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Ethnobotanical Knowledge, Awareness, Attitude And Practices (KAAP) of Maranao Learners on Herbal Plants: Basis for STEM Lesson Plan

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Abstract

This study determines the knowledge, awareness, attitudes, and practices (KAAP) surrounding herbal medicine among Grade 10 learners in Lanao del Sur, emphasizing the demographic landscape and cultural influences. A descriptive research design was utilized, and the results indicate that a predominantly female group of respondents from Marawi Poblacion, mostly single, aged 16, and identified as Maranao. Learners showed slight awareness of indigenous herbal plants, predominantly identifying only 8-15 species, and displayed limited knowledge, suggesting opportunities for further exploration of the hidden potential of plants used in treating diseases. Thematic analysis was also employed to gain a deeper understanding of their cultural, social, and health-related perspectives. The data highlighted a generally positive attitude towards herbal medicine, citing perceived benefits such as safety, affordability, and efficacy in treating illnesses. However, concerns persisted regarding safety, particularly for children, and uncertainties concerning the integration of herbal medicine with conventional treatments. Learners also agreed on varying practices relating to herbal plants and expressed a willingness to observe procedures for their preparation. They would also recommend these remedies to their family and friends during illness. Furthermore, a STEM lesson plan was developed to actively engage learners in activities aimed at enhancing their creativity while simultaneously raising awareness and preserving herbal plants within their community. This study underscores the need for greater education and research to address these concerns and provide clearer guidelines on the use of herbal medicine, all while enhancing learners' awareness.

Keywords: ethnobotanical, KAAP, STEM lesson

1. Introduction

Mindanao is a basin of rich culture and diversity where different ethnic groups live. The Meranaws (sing.: /Məranaw/) dominantly occupy the provinces of Lanao del Norte and Lanao del Sur. Their culture is rich, especially in beliefs and traditions (Coronel, 1992). One of which are Maranao traditional healers that were found to use traditional

medicine that is based on indigenous theories, beliefs and experiences that are conserved and has been handed down from past generations. It was noted that during the conduct of the study, one healer was quite hesitant in sharing some of her knowledge in healing because she believed that once shared, its effect and power is lessened. Most of the respondents were mostly second generation of healers in their family, next to their parents who have already passed away. According to them, they believe that their healing craft is God-given (Aba-conding et al., (2019).

Medicinal plants are an important element of indigenous medical systems in many parts of the world, and these resources are usually regarded as part of the traditional knowledge of a culture (Cajuday &Bañares, 2019). According to the World Health Organization (WHO), (2019) over 80% of the world's population use herbal plants. However, due to an increasing loss of indigenous knowledge, especially in developing countries with rapid industrialization and loss of ethnic customs and culture, there is a need to increase research in this field. Further, traditional knowledge can provide valuable guidance in selecting and obtaining novel plant material of potential therapeutic interest for drug discovery (Cajuday &Bañares, 2019).

Likewise, the use of herbal medicines (HMs) continues to expand globally with their increased acceptance among consumers (Pal et al., 2003). Herbal medicine is described as the use of herbs or plants products derived from various parts of the plants like leaves, roots, flowers, fruit, berries, etc. for medicinal purposes. Herbal medicines as dietary supplements are extensively used worldwide for sustaining wellbeing, boosting immunity or to cure diseases (Saydah, 2002; Ehrlich, 2006). Many studies have suggested numerous propitious effects of herbal medicines like gastroprotective, anti-inflammatory, and anti-Helicobacter pylori, etc. (Zaidi et al., 2015). Nevertheless, on the study of Deciga et al., (2007); Patel et al., (2011) herbs are not free from side effects, and some have been shown to be toxic (Gohil et al., (2007). St. Johns wort was among the commonest herb involved in HDIs, followed by ginkgo biloba, kava-kava, ginger and ginseng. As per a systematic review by Posadzki et al., (2013) the most common HDIs were with antiplatelet agents and anticoagulants. Use of ginger, garlic, ginkgo, ginseng with anti-platelets may cause bleeding.

However, the combined effects of diminishing interest in learning and practicing traditional healing and the widespread and rapid land use conversion support the urgent need for a nationwide ethnobotanical documentation. Besides, elders have this problem on attrition wherein young members of tribes leaving and not returning to learn from their elders –there is no one left then to carry on the traditions. This is also true for the Maranao community, wherein once the elders are gone, their knowledge on traditional ethnobiology goes with them in their grave. These days, traditional knowledge on ethnobiology is gradually lost and endangered because younger generation prohibit themselves to learn from their elders old fashion way (Popova, 2009). Besides, knowledge transfer to younger generations and the actual practice of traditional healing using medicinal plants have stalled primarily due to the adoption of modern treatment methods. Considering the advanced age of the remaining traditional healing practitioners, this important resource in the form of traditional knowledge, acquired through several centuries, could be completely forgotten in the very near future. Hence, a timely and widespread ethnobotanical survey across the country is warranted. Finally, many plant species identified in the study of Garcia et al., (2018) suggest that it could potentially be subjected to scientific investigations to confirm their medicinal efficacy.

Moreover, the current state of STEM education in the Philippines clearly shows that it will still have a long way to go. However, this should not prevent us from acknowledging the fact that there is indeed a problem that needs to be addressed Villaruz et al., (2019). Moreover, there is a context-based STEM Education teaching approach that was suggested by Sutaphan and Yuenyong (2019) that aims to enhance science education through real-

world problem-solving and project-based learning. This student-centered approach has seven stages which are the following: (1) Identification of Social Issues; (2) Identification of Potential Solutions; (3) Need for Knowledge; (4) Decision-making; (5) Development of prototype or product; (6) Test and evaluation of the Solution; and (7) Socialization and Completion of Decision Stage. Several studies have adopted the STEM education teaching approach proposed by Sutaphan and Yuenyong (2019), showcasing its effectiveness in various contexts. For instance, this approach was utilized in creating a module on typhoon and earthquake preparedness (Tubo et al., 2024), developing an air purifier to address smog issues (Ratnaningtyas et al., 2022), and formulating healthier local snacks (Masita et al., 2019). It also guided the development of STEM-based lessons such as designing moringa leaf tea (Koes-H et al., 2021), teaching biodiversity concepts (Shaeef et al., 2024), tea village (Phan et.al., 2021), formulating ice cream products (Villaruz et al., 2019). Additionally, the approach supported lessons like refreshment drink formulation (Guarin et al., 2019), demonstrating its flexibility across different STEM-related challenges. Moreover, numerous other studies have been conducted that not only support learners in deepening their understanding and exploration of various concepts but also contribute meaningfully to the broader community. With this, the study will contributes to the preservation of indigenous knowledge and encourages intergenerational learning using STEM Education that will also help educators create better learning experiences and public awareness campaigns.

