Ethnobotanical and Pharmacological Survey of Medicinal Plants Used by Indigenous People of Cawilan, Tubod Surigao del Norte

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Abstract— The study determined the medicinal plants used by the Indigenous People of Cawilan, Tubod Surigao del Norte. It identified the part of the plant used, methods of preparing the plant parts, how the prepared herbal medicine administered and what particular ailments can be treated by the identified medicinal plants. The study includes 80 respondents from the Indigenous People of the said research locale. Descriptive survey and purposive sampling were used to include individual who possessed deep understanding of the medicinal plants. The was analyze using the following descriptive statistical tool: (a) Percentage Distribution, (b) Analysis of Variance (ANOVA), and (c) Pearson R. The findings reveals that there is 25 identified medicinal plants, which Hilbas (Artemisia vulgaris) got the highest percentage of 10% and Tanglad (Cymbopogon citratus) obtain the lowest percentage of 1% of all the identified medicinal plants. Out of all the identified medicinal plants, 5 plant parts were utilized. Furthermore, there were 4 methods of preparation used with the identified medicinal plants and 4 methods of administration were identified in treating certain ailments. Lastly, 16 ailments were determined that can be cured by the identified medicinal plants. According to the findings and conclusion drawn from the data collected, Indigenous People of Cawilan, Tubod Surigao del Norte practiced and used medicinal plants in treating certain ailments. Further research is recommended on the effectiveness of medicinal plants in treating certain ailments.

Keywords— ethnobotanical, pharmacological, medicinal plants, indigenous people

I. INTRODUCTION

Ethnobotany is generally defined as the study of plant and people relationships. This academic discipline was thought to emerge in the 19th century. Pharmacology is the scientific discipline that investigates the effects of drugs on living organisms and their mechanisms of action. By studying the medicinal plants used by the Indigenous People in Cawilan, Tubod, Surigao del Norte, researchers can explore the pharmacological properties of these plants and gain insights into their therapeutic potential.

Medicinal plant is a given term to various species of plants that are applied as herbal therapy or for consumption with regards to its phytochemical properties to cure illness or to act as health supplements
(Salmerón-Manzano et al., 2020). It generates advantageous products such as syrups, powders, ointments, etc. (Tugume & Nyakoojo, 2019).

Despite of the technology modernization the Indigenous people still practiced the use of herbal medicine in primary health care and medicinal use (Barneso et al., 2021). This is partly due to the high costs of modern medicine and inability to access health facilities (Tugume & Nyakoojo, 2019). With this, plants become the most convenient way to use as a source of medicines. And this knowledge continually deteriorates and was found out that there are only few indigenous people known to have vague knowledge – traditionally and botanically (Barneso et al., 2021). This traditional knowledge of indigenous people is in danger of being lost, along with the plants themselves and this indigenous knowledge on traditional medicinal plants is passed on from generation to generation by oral tradition especially to the cultural group (Garcia et al., 2021). The study recognizes the significance of medicinal plants in the primary healthcare and medicinal practices of the Indigenous People, particularly in areas where access to modern medicine and healthcare facilities is limited or costly.

Exploring a community with fewer known details allowed for a unique opportunity to conduct research in an environment where the cultural practices might differ from more well-known areas, that is why the researcher conducted this study to document and preserve the indigenous knowledge of medicinal plants used by the Indigenous People in Cawilan, Tubod, Surigao del Norte. Aiming to contribute to the understanding of the Indigenous People's ethnobotanical practices and potential pharmacological applications. The study aims to document the plant parts utilized for medicine, the ailments treated, and the different modes of administration and preparation of medicinal plants.

II. FRAMEWORK

This study was anchored on Nuñeza et al. (2021) study, titled “Ethnobotanical survey of medicinal plants used by the Mamanwa tribe of Surigao del Norte and Agusan del Norte, Mindanao, Philippines” which focused on documenting the valuable ethnomedicinal knowledge and will help preserve the vanishing tradition of cultural communities in terms of medicinal plant utilization.

The framework of this study was depicted in the study’s schematic figure next page. It depicts the indigenous people’s profile, procedures, and output of the study.

