Herbal plants can be used as medicine to treat illness; iii) Herbal plants can be used as medicine as they are safe; and iv) Herbal plants can be used as medicine as they come from natural ingredients. However, the rest of the statements have a verbal interpretation of moderately positive as shows in the table 4.

Table 4 Attitudes on the Use of Herbal Plants as Medicine

STATEMENT	Mean	Verbal Interpretation
1. Herbal plants can be used as medicine to help maintain and promote health.	3.36	Highly Positive
2. Herbal plants can be used as medicine to treat illness.	3.34	Highly Positive
3. Herbal plants can be used as medicine as they are safe.	3.3	Highly Positive
4. Herbal plants can be used as medicine as they come from natural ingredients.	3.56	Highly Positive
5. Herbal plants can be used as medicine better than synthetic drugs.	2.8	Moderately Positive
6. Herbal plants can be used as medicine for kids as they are not dangerous.	2.98	Moderately Positive
7. I prefer herbal plants as medicine as they are cheap.	2.7	Moderately Positive
8. Herbal plants can be used as medicine as they are readily available.	3.1	Moderately Positive
9. Herbal plants are better use as medicine without adverse effect.	2.9	Moderately Positive
10. Herbal plants can be taken as medicine with synthetic drugs.	2.92	Moderately Positive
Mean	**3.096**	Moderately Positive

Common Herbal Plants known by the Respondents

Table 5 shows the common herbal plants identified by the respondents. There were a total of 42 common herbal plants listed which was gathered from the herbal users in MSU-IIT College of Education, Iligan City. Out of 42 common herbal plants, 80 respondents indicated that Malunggay, Calamansi and Guava is the most commonly know herbal plants by the respondents that ranked number 1 in the survey. Lagundi ranked 2, Luy-a ranked 3, Ahos ranked 4 and Papaya ranked 5. This was then followed by Onion ranked 6, Kalabo ranked 7, Gabon and Tanglad ranked 8, Mango ranked 9 and finally Lubi as ranked 10. Table 5 completely indicates the ranking of these 42 commonly know herbal plants.

Table 5: Common Herbal Plants Known by the Respondents

Family	Scientific Name	Common Name	Local Name	Frequency	Rank
Moringaceae	*Moringa oleifera*	malunggay	Kalamunggay	80	1
Rutaceae	*Citrofortunellamicrocarpa*	kalamansi	Lemonsito	80	1
Myrtaceae	*Psidium guajava*	guava	Bayabas	80	1
Verbenaceae	*Vitex negundo*	lagundi	Lagundi	56	2
Zingiberaceae	*Zingiber officinale*	luya	luy-a	49	3
Amaryllidaceae	*Allium sativum*	bawang	Ahos	41	4
Caricaeae	*Carica papaya*	papaya	Kapayas	37	5
Amaryllidaceae	*Allium cepa*	onion	Bombay	35	6
Lamiaceae	*Origanum vulgare*	Oregano	Kalabo	34	7

Table 5 (Cont')

Family	Scientific Name	Common Name	Local Name	Frequency	Rank
Asteraceae	*Blumea balsamifera*	sambung	Gabon	33	8
Poaceae	*Cymbropogoncitratus*	lemon grass	Tanglad	33	8
Anacardiaceae	*Mangifera indica*	*Mango*	*Mangga*	31	9
Arecaceae	*Cocos nucifera*	niyog	Lubi	29	10
Lauraceae	*Persea Americana*	Avocado	Abokado	28	11
Lamiaceae	*Coleus blumei*	mayana	Mayana	28	11
Convolvulaceae	*Ipomea batatas*	camote tops	talbos ng kamote	26	12
Musaceae	*Musa paradisiaca L.*	saging	sagingsab'a	25	13
Solanaceae	*Capsicum annuum*	Chili pepper	Sili	24	14
Lythraceae	*Lagerstoemia speciosa*	banaba	Banaba	22	15
Lythraceae	*Heliotropium indicum*	Hikau-hikauan	Elepante	21	16
Bromeliaceae	*Ananas comosus Linn*	*pinya/pineapple*	*Pinya*	21	16
Sapotaceae	*Chryspohyllumcainito*	Star apple/ caimito	Kaimito	19	17
Euphorbiaceae	*Jatropha curcas Linn*	Physic nut	tuba-tuba	17	18
Asteraceae	*Artemisia vulgaris*	Hilbas/damong maria	Hilbas	16	19
Oxalidaceae	*Averrhoa caramboia*	Balimbing/ star fruit	Balimbing	14	20
Piperaceae	*Piper beetle L.*	*betel leaf*	*Buyo*	14	20
Muntigiaceae	*Muntingiacalabura*	aratiles	Mansanitas	14	20
Asteraceae/Compositae	*Emilia sonchifolia L.*	*dadayem*	*Pisawpisaw*	13	21
Poaceae	*Imperata cylindrica*	cogon	Kogon	12	22
Bixaceae	*Bixa orellana*	atsuete	Atsuete	10	23
Poaceae	*Eleusine indica L.*	paragis	bila-bila	9	24
Amaryllidaceae	*Allium odorum*	Kutsay/garlic chives	Ganda	9	24
Moraceae	*Ficus microcarpa*	lagnob	Lagnob	9	24
Euphorbiaceae	*Euphobiahirta*	tawa-tawa	Mangagaw	8	25
Aracaceae	*Coryphaelata*	Buri/buli	Buli	7	26
Labiatae	*Lantana camara L.*	Koronitas	baho-baho	6	27
Cyperaceae	*Kyllinga intermedia*	pugo-pugo	Busikad	5	28
Apiaceae	*Centella asiatica L.*	Gotu kola	gotu kola	3	29
Asteraceae	*Elephantopus carolinensis*	Dila-dila	dila-dilasairo	2	30
Lamiaceae	*Orthosiphon aristatus*	Cat's Whiskers, Java Tea	Watsisaw	0	31