Furthermore, the study will consider demographic variables such as age, gender, educational background, and socioeconomic status to examine how these factors might influence learners' KAAP. This demographic analysis will provide a nuanced understanding of the diversity within the learner population and highlight any significant differences or trends across different groups. Although, there are studies about knowledge, awareness, attitude, practices and perception yet Zaidi et al., (2022) recommended that more studies are required locally, as well as globally, and there is a need to design and implement awareness programs both for the general public as well as for health-related professionals. Also, in this study a qualitative survey is included for further analysis on their personal experiences.

1.1 Research Objectives

This research determines the ethnobotanical knowledge, awareness, attitude and practices of the learners. Specifically, this study aims to:

1. Determine the demographic profile of Junior High School Learners in terms of: a) Age, b) Gender, c) Civil Status, d) Ethnicity, e) Barangay
2. Evaluate the Knowledge, Awareness, Attitude and Practices (KAAP) of Junior High School learners on the use of herbal plants.
3. Develop an engaging STEM Lesson for Learners

2. Methodology

The study will employ a descriptive research design to explore and analyze the Knowledge, Awareness, Attitude, and Practices (KAAP) of learners regarding herbal medicine. The primary data collection method will be a survey-questionnaire that include a variety of question types, such as Likert scale, and open-ended questions thereby, enriching the data with qualitative insights where participants will share their experiences and beliefs. The data was analyzed using thematic analysis, a method that involves identifying, analyzing, and reporting patterns (themes) within the data.

The respondents were purposively chosen among Grade 10 Junior High School learners at Lanao del Sur. This group was chosen due to their developmental stage, where they are likely to have formed initial perceptions and attitudes toward health practices, including the use of herbal medicine. A formal letter was prepared and addressed to the

administrators, teachers, and students. The use of pseudonyms was implemented to protect the identity of the respondents and ensure confidentiality, adhering to ethical standards in research emphasizing voluntary participation and confidentiality assurance in alignment with RA 10173, the Data Privacy Act of 2012, all data collected during the study were handled with the utmost care to protect participants' privacy and confidentiality.

3. Conclusion

3.1 Demographic Profile of the Respondent

A total of 98 Grade 10 learners of Lanao del Sur participated in the survey.

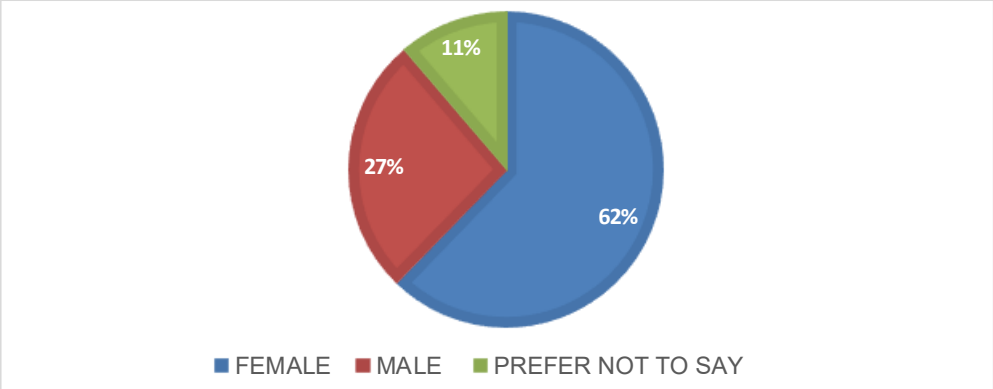

Figure 1. Gender of Grade 10 Learners

In this study, the majority of the respondents were female, comprising 62% of the sample, while males constituted 27%, and 11% preferred not to disclose their gender. This demographic breakdown is important for understanding the context of the data and for interpreting the findings related to the Knowledge, Awareness, Attitude and Practices (KAAP) regarding herbal medicine among the participants.

The study by Zaidi et al. (2022) examined the impact of various demographic factors, including gender, on knowledge and views regarding herbal medicines. Their findings indicated that gender did not significantly influence the knowledge. Contrastingly, a study by Alghethmi et al. (2020) highlighted a different aspect of gender differences and found that females were generally more aware of herbal medicines compared to males. Additionally, Stagg et al., (2022) highlighted on a review that females exhibited higher traditional plant knowledge than males in 18 studies, males showed higher knowledge in 13 studies and 15 studies found no significant difference between genders. Knowledge was directly correlated with plant experience.

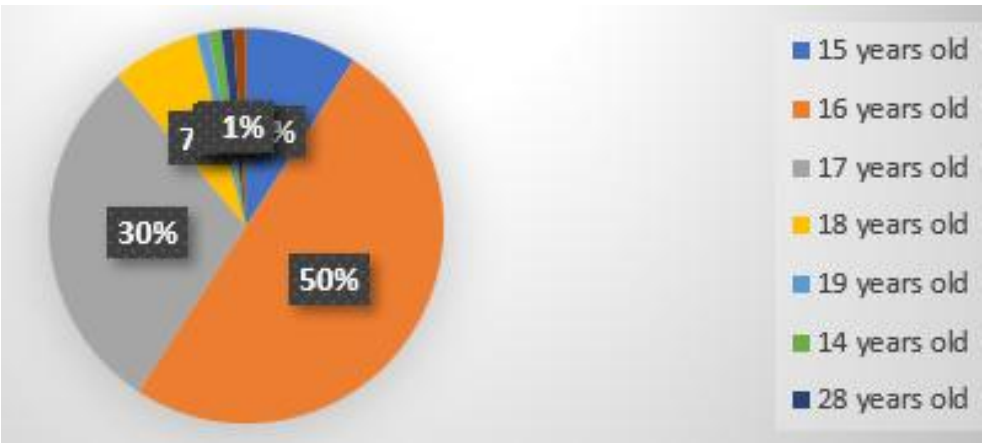

Figure 2. Learners Age Distribution

The data indicates that the majority of respondents are 16 years old, comprising 50% of the sample, while 30% of the respondents are 17 years old. The remaining age groups make up a very small fraction of the sample, with the highest age being 29 years old. On the usage of herbal medicine, it has been reported that individuals with higher age are more inclined towards the use of herbal medicines, and consequently, their knowledge and practice of herbal medicines tend to increase with age (de Souza Silva et al., 2014). However, this contradicts to the study of in which the older women have lower awareness level regarding herbal remedies than young females and have higher use as well (Alsubaei et al., 2017)