The first box represents the profile variable of the participants in terms of their; age, sex, civil status, and years of living in the community.

The second box represents the methods on how the researcher identify the medicinal plants used by the indigenous people, and it also state the process of how the researchers will gather the data.

The third box represents what is the output based on the gathered data, and this is where the researchers can identify the common herbal medicines.

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III. STATEMENT OF THE PROBLEM

This study focused on determining the medicinal plants used and practiced by Indigenous People in Cawilan, Tubod, Surigao del Norte. Specifically it sought to answer the following questions:

1. What is the profile of the participants in terms of:
   1.1. Age
   1.2. Sex
   1.3. Civil status
   1.4. Number of years living in the community
2. What are the ethnobotanical medicinal plants used by the indigenous people of Cawilan, Tubod, Surigao del Norte in terms of the following:
   2.1. Plant part used
   2.2. Mode of Preparation
   2.3. Mode of Administration
3. What specific ailments can be treated/cured with the identified medicinal plant/s by the Indigenous People?
4. Is there a significant difference of the different types of medicinal plants used by the indigenous people regardless of their profile variable?
5. Is there a significant relationship between the type of medicinal plant used and the specific ailments treated/cured with the identified medicinal plants?
6. What recommendation can be proposed?

IV. HYPOTHESIS

H01: At 0.05 Level of significance, it mere hypothesized as: there is no significant difference of the different types of medicinal plants used by the Indigenous people regardless of their profile variables.

H02: At 0.05 Level of significance, it mere hypothesized as: there is no significant relationship between the type of medicinal plant used and the specific ailments treated/cured with the identified medicinal plants.

V. METHODOLOGY

The study employed the descriptive survey, particularly the interview method and purposive sampling was used. This approach aimed to include individuals who possessed a deep understanding of traditional medicinal plant use and its cultural significance within the community. Descriptive surveys are well-suited for collecting data to describe and understand the characteristics, behaviors, and opinions of a specific population. In this research design, the focus was on collecting information about the traditional practices and medicinal plant used by the Indigenous People living in Cawilan, Tubod, Surigao del Norte.

The participants were consisted of 217 individuals from the Indigenous People community of Cawilan in Tubod, Surigao del Norte. Out of the total population of 217 individuals, there were 109 males and 108 females and there were 9 senior citizens, consisting of 4 males and 5 females. With the said population, the researchers gathered 80 participants.

The age range of the participants varied, most of the people in the community are children, young adults, middle-aged individuals, and elderly members of the community. This diversity in age groups will help provide a comprehensive understanding of traditional medicinal plant used. Thus, purposive sampling was used.

The instrument used in this study was a researcher made standard interview questionnaire for ethnobotanical study. The constructed questionnaire for Indigenous People had two parts. Part I The researchers asked for the participants' profile and number of years living in the said community. Part II deal with the identification of some of their healing practices when illnesses arise to their living, and what are the different types of medicinal plants used. And the questionnaire is in English and explain in "Bisaya" dialect in order to suit the native language of the participants.

VI. RESULTS AND DISCUSSION

This chapter presents the data gathered in the study and discusses the implications of the findings. Based on the results, the following findings were drawn:

1. 80 respondents were primarily identified as females, participants with broad knowledge of medicinal plants were 42-51, and all of the participants were married.
2. All the medicinal plants used by the Indigenous People of Cawilan, Tubod, Surigao del Norte were identified: *Arcangelisia flava, Psidium guajava, Curcuma longa, Chromolaena odorata, Artemisia vulgaris, Cinnamomum mercadoi, Origanum vulgare, Cordyline fruticosa, Dendrocnide meyeniana, Mimosa pudica,* etc.
Moringa oleifera, Muntingia calabura, Coleus blumei, Ipomoea triloba, Eleusine indica, Strobilanthes alternata, Blumea balsamifera, Echinochloa colona, Caesalpinia sappan, Peperomia pellucida, Senna alata, Ficus racemosa, Cyperus obtusatus, Cymbopogon citratus, Euphorbia hirta.

3. There were five (5) identified plant parts, namely: Leaves, Roots, Stem, Sap, and flowers; among all the parts of the plant used, leaves are the most frequently used by the Indigenous People, while the minor part used was the sap of the plants.