Other Herbal Plants Known by the Respondents

Aside from the 42 commonly know herbal plants mentioned in the table 5, some of the respondents mentioned other herbal plants as indicated in Table 6. According to the survey, Blue Tarnate ranked 1, Dulaw ranked 2, Katangantangan and Sinaw-sinaw ranked 3, Rosemary and Kataka-take ranked 4, and 3 herbal plants ranked 5th which includes Sirguelas, Gemilina and Talan. The result only shows that college students in MSU-IIT College of Education are knowledgeable of other types of herbal plants.

Table 6 Other Herbal Plants Identified by the Respondents

Family	Scientific Name	Common Name	Local Name	Frequency	Rank
Fabaceae	*Clitoriaternatea L.*	Butterfly pea flowe	Blue Ternate	5	1
Zingiberaceae	*Curcuma longa Lin*	LuyangDilaw	Dulaw	4	2
Euphorbiaceae spurge; euphorbes	*Euphorbia*	TubangBakod	Katangantangan	3	3
Piperaceae	*Peperomia pellucid*	Shiny bush, pepper elder,	Sinaw-sinaw	3	3
Lamiaceae	*Salvia rosmarinus*	Romero	Rosemary	2	4
Crassulaceae	*Kalanchoe pinnata (Lam.) Pers.*	Kataka-taka	Kataka-taka	2	4
Anacardiaceae	*Spondias purpurea*	Sineguelas	Sirguelas	1	5
Lamiaceae	*Gmelina arborea*	Gmelina	Gemilina	1	5
Fabaceae	*Litseagardneri*	Talan	Talan	1	5

Parts Used

Figure 4 shows the most common plant part used in consuming herbal plants. There were 7 different part parts used to prepare the medicinal plant remedies as presented in Figure 4. The most frequently used plant parts were the leaf (87.50%), followed by flower (55%), root (47.50%), stem (45%), fruit (42.50%), seed (35%) and whole plant (30%).
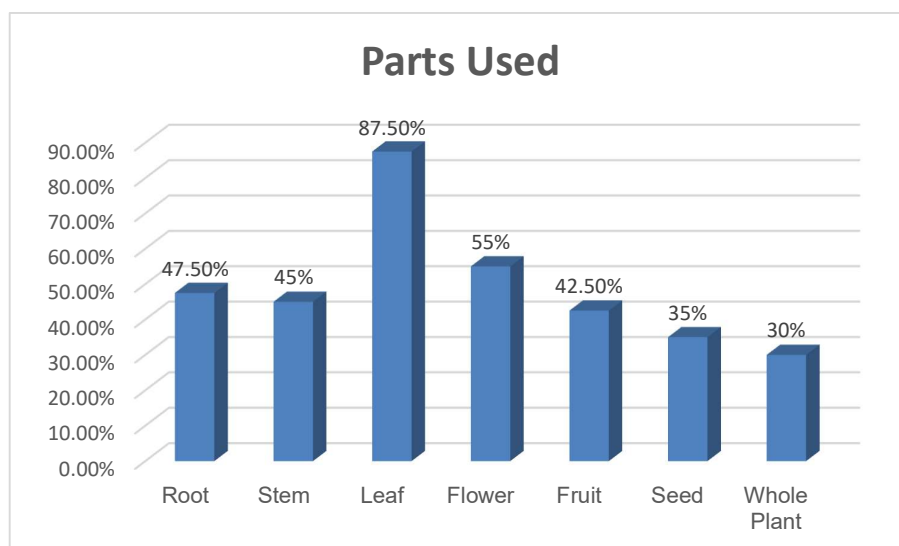
Figure 4. Parts Used