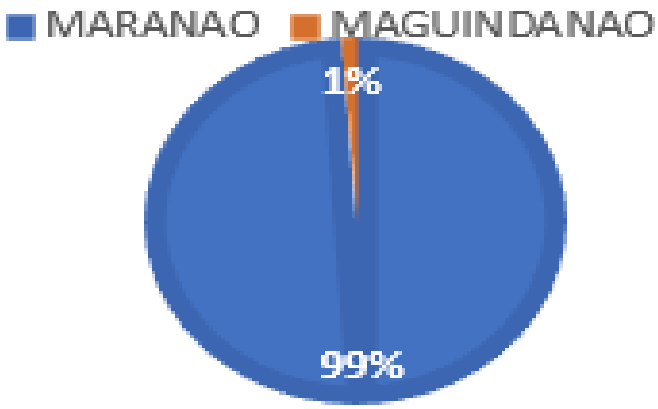

Figure 3. Ethnic Composition of the Learners

In examining the demographics of the respondents, it is noteworthy that a vast majority, 99%, identified as Maranao, with only 1% identifying as Maguindanaon. This ethnic distribution is significant, as it provides context for understanding the cultural influences on the learners' knowledge, awareness, attitudes and practices (KAAP) regarding herbal medicine. A study by de Souza Silva et al., (2014) examined the broader implications of demographic factors on herbal medicine usage, suggesting that cultural and ethnic backgrounds significantly influence how individuals perceive and use herbal remedies. Also, Nisly et al., (2010) highlighted the trend of increased herbal medicine usage among older adults, which can be linked to cultural practices and preservation within community.

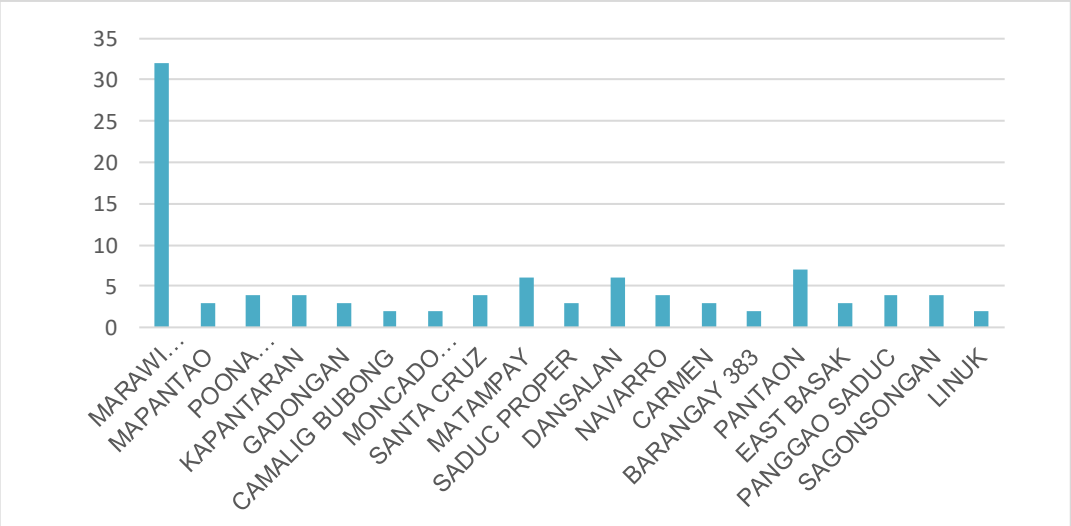

Figure 4. Different Barangays in Lanao del Sur

Out of the 1,159 barangays in Lanao del Sur, 19 were identified as the locality of the learners. According to Shahpur, (2018), Marawi Poblacion is the central district of Marawi City, which is known for its rich cultural heritage and historical significance. Marawi City, often referred to as the Islamic City of Marawi, is the capital of Lanao del Sur and is predominantly inhabited by the Maranao people. The city's central area, Poblacion, is a hub of economic, educational, and cultural activities The geographic context of the study is crucial in understanding the background and influences of the learners. Most learners in this study are from Marawi Poblacion, the central area of Marawi City. This locality plays a significant role in shaping the cultural and social dynamics of the learners.

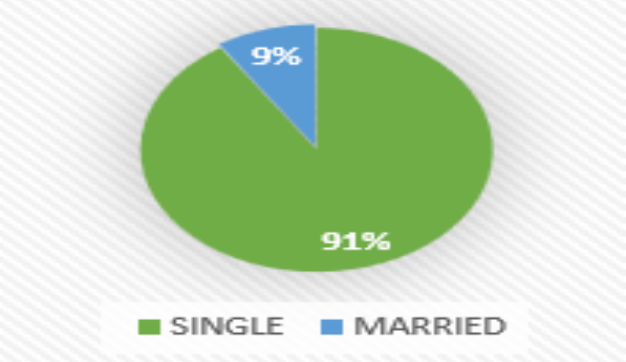

Figure 5. Marital Status of Grade 10 Learners

It is significant to note that 91% of the learners were single, while 9% were married. Regarding the marital status, it has been turned out that, married women have the highest use percentage among other women of different statuses such as, single, widow, and divorced women (Alsubaei et al., 2017). De Souza Silva et al. (2014) highlighted that married individuals often have more stable health practices due to shared responsibilities and mutual influence.