4. In terms of mode of preparation, four (4) were identified: Decoction, Slightly Roasted, Rinse and Slightly Pounded. The decoction was the most commonly used method of preparation, while slightly roasted was considered the least frequently used method.

5. In terms of mode of administration four (4) were identified: Oral Administration, Topical Application (Rubbing), Ingestion, and Topical Application (Patching). Oral administration got the highest frequency in terms of methods of administration used while applying it to the affected part of the body got the minor frequency.

6. There were sixteen (16) identified diseases that can be cured with the identified medicinal plants: Cough, Cold, Fever, Flatulence, Muscle Pain, Epigastric Pain, Diarrhea, Relapse, Poisonous Bites, Snake Bite, Ulcer, Kidney Disease, Hypertension, UTI, Wounds, and lastly Blood Vomit. Among all the identified medicinal plants, cough was the most mentioned disease that specific medicinal plants can cure.

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Scientific Name</th>
<th>Plant Parts Used</th>
<th>Method of Preparation</th>
<th>Method of Administration</th>
<th>Ailment treated</th>
<th>Literature supporting the pharmacological use of the plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alibutra</td>
<td>Arcangelisia flava</td>
<td>-Roots</td>
<td>-Decoction</td>
<td>-Oral Administration</td>
<td>-Flatulence</td>
<td>In Indonesia the stems are used to treat sprue, stomach problem and jaundice (ASEAN Herbal and Medicinal Plants 2010).</td>
</tr>
<tr>
<td>Bayabas</td>
<td>Psidium guajava</td>
<td>-Leaves</td>
<td>-Decoction</td>
<td>-Oral Administration</td>
<td>-Cough</td>
<td>According to the DOH (n.d) Bayabas is a Philippine herbal medicine used as antiseptic, anti-inflammatory, antispasmodic, antioxidant hepatoprotective, anti-allergy, antimicrobial, anti-plasmodial, anti-cough, antidiabetic, and antigenotoxic in folkloric medicine.</td>
</tr>
<tr>
<td>Duyaw</td>
<td>Curcuma Longa</td>
<td>-Roots</td>
<td>-Decoction</td>
<td>-Oral Administration</td>
<td>-Muscle Pain -Cold</td>
<td>It is employed in several other ailments such as cough, cold, dental issues, indigestion, skin infections, blood purification, asthma, piles, bronchitis, tumor, wounds, and hepatic disorders, and is used as an antiseptic. (Fuloria et al., 2022)</td>
</tr>
<tr>
<td>Hagunoy</td>
<td>Chromolaena odorata</td>
<td>-Leaves</td>
<td>-Decoction</td>
<td>-Oral Administration</td>
<td>- Epigastric Pain</td>
<td>Ethnopharmacological properties of this plant such as antibacterial, anti-inflammatory, antioxidant and analgesic activity. Other medicinal uses</td>
</tr>
</tbody>
</table>
### Hilbas

**Artemisia vulgaris**

-Leaves
-Roots
-Decoction

-Oral Administration
-Topical Administration (Rubbing)

-Cough
-Flatulence
-Fever

-include its potential in wound healing treatment, skin infection as well as to treat stomach problems. (Aziz, 2020)

-plant extracts of *Artemisia vulgaris* have been found to be rich in phenolic and flavonoids contents and were used for the cure of several diseases with sufficient scientific proof supports for its medicinal property as antidiabetic, anti-epileptic, antihelmintic, antimalarial, anti-microbial, antinociceptive, anti-oxidants anti-hysteric, diuretic, digestive and stimulant (Thangjam et al., 2020)


### Kalingag

**Cinnamomum mercadoi**

-Body
-Decoction

-Oral Administration

-Relapse

-Kalingag is used to treat various diseases, including relapses, bloating, flatulence, diarrhea, indigestion, vomiting, rheumatism, colds, fever, headache, sinusitis, asthma, injuries. (Balangiao & Walag, 2022)


### Karabo

**Origanum vulgare**

-Leaves
-Decoction

-Oral Administration
-Topical Administration (Rubbing)

-Cough
-Cold
-Flatulence

-Soltani et al. (2021) stated that some of the uses for *Origanum vulgare* in traditional medicine are respiratory disorders, stomachache, painful menstruation, rheumatoid arthritis, analgesics, nutritive disturbance and urinary problems as a diuretic and antiurolithic.