Methods of Preparation of the Herbal Plants

In the figure 5, the data presents the method of preparation of the herbal plants as indicated by the respondents in the survey. There were six different preparations for the medicinal plants. The figure below reveals that 37% knows how to prepare herbal plants by decoction which was used for drinking, washing, bathing, and body steaming. This was followed by juice (18%), powder (16%), crushed (14%) poultice (11%), and natural form (4%). This study reveals that decoction is the process most preferred by the respondents. The results of a study by Cordero, et al. (2022) titled "Ethnobotany and Diversity of Medicinal Plants Used among Communities in Mina, Iloilo, Philippines: a Quantitative Study" which discovered that decoction was the most popular method of preparing herbal plants are consistent with this.
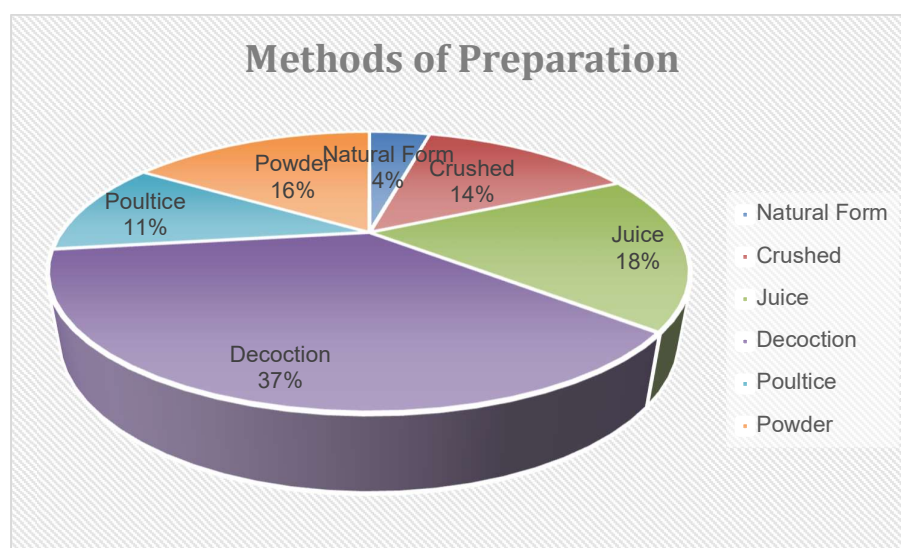

Figure 5. Methods of Preparation

5. Conclusions

The findings indicate that respondents are well-informed about the use of herbal plants and their availability in their locality. The study reveals that respondents generally hold favorable attitudes and impressions regarding the use of herbal plants. However, while this information shows that the participants are aware of herbal plants and their uses, the analysis could benefit from deeper insights into how this knowledge influences their health practices.

Among the respondents, Kalamunggay (Moringa oleifera) emerged as the most popular herbal plant, followed by Lemonsito (Citrofortunella macrocarpa) and Bayabas (Psidium guajava). The leaf was identified as the most frequently utilized part of the plant in disease treatment, with decoction being the preferred preparation method. Notably, few respondents provided additional information on other herbal plants they are familiar with or use in their daily lives, particularly for treating illnesses, aside from the ones identified in the study.

These findings suggest that the younger generations in Iligan City are still aware of the presence and applications of herbal plants in their neighborhood. Moreover, it can be inferred that younger generations living in rural areas possess awareness of the medicinal properties of plants.

To align the findings with the preparation of a STEM lesson plan, the knowledge and attitudes surrounding herbal plants could be integrated into a broader educational framework. For example, a STEM lesson plan could be developed around the scientific exploration of herbal plants, combining biology, chemistry, and environmental science. Students could investigate the chemical properties of herbal plants, their medicinal uses, and the preparation methods, such as decoction. Additionally, students could design experiments to test the efficacy of different plants in treating certain conditions or study the environmental impact of herbal plant cultivation. This hands-on approach would not only enhance their understanding of herbal plants but also encourage them to apply scientific thinking and problem-solving skills in real-world contexts.

To enhance the study's contribution to the field of STEM education, further revisions could provide speculative suggestions for incorporating these findings into lesson plans. This could involve drawing connections between traditional herbal knowledge and modern scientific research, encouraging students to explore and validate traditional practices through a scientific lens. This approach can also promote interdisciplinary learning, as students engage with botany, health sciences, and local ecological systems.

Recommendations

There are countless uses for plants that hold great promise for the development of new medicines. Therefore, the findings of this ethnobotanical study will act as a foundation for additional pharmacological research, particularly for the most widely used, favored, valued, and significant medicinal herbs. Additionally, it will raise awareness of the need to protect medicinal plants, which can be utilized as a secure and efficient replacement for conventional medical procedures and even in the field of education. Teachers are therefore the link that allows knowledge of the value and use of herbal plants to be recognized and passed down from generation to generation.

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