3.2 Learners Knowledge, Awareness, Attitude and Practices (KAAP)

To comprehensively gather data on the Knowledge, Awareness, Attitude and Practices (KAAP) related to herbal medicine among the learners, the researchers utilized an adopted and modified survey questionnaire: On learners' knowledge, attitude, and practices on herbal medicine: this section of the survey was adapted from the study by Zaidi et al., (2022) designed to assess learners' knowledge of herbal medicine, their attitudes towards its use, and their actual practices. Then, on learners' awareness on herbal medicine: the questionnaire on awareness was based on the study by Abas et al., (2016). This part focused specifically on gauging the learners' awareness levels regarding various herbal plants and their medicinal uses ensuring a comprehensive understanding of their familiarity with herbal medicine. On learners' perception on herbal medicine: adapted from Naquines et al., (2023), this section explored learners' perceptions and beliefs about the efficacy, safety, and overall value of herbal medicine. Lastly, on learners' identification of plants used at home/community: patterned after the template from Cordero et al., (2022), this section aimed to identify the specific medicinal plants that learners and their communities commonly use crucial for understanding the practical application within the learners' daily lives.

The table presents detailed information on the frequency and percentage of respondents' This suggests that a significant number of individuals possess minimal knowledge regarding these herbal resources. The data collectively implies that while there is some level of awareness about indigenous herbal plants among the respondents, a majority are only slightly knowledgeable. This could reflect a broader trend of declining

traditional knowledge in favor of modern medicine or a lack of educational resources focusing on indigenous botanical knowledge.

Table 1: Learners Knowledge About Herbal Plants

Score Interval	Remarks	Frequency	Percentage
23-30	Highly knowledgeable	3	3.06%
16-22	Knowledgeable	11	11.22%
8-15	Slightly knowledgeable	45	45.92%
1-7	Not knowledgeable	39	39.80%
Total		**98**	**100%**

Moreover, comparing this with findings from Gelayee et al., (2017) study in which the majority of respondents in claimed to have acceptable general knowledge about herbal medicines, with more than a quarter admitting their knowledge was poor. This finding aligns with the data from Lanao del Sur, where significant proportions of respondents have either basic or minimal knowledge of indigenous herbal plants. Other studies also support these findings. Oshikoya et al. (2013), Chen et al. (2016), and Robinson et al., (2011) similarly report gaps in knowledge regarding herbal medicine among their respondents. This consistent trend across various studies suggests that there is a widespread need for better education and dissemination of information about herbal medicine. Improving public knowledge about indigenous herbal plants and their uses could have significant benefits, including the preservation of traditional knowledge and potential enhancements in public health outcomes.

Table 2: Learners Awareness on the Use of Herbal Plants

Statement	Mean	SD	Description
1. I know what herbal plants are.	3.32	0.64	Highly Aware
2. I know that there are plenty of herbal plants in our community.	3.31	0.80	Highly Aware
3. I know that herbal plants can be used as medicine to cure ailments.	3.74	0.50	Highly Aware
4. I know that herbal plants can be used as medicine to prevent illness.	3.76	0.43	Highly Aware
5. I know that there are herbal plants has specific part that can be used to cure ailments.	3.30	0.81	Highly Aware
6. I know how to prepare herbal plants to cure ailments.	2.12	0.94	Aware
7. I know that there are herbalist in our area.	2.59	1.05	Aware
8. I know that herbal plants can be prepared in different ways depending on what ailment they will cure.	3.10	0.86	Aware
Overall	**3.15**	**0.52**	**Aware**

Legend: 1.00 - 1.74 - Not Aware 1.75 - 2.49 - Slightly Aware 2.50 - 3.24 - Aware 3.25 – 4.00 - Highly Aware

The table shows that the high mean score of knowing what herbal plants are comprises 3.32 mean which indicates that respondents have a strong understanding of what herbal plants are. Respondents are also well aware of the abundance of herbal plants in their community. Another is they have strong awareness that herbal plants can be used medicinally to cure ailments. The low SD (0.50) shows that this knowledge is very consistent among respondents. Moreover, they are aware how to prepare herbal plants to

cure ailments which has the lowest mean score (2.12), suggesting that while respondents know about the medicinal uses of herbal plants, they are less confident in their knowledge of how to prepare them. The higher SD (0.94) indicates significant variability in responses, showing that preparation knowledge is not uniformly distributed. Additionally, respondents are aware that different preparation methods are needed for different ailments, there are herbalists in their area with the highest SD (1.05), indicating diverse opinions and knowledge levels regarding local herbalists. The overall mean score of 3.15 falls within the 'Aware' category. This suggests that while respondents have a good general awareness of various aspects of indigenous herbal plants, there is room for improvement, particularly in specific areas like preparation methods and knowledge about local herbalists.

Table 4: Practices on the Use of Herbal Plants

Statement	Mean	SD	Description
1. Herbal plants can be used as medicine to help maintain and promote health.	3.59	0.53	Strongly Agree
2. Herbal plants can be used as medicine to treat illness.	3.66	0.48	Strongly Agree
3. Herbal plants can be used as medicine as they are safe.	3.38	0.67	Strongly Agree
4. Herbal plants can be used as medicine as they come from natural ingredients.	3.72	0.57	Strongly Agree
5. Herbal plants can be used as medicine better than conventional medicine.	3.12	0.76	Agree
6. Herbal plants can be used as medicine for kids as they are not dangerous.	3.18	0.72	Agree
7. I prefer herbal plants as medicine as they are cheap.	2.97	0.85	Agree
8. Herbal plants can be used as medicine as they are readily available.	2.98	0.75	Agree
9. Herbal plants are better used as medicine without adverse effect.	2.98	0.76	Agree
10. Herbal plants can be taken as medicine with synthetic drugs.	2.69	0.78	Agree
Overall	**3.23**	**0.33**	**Agree**

Legend: 1.00 - 1.74 – Strongly Disagree 1.75 - 2.49 – Disagree 2.50 - 3.24 – Agree 3.25 – 4.00 – Strongly Agree

On the study of Gelayee et al., (2017) which investigates the self-medication practices among pharmacy students, particularly focusing on their awareness and knowledge of herbal medicines. It found that a significant portion of these students had poor knowledge about the interactions and side effects of herbal medicines. Similarly, the study of Boparai et al., (2003) found out that the students had low level of knowledge and awareness about herbal medicines and about herb-drug interactions. Another study, explores the use of complementary and alternative medicine, including herbal plants, among parents of children with chronic illnesses, highlighting the varying levels of awareness and knowledge among parents regarding these herbal remedies (Oshikoya et al., 2013).