### Kilaha

**Cordyline fruticosa**

-Roots
-Rinse
-Ingestion

-Snake Bite

-No RRL found


### Lingatong

**Dendrocnide meyeniana**

-Roots
-Decoction

-Oral Administration

-Flatulence

-Dendrocnide meyeniana used as alternative medicine for ulcer, gas pain, flatulence, stomach acidity, burning chest. (Pucot & Demayo, 2021)


### Makahiya

**Mimosa pudica**

-Roots
-Decoction

-Oral Administration

-UTI

-Results revealed that the decocted roots of *Mimosa pudica* Linn is comparable to the effect of the commercial drug in the treatment of urinary tract infections. (Balag-ey., 2010)
<table>
<thead>
<tr>
<th>Malunggay</th>
<th>Moringa oleifera</th>
<th>Leaves</th>
<th>Decoction</th>
<th>-Oral Administration -Ingestion</th>
<th>-Ulcer-Kidney disease</th>
<th>Moringa extract was shown to significantly reduce free radicals and neutralize the acidic behavior of gastric juice and have a protective effect on the development of gastric ulcer. (Ijioma et al., 2017)</th>
<th>22</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mansanitas</td>
<td>Muntingia calabura</td>
<td>Leaves, Roots</td>
<td>Decoction</td>
<td>-Oral Administration</td>
<td>-Diarrhea</td>
<td>The leaves, flowers, barks and roots of M. calabura have been used as a folk remedy to treat migraine, fever and incipient cold. Besides, they are also employed as antiseptic, antispasmodic, and antidiyspeptic agent. (Halim et al., 2017)</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Manyana</td>
<td>Coleus blumei</td>
<td>Leaves</td>
<td>Decoction</td>
<td>-Oral Administration</td>
<td>-Cough -Fever</td>
<td>Mayana has long been used as home remedy for many illnesses such as cough and cold and also fever. It has long been used since about a century ago. (Galasiao, 2015)</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Muti-muti</td>
<td>Ipomoea triloba</td>
<td>Leaves</td>
<td>Decoction</td>
<td>-Topical Administration (Rubbing)</td>
<td>-Muscle Pain</td>
<td>No RRL found</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>Paragis</td>
<td>Eleusine indica</td>
<td>Roots</td>
<td>Decoction</td>
<td>-Topical Administration (Rubbing)</td>
<td>-Epigastric Pain</td>
<td>The plant is broadly used for deworming; mitigate cough and lung infections, dysentery, heart attacks, and high blood pressure, spleen and liver problems, blood and kidney stones as well as dislocation of bones and lumbago. Boiled plant decoctions are commonly used as anti-helminthic and febrifuge treatments. (Kashyap et al., 2023)</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Ramon</td>
<td>Strobilanthes alternata</td>
<td>Leaves</td>
<td>Slightly Pounded</td>
<td>-Topical Administration (Patching)</td>
<td>-Wounds</td>
<td>It has been used in the traditional system of medicine in India for treating various ailments like cut wounds, haemorrhage, venereal disease, excess mensuration etc. (Krishnan et al., 2023)</td>
<td>41</td>
<td>6</td>
</tr>
<tr>
<td>Sagbong</td>
<td>Blumea balsamifera</td>
<td>Leaves</td>
<td>Decoction, Slightly Roasted</td>
<td>-Drank -Topical Administration (Patching)</td>
<td>-Muscle Pain -Epigastric Pain -Fever -Cough -Blood Vomit -Diarrhea</td>
<td>Used as a traditional medicine for patients with kidney stones, common cold or as a diuretic (Widiiantara &amp; Jawi, 2021). Additionally, Sambong has antimicrobial properties that help in a lot of diseases. Perhaps one of the</td>
<td>49</td>
<td>7</td>
</tr>
<tr>
<td>Plant Name</td>
<td>Scientific Name</td>
<td>Part Used</td>
<td>Formulation</td>
<td>Administration</td>
<td>Benefits</td>
<td></td>
<td></td>
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<tr>
<td>Sambong</td>
<td>Echinochloa colona</td>
<td>Leaves</td>
<td>Decoction</td>
<td>Oral Administration</td>
<td>Fever</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sambong</td>
<td>Caesalpinia sappan</td>
<td>Flower</td>
<td>Rinse</td>
<td>Ingestion</td>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sambong</td>
<td>Sinaw</td>
<td>Leaves - Roots</td>
<td>Decoction</td>
<td>Oral Administration</td>
<td>Diarrhea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sambong</td>
<td>Senna alata</td>
<td>Leaves - Flower</td>
<td>Decoction - Rinse</td>
<td>Oral Administration - Ingestion</td>
<td>Diarrhea - Poisonous Bites</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sambong</td>
<td>Ficus racemosa</td>
<td>Leaves - Roots</td>
<td>Decoction</td>
<td>Oral Administration</td>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The best sambong benefits is its ability to destroy bacteria and other microbes. Coupled with its anti-inflammatory chemicals, sambong can be used to help in the treatment of diarrhea and stomach-ache; skin problems, like worms and boils; sore throat; and rheumatism. (Bunag, 2023)