The overall mean rating across all statements is 3.23, which suggests that they agree with the statements presented. There is a fairly strong agreement that herbal plants can be used to maintain and promote health with a mean, they are safe and come from natural ingredients Respondents show even stronger agreement that herbal plants can be used to treat illness with a mean of 3.66 with the lowest SD, indicating high consistency in responses. Moreover, they agree that it can be used as medicine better than conventional, it is safe for kids, it is cheap, it is readily available and can be taken as medicine with synthetic drugs.

The data indicates a generally positive attitude towards the use of herbal plants as medicine. However, there is less consensus on their safety, especially for children, their cost-effectiveness, availability, and the lack of adverse effects. Ali-Shtayeh et al., (2013) conducted a study examining the attitudes and practices related to the use of complementary and alternative medicine, including herbal plants, among Palestinian diabetic patients. The study found that a large proportion of these patients held positive attitudes towards herbal remedies and frequently used them alongside conventional treatments. Similarly, Jaiswal et al., (2016) investigated the attitudes of patients in India towards the use of herbal medicine, revealing that many patients have a positive attitude towards herbal treatments, valuing their natural origins and perceiving them as safer alternatives to synthetic drugs. In another study, Nordeng et al., (2004) explored the attitudes and usage of herbal drugs among pregnant women in Norway. The findings indicated that many women have a positive attitude towards using herbal remedies during pregnancy, often perceiving them as safer options compared to conventional medications.

Table 4: Practices on the Use of Herbal Plants

Statement	Mean	SD	Description
1. I take herbal medicines according to what my family and friends told me.	3.58	0.52	Strongly Agree
2. I am in favor of giving herbal medicines to my family members if they get sick.	3.63	0.69	Strongly Agree
3. I don't consult doctors before taking herbal medicines.	3.22	0.75	Agree
4. I observe my family when preparing a herbal medicine to treat or cure illness.	3.43	0.67	Strongly Agree
5. When I get sick, I first take herbal medicines to help me get better.	2.87	0.73	Agree
6. I take herbal medicines in case of acute conditions like severe pain.	3.13	0.87	Agree
7. I prefer taking herbal medicines to conventional medicines.	2.56	0.77	Agree
8. I always take herbal medicine whenever I have health problems.	2.47	0.89	Disagree
9. I advise others to take herbal medicine whenever they have problems.	3.00	0.75	Agree
10. I always make sure I prepare and use herbal medicine in a safe way.	3.60	0.67	Strongly Agree
Overall	**3.15**	**0.40**	**Agree**

Legend: 1.00 - 1.74 – Strongly Disagree 1.75 - 2.49 – Disagree 2.50 - 3.24 – Agree 3.25 – 4.00 – Strongly Agree

The table reveals that respondents tend to trust and rely on herbal medicines, often following the advice of their family and friends in which they strongly agree with a mean of 3.58. They express a preference for herbal remedies, particularly when treating family members, and show a commitment to traditional methods when preparing these remedies. Although many respondents agree that they don't consult doctors before using herbal medicines and preferring them over conventional medicine, fewer are consistent in always using herbal medicines or recommending them to others. Nevertheless, there is a consensus on the importance of ensuring the safe preparation and use of herbal remedies with an overall mean of 3.15 which means they agree on the given questions.

Bussmann, (2015) documented the traditional medicinal plant knowledge and practices among indigenous communities in Ecuador and found that these traditional herbal medicine practices were deeply rooted in the cultural heritage of the indigenous people. The study highlighted the importance of preserving and promoting these traditional herbal medicine practices for their cultural significance and potential healthcare

benefits. Diallo, (2006) conducted an ethnopharmacological survey and documented the various medicinal properties and uses of these plants as reported by local communities in different regions of Mali. The study also highlighted the diverse therapeutic applications of medicinal plants in traditional herbal medicine practices and emphasized the importance of preserving indigenous knowledge for sustainable healthcare practices.

Table 5: Common Herbal Plants Known

	English/ Common Name	Maranao Name	Plant Part Used	Method Used	Medicinal uses	Rank
Carica papaya L.	Papaya	Kopaya	Leaves	Juice	lowers fever	1
Coleus amboinicus Lour.	Oregano	Kapal	Leaves	Juice	cures cough and lowers fever	2
Psidium guajava	Guava	Bayaba	Leaves	-Decoction -Juice	for wounds; stomachache	3
Zingiber officinale	Ginger	Loya pagirisun	Stem (rhizome)	Juice	relief of sore throat; cures cough	4
Vitex negundo L.	Five-leaved chaste tree	Lagundi	Leaves	Juice	cures cough and lowers fever	5
Annona muricata L.	Soursop	Gabana	Leaves	-Juice -Eaten -Poultice	diabetes; lowers hypertension; fever; diarrhea; cures heart-related diseases; wounds and rashes	6
Momordica charantia L.	Bitter melon	Paliya/ Pariya	Fruit	Eaten	lowers blood sugar, anti-anemia	7
Allium sativum L.	Garlic	Lasona a tukapun	Stem (bulb)	-Eaten -Crushed	lowers hypertension; cures sore throat; ear problem; pneumonia and cure itchiness/skin rashes	8
Citrofortunella microcarpa	Kalamansi	Lemonsito	Fruit	-Eaten -Juice	Cough, cold and sore throat	9
Moringa oleifera	Horse radish tree	Kalamunggay	leaves	-Juice -Crushed	lowers fever; abate bleeding in cuts or wounds	10
Coleus blumei	Painted nettle/ Mayana	Mayana	leaves	-Juice -Crushed	Cures cough; heals wounds	11
Rauvolfia serpentina	Serpentina	Serpentina	Leaves	Decoction	Cures diabetes	12
Abelmoschus esculentus	Lady's finger	Okra	Fruit	Eaten	Cures diabetes	13
Curcuma longa	Turmeric	Kalawag	Stem (rhizome)	-Juice -Eaten	cures person vomiting with blood; cough; sore throat	14
Musa sapientum L.var. compressa	Banana saba	Saging kardaba/ saba	Stem (bark)	Poultice	abate bleeding on cuts or wounds	15
Coffea arabica	Coffee	Kape	Leaves	Poultice	cures burns/wounds	16

Table 5: (Cont')

	English/ Common Name	Maranao Name	Plant Part Used	Method Used	Medicinal uses	Rank
Garcinia mangostana	Mangosteen	Mangosteen	Fruit	Eaten	lowers hypertension and blood sugar level	17.5
Cymbopogon citratus	Lemon grass	Bawing	Whole plant	Decoction	lowers hypertension	17.5
Manihot esculenta	Cassava	Banggala	Leaves	Crushed	wounds	19
Euphobia hirta	Cat's hair	Talawatawa	Whole plant	Decoction	lowers high fever (due to dengue and measles)	20
Aloe vera L.	Aloe	Sabila	Leaves	Poultice	treats burns and skin diseases (eczema)	21
Jatropha curcas L.	Tuba-tuba plant	Katangan-tangan	Leaves	Crushed	cures wounds; canker sores or "luas" and toothache	22
Ipomoea batatas	Sweet potato	Rapa	leaves	Crushed	cures boils; wound	23.5
Piper betle	Betel leaf pepper	Namat	leaves	-Juice - Decoction	Cures cough	23.5
Swietenia mahogani	Mahogany	Mahogany	seeds	Eaten	relief of stomachache	25
Theobroma cacao	Cacao	Kakaw	Leaves	Poultice	treats sprains	26
Solanum lycopersicum	Tomato	Kamatis	Fruit	Eaten	Vomit blood	27
Ananas comosus Linn	pinya/ pineapple	Pinya	fruit	Eaten	Heart disease	28
Musa textilis	Abaca	Abaka	Shoot	Crushed	muscle pain	29
Heliotropium indicum	Indian heliotrope	Elepante	Whole plant	Decoction	muscle pain or over fatigue or "bughat" in women	30
Carmona retusa (Vhal.) Masam	Philippine tea tree	tsaang gubat	Leaves	-Juice - Decoction	Cures diarrhea; stomach ache and cough	31

These are the common herbal plants known among students and the community in Lanao del Sur include a variety of medicinal plants traditionally used for various ailments. *Carica papaya* (Papaya)**,** locally known as "Kapayas," is the most recognized plant, with a frequency rank of 64. It is widely acknowledged for its digestive benefits and other medicinal properties. The fruit, seeds, and leaves are used to treat a range of conditions, from gastrointestinal issues to wound healing. Another is *Psidium guajava* (Guava)**,** locally called "Bayabas," is frequently used for its antimicrobial properties, particularly in treating diarrhea and wounds, holding the third rank in terms of recognition. The leaves are often employed in traditional medicine for their antiseptic and anti-inflammatory properties. Also, *Zingiber officinale* (Ginger)**,** known locally as "Luya," is commonly used for its anti-inflammatory and gastrointestinal benefits, ranking fourth in frequency. It is a popular remedy for nausea, digestive problems, and pain relief. Additionally, *Vitex negundo* (Lagundi)**,** referred to locally as "Lagundi," is traditionally used to treat respiratory conditions such as coughs and colds, ranking fifth in popularity.

The study of Jariya et al., (2016) highlights the phytochemical components of Carica papaya and its diverse pharmacological activities, including digestive benefits, anti-inflammatory, and wound-healing properties. Another research from Hemshekhar et al., (2012) focuses on the bioactive compounds in papaya and their therapeutic effects, including treatment for gastrointestinal issues and wound healing. Moreover, a review from Gutierrez et al., (2008) discusses the antimicrobial properties of guava, particularly its effectiveness in treating diarrhea and wounds. Alotaibi et al., (2018) also reviews the traditional medicinal uses of guava leaves, highlighting their antiseptic and anti-inflammatory properties. Furthermore, the study of Lete et al., (2016) provides an overview of the anti-inflammatory and gastrointestinal benefits of ginger, emphasizing its role in treating nausea and digestive problems. Ernst et al., (2000) also explore the pharmacological mechanisms behind ginger's effectiveness in treating gastrointestinal issues and its pain-relief properties. Likewise, Dharmasiri, (2003) outlines the traditional uses of Vitex negundo, particularly in treating respiratory conditions such as coughs and colds. Another study focuses on the anti-inflammatory and analgesic properties of Vitex negundo, supporting its use in treating respiratory ailments Rai et al., (2010). Additionally, the study by Olowa et al. (2015) offers extensive information about herbal plants, which aligns with this study's findings on their methods, uses, and purposes.

3.2.1 Learners Perspectives and Experiences on Herbal Plants

Thematic analysis was used in order to identify recurring themes, patterns, and specific terms relevant to the perceptions and experiences of Maranao learners regarding herbal plants in which Prasad, (2008) defines it as the study of the content with reference to the meanings, contexts and intentions contained in messages. The results provide valuable insights into the cultural and educational significance of herbal plants within the Maranao community, highlighting their integral role in both traditional knowledge and learning environments.