The plant Echinochloa colona of family Gramineae, is medicinally and claimed to be useful in the treatment of various ailments such as fever, diabetes, and jaundice. (Praneetha et al., 2017)

Caesalpinia sappan extract represents a potential treatment for oxidative stress-induced skin photoaging, possesses gastroprotective activity kills fungus, virus, and bacteria, protects cardiovascular system, reduces inflammation, and blood glucose, inhibits human breast cancer, cures miliaria and diarrhea. (Vardhani, 2019)

In ethnomedicine, it is used to treat hemorrhages, fevers, lower cholesterol levels and serves as a cough suppressant, emollient, and diuretic. (Uwaya et al., 2021)

In the Northern part of Nigeria, S. alata is used in the treatment of skin, diarrhea, wound, inflammation, constipation, and burns (Atanu et al., 2022). Senna alata are also used for treatment of snake bites and venereal eruptions in India and South America (Ling et al., 2019)

The traditional Indian medical system, has employed the popular medicinal plant Ficus racemosa for many years to treat a variety of illnesses and disorders, including skeleton.
Table 1. Different Types of Medicinal Plants Used by the Indigenous People of Cawilan, Tubod, Surigao del Norte

<table>
<thead>
<tr>
<th>Plant</th>
<th>Species</th>
<th>Parts Used</th>
<th>Administration</th>
<th>Mode of Administration</th>
<th>Condition(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamok</td>
<td>Cyperus obtusatus</td>
<td>-Roots</td>
<td>-Decoction</td>
<td>Oral Administration</td>
<td>Cough</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No RRL found</td>
</tr>
<tr>
<td>Tanglad</td>
<td>Cymbopogon citratus</td>
<td>-Roots</td>
<td>-Decoction</td>
<td>Oral Administration</td>
<td>Hypertension</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cymbopogon citratus (C. citratus) is used in the traditional treatment of cardiovascular disorders. (Tcheutchoua et al., 2022)</td>
</tr>
<tr>
<td>Tawa-tawa</td>
<td>Euphorbia hirta</td>
<td>-Leaves</td>
<td>-Decoction</td>
<td>Oral Administration</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Stem</td>
<td></td>
<td></td>
<td>This medicinal plant is recommended for certain sicknesses particularly, Dengue. It is also used for respiratory problems like Asthma. It also helps increase the count of blood platelet that helps ease dengue. (Ungoco, 2017)</td>
</tr>
</tbody>
</table>

VII. CONCLUSIONS

To shed light on the significant findings of the study, the research discovered that Indigenous People in the community generally use medicinal plants in a similar way, no matter their background. But, when it comes to picking certain plants, it did not make a big difference in treating specific health issues. So, in simple terms, the study showed that the kinds of plants they use are not strongly connected to the illnesses they trying to treat.

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