Table 6: Learners Familiarity on Herbal Plants

Responses	Code	Theme
Participants indicated a lack of familiarity with herbal plants and their traditional uses, with specific responses such as "Not familiar," clearly indicating no knowledge or use of herbal plants (L1, L26, L37, L40, L41, L54, L57, L62, L64, L69, L82).	Familiarity	Learners Familiarity and Use of Herbal Plants
A group of participants showed high familiarity with herbal plants and frequently used them for treating illnesses, as indicated by specific responses such as "Very familiar since we always used it when having illnesses" (L5, L17). Finally, there were participants who indicated a low level of familiarity due to a lack of interest in herbal medicine, with the specific response, "Low level because I'm not into herbal medicine" (32).		
On the other hand, there were participants who expressed minimal knowledge about herbal plants, often relying on modern or synthetic medicines instead; these responses, such as "Little bit only, sometimes family used now modern/synthetic medicines," indicate some awareness but limited use of herbal remedies (L6, L7, L11, L13, L14, L16, L18, L19, L20, L21, L22, L24, L25, L26, L27, L28, L29, L33, L34, L35, L36, L39, L42, L44, L45, L46, L47, L48, L49, L51, L52, L53, L56, L58, L60, L61, L63, L68, L70, L71, L72, L73, L74, L75, L76, L78, L79, L80, L81, L83).	Minimal Knowledge	

Some participants demonstrated basic knowledge of herbal plants but lacked the skills to identify or use them effectively, with specific responses like "I know only little how to use and prepare it, "I have a little knowledge about herbal plants and how to use it, very poor," and "I can't really identify them properly" (L10, L31, L43, L50, L55, L65, L66, L77).	Basic Knowledge

Some participants indicated a complete lack of familiarity with herbal plants, showing no knowledge or use of them. This situation is common in urbanized or younger populations where traditional knowledge may not be passed down or prioritized. A study in the Urgam Valley of Chamoli Garhwal, Uttarakhand, India, highlights that the transmission of traditional knowledge often depends on cultural practices and the presence of knowledgeable elders in the community (Hindawi, 2021). Participants with basic knowledge but poor identification skills reflect a partial awareness of herbal plants without the expertise to use them effectively. This gap in knowledge often results from the lack of formal education or practical experience in traditional medicine. The study in Western Kenya noted similar patterns, where communities have basic knowledge but may not always be adept at proper identification and preparation of herbal remedies (Mbuni et.al., 2020).

Table 7: Learners Perception on Herbal Uses

Responses	Code	Theme
Respondents revealed a varied use of herbal plants as remedies for common ailments for instance, Lagundi (Vitex negundo) is primarily used to treat cough, with participants (L1, L13, L25, L32, L40, L48, L51, L53, L57, L60) frequently drinking it for its medicinal properties. Tawa-tawa (*Euphorbia hirta*) is utilized for fever, general sickness, and cough, with many participants (L2, L9, L10, L17, L18, L20, L24, L25, L35, L36, L41, L62, L76, L77, L78, L79) reporting its repeated use for these conditions. Kalabo (*Blumea balsamifera*) is mentioned by participants (L3, L4, L14) for its effectiveness in alleviating cough. Papaya leaves are employed to manage cough and fever, with participants (L6, L26, L29, L43, L52, L55, L61, L71, L73) using them for these ailments. Malunggay (*Moringa oleifera*) is applied to treat wounds, specifically by participant (L7). Kapal (Clinopodium douglasii) is used for fever, cough, and wounds, with numerous participants (L8, L15, L16, L27, L28, L30, L33, L34, L37, L39, L46, L49, L50, L62, L65, L67, L68, L80, L83) mentioning their mothers preparing it for treatment. Guava leaves (*Psidium guajava*) are utilized for wounds, antibacterial purposes (especially post-circumcision), and measles, commonly used by participants (L5, L11, L12, L42, L54, L56, L64). Ginger (*Zingiber officinale*) treats cough and tonsillitis, frequently used by participants (L59, L63, L70, L74, L75) Garlic (*Allium sativum*) is used to alleviate toothache, specifically mentioned by participant (66). Oregano (*Origanum vulgare*) is used for fever, as mentioned by participant (L69), calamansi (*Citrus microcarpa*) is used to treat cough, specifically by participant (L81)	Herbal Plants and uses	Specific Herbal Plants and Their Uses
Some participants (L23, L72, L82) indicated they have not used any herbal plants as remedies.	No idea	

Several studies investigated the efficacy of these herbal remedies, such as: *Vitex negundo* (Lagundi)**,** Tigno et al. (2000) evaluated its effectiveness in treating cough among Filipinos. *Euphorbia hirta* (Tawa-tawa) has been studied by Titaley et al. (2010) for its use in reducing early neonatal deaths in Indonesia. Another study from Mokkhasmit et al. (1971) in which using a *Blumea balsamifera* (Kalabo)**,** conducted a pharmacological evaluation of Thai medicinal plants. *Moringa oleifera* (Malunggay**)** was reviewed by Fahey (2005) for its nutritional, therapeutic, and prophylactic properties. The traditional uses, phytochemistry, and pharmacology of *Psidium guajava* (Guava Leaves) were reviewed by Gutierrez et al. (2008). *Zingiber officinale* (Ginger) was examined by Mashhadi et al. (2013) for its antioxidative and anti-inflammatory effects, Rivlin (2001) provided a historical perspective on the use of *Allium sativum* (Garlic)**.** Also, *Origanum vulgare* (Oregano) was studied by Manohar et al. (2001) for its antifungal activities against Candida albicans, as documented in *and on the study of* Zaidi, et al., (2022) there are also respondents who honestly said that they had not used the herbal medicines before.

Table 8: Learners Source of Information

Responses	Code	Theme
The participants in the study rely on various sources to learn about the benefits and uses of herbal plants. The primary sources of information are familial, including parents, grandparents, and other family members (L10, L25, L39, L57, L67, L72, L75, L83) mentioned learning from family members in general, while others (L2, L3, L4, L8, L17, L18, L27, L35, L37, L46, L47, L52, L77, L78, L81, L82) specifically rely on their parents. Relatives are a valuable source for participant 9, and grandparents provide knowledge for participants (L6, L14, L16, L33, L40, L50, L51, L60, L61, L63, L69).	Family as the source of information	Familial and Modern Influences on Herbal Plants
Some participants (L12, L29, L41, L42, L45, L59, L68, L70) turn to friends, family, and relatives for guidance on herbal plant usage. A few, such as participants (L24 and L66) rely on their mother and her book on herbal medicine.	Relatives	
Additionally, participants (L26, L28, L36, L37, L44, L49, L76, L80) use both their parents and social media platforms to gather information.	Both parents and Social media	
Social media is also a primary source for participants (L53, L56, L65, L71) while participants (L54 and L64) seek knowledge from people in their community.	Social Media	

Ghorbani et al., (2016) explores how knowledge of medicinal plants is passed down through generations within families and communities. Likewise, Quave et al., (2015) highlights the importance of family and social networks in preserving and transmitting ethnobotanical knowledge in Italy. Another is from the article of Reyes-García, (2013) discusses how traditional ecological knowledge, including the use of medicinal plants, is transferred across generations. Besides, Ventola, (2014) examines the impact of social media on health practices, including the dissemination of information about herbal medicine. Another is from the study of Heinrich et al., (1998) which investigates the role of traditional healers and the cultural importance of medicinal plants in Mexico. Additionally, Sharma et al., (2000) also focuses on how family members in rural areas are primary sources of knowledge about medicinal plants. Overall, Participants predominantly rely on familial sources such as parents, grandparents, and other family members, as well as friends, relatives, and social media platforms, to learn about the benefits and uses of herbal plants.

Table 9: Learners Confidence Level in Herbal Identification

Responses	Code	Theme
a majority (L1, L17, L23, L25, L26, L28, L39, L41, L44, L48, L51, L53, L54, L57, L63, L64, L69, L70, L73, L75, L77, L80, L81, L82) express low confidence while some (2, 5, 19, 30, 32, 42, 50, 61, 67) feel moderately confident at about 50%. Others (L6, L7, L11, L15, L18, L24, L27, L33, L35, L36, L37, L38, L40, L45, L46, L47, L49, L52, L59, L60, L61, L68, L72, L74, L76, L78, L79, L83) admit to being not really familiar with herbal plants, relying mainly on parental or grandparental knowledge while a few (L10, L16, L66) are very confident.	Confidence in plant identification and uses	Confidence Level in Identifying and Using Herbal Plants
One participant (L12) is uninterested in learning about herbal plants two (L14, L29) have little to no idea as they don't use them.	No idea	

Reyes-Garcia (2009) explores the cultural transmission of ethnobotanical knowledge within indigenous societies, shedding light on how confidence levels may vary among participants. In addition, Sivadasan, (2018) examines how familial and social networks influence health-seeking behavior, which may be relevant to participants' reliance on parental or grandparental knowledge about herbal plants. Nonetheless, the book of Marmot et al., discusses cultural and social factors that influence health outcomes, including the transmission of knowledge about medicinal plants within families and communities. Another book discusses how health beliefs are influenced by cultural and generational factors, which may contribute to participants' varying levels of familiarity and confidence regarding herbal plants (Calnan et al., 2006). Another is a systematic review which explores the relationship between health literacy and health outcomes, which may relate to participants' confidence levels in identifying and using herbal plants Berkman et al., 2011).

Table 10: Perception on Herbal Plant Usage

Responses	Code	Theme
Participants perceive herbal medicine as safer, with fewer side effects and being more affordable compared to conventional medicine (4, 7, 14, 78, 5, 6, 29-32, 33, 45, 82, 10, 16, 36, 1, 11, 30, 31, 36, 59, 71, 72, 76, 79, 80, 83).	Advantage of Herbal Medicine	Perceptions and Concerns Between Herbal Medicine and Conventional Medicine
However, concerns exist regarding the lack of knowledge about potential side effects and the preference of doctors for conventional medicine (12, 15, 25, 28, 38, 39, 40, 51, 52, 53, 57, 65, 66, 67, 68, 69, 70, 73, 74, 75, 26, 46, 54, 63, 81, 64).	Concerns and Limitation of Herbal Medicine	
Availability, taste, and convenience also influence opinions on herbal and conventional medicine (27, 41, 42, 49, 60, 44, 48, 50, 56, 61, 77	Practical Considerations	

Smith et al., (2019) found out that participants perceive herbal medicine as safer, with fewer side effects, and more affordable compared to conventional medicine. Which affirm on the study of Garcia et al., (2020) in which participants express preferences for herbal medicine due to perceived safety, fewer side effects, and affordability yet concerns exist regarding the lack of knowledge about potential side effects and the preference of doctors for conventional medicine. Another study from Johnson et al., (2018) noted that herbal medicine users perceive it as safer and with fewer side effects compared to conventional

medicine users meanwhile participants' perceptions of safety and side effects differ between users of herbal and conventional medicine. Chen et al., (2017) determine factors influencing participants' perceptions of herbal medicine include availability, taste, and convenience. Also, the qualitative data of the study suggests that familiarity with herbal medicine within families and communities also shapes perceptions. Further, Wang et al., (2016) highlight on their meta-analysis that herbal medicine is generally perceived as safer with fewer side effects compared to conventional medicine. Moreover, safety concerns and potential side effects are significant factors influencing participants' perceptions of herbal and conventional medicine.

4. Conclusion

The study provides insightful information in the surrounding herbal medicine among participants within the specific context of Lanao del Sur. Majority of respondents are female Maranao individuals from Marawi Poblacion reflecting the cultural and social dynamics of the region. The learners were slightly aware of the indigenous herbal plants, with variations in confidence levels and usage practices. They also have positive attitude towards herbal medicine while many perceive herbal medicine as safer and more affordable than conventional medicine, concerns exist regarding side effects, doctor preferences, and lack of knowledge. Moreover, it becomes apparent that the participants exhibit a varying degree of familiarity and confidence levels. While some demonstrate a commendable grasp of herbal remedies, others navigate with cautious steps, relying on familial knowledge and cultural traditions passed down through generations. This divergence in awareness underscores the knowledge dissemination within the community, with traditional wisdom serving as a cornerstone in shaping healthcare practices.

Moreover, some participants leaning heavily on familial traditions, while others have multiple information sources, including social media and community networks therefore socio-cultural, economic, and personal factors may have an effect. In conclusion, this study provides foundational knowledge on herbal medicine within the distinctive socio-cultural context of Lanao del Sur, serving as a basis for STEM lesson implementation and future research that encourages the preservation of traditional knowledge and practices from older generations.

Recommendations

1. Execute the STEM-based lesson plan within the classroom environment to enhance learner engagement regarding the topic of herbal plants.
2. Implement education and awareness programs to the learners in order to enhance understanding of indigenous herbal plants, their benefits, and safe usage practices.
3. Foster community engagement and collaboration to facilitate knowledge-sharing and preservation of traditional herbal medicine practices.

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