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Ethnozoological study of traditional medicinal animals and their products used by the Manobo Umayamnon tribe in the Southern Philippines

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ABSTRACT

This study documented the species of animals used by the Manobo Umayamnon tribe in Loreto, Agusan del Sur, Philippines. The animal parts for medicinal purposes and the treatment process of the ethnomedicinal species were surveyed. The most commonly used animals were determined using Fidelity Level (FL) and Informant Consensus Factor (ICF). The Relative Frequency of Citation (RFC) that indicated each species' local importance was also determined. A total of 100 respondents from six barangays were interviewed regarding the utilization of animals for medicinal purposes. Manobo Umayamnon listed a total of 11 species of medicinal animals that belong to 11 families. Python snake bile was the most commonly used animal organ, decoction was the most widely used preparation method, and drinking was the most frequent way of administering medicine. Based on RFC values, the family Pythonidae (Baksan) accounted for 94.59% of the animals. The findings provide a detailed inventory of valuable medicinal animals utilized by the Manobo Umayamnon tribe and serve as a physical record of their culture.

Keywords: *Ethnomedicinal Animals, Manobo Umayamnon, Fidelity Level*

1 Introduction

Biodiversity has been used for healing in various cultures since ancient times (Vijayakumar et al. 2015) and is widely utilized in modern society (Alves and Rosa 2005). On the other hand, ethnomedicine refers to the study of traditional medicine used by the indigenous people, particularly for human health care, such as to cure diseases (William 2006). Most communities, particularly in rural regions, have many traditional healers who employ ethnomedicine to treat illnesses (Ahmad et al. 2011). These indigenous people have been taught how to use natural systems for food, medicine, and other purposes (Chellappandiyan et al. 2014).

Plants are not the only source of ethnomedicine; they can also be the animals around us. A study of the relevance of the people in the society and the animal richness they may utilize for beneficial purposes is called ethnozoology. Zootherapy is an essential part of ethnozoology, which deals with the curacy of different diseases in the human body using a medicine prepared from various kinds of animals or other products that come from animals (Jaroli and Mahawar 2010). Ethnozoological investigations are crucial in the development of novel drugs (Alves and Rosa 2005). Animals were heavily used in the inventory of therapeutic components employed in various cultures in ancient times, and their parts and products are essential in the list (Jaroli et al. 2010; Borah et al. 2017). In traditional Chinese medicine, there are more than 1500 species of animals with medicinal uses (Still 2003). A region's absence of ethnozoological studies

may contribute to underestimating zootherapeutic resources' relevance (Alves and Rosa 2010).

The Manobo Umayamnon is a living tribe in the Municipality of Loreto in the southwest part of Agusan del Sur, Philippines. The Manobo Umayamnon had already existed together with other ethnolinguistic groups of people in the municipality, yet they were widely distributed in any vicinity. Following their ancient practices and living processes, they survived and fought against various diseases (Masendo 2015). Because of its proximity to Agusan Marsh Wildlife Sanctuary (AMWS), the country's most biologically significant wetlands, the Municipality of Loreto is unique in terms of plant and animal richness. The Umayamnons preferred to live in the forested area because of their practice of ethnomedicine which is free and very accessible. The Manobo Umayamnon are somewhat separated from other ethnolinguistic groups. They have established private lives that rely heavily on a deep understanding of biological cycles, natural resource utilization, and traditional technology legacy (Diegues and Mito 1998).

More research is needed to acquire knowledge about the fauna with therapeutic characteristics in Loreto, Agusan del Sur. Because many rural communities are losing their socioeconomic and cultural traits, it is critical to document traditional knowledge (Alonso-Castro et al. 2011). The current documentation provides scientific records on this losing information before it is eroded from the mountains and lost to the scientific community. It is also needed to protect traditional knowledge, ensuring Manobo Umayamnon sovereign rights over its genetic resources and exploitation, and conserving and sustainable usage of Loreto, Agusan del Sur's rich biodiversity for future generations.

For the first time, a quantitative ethnozoological survey was designed to collect primary data in the Municipality of Loreto, Agusan del Sur, to discover and document the traditional uses of animals and evaluate the relevance of medicinal animals utilized by the Manobo Umayamnon. This study is also significant for biological resource conservation and exploitation. It will also assess the information received from the tribe systematically and quantitatively, highlighting the relevant animal species, the procedure, and animal products utilized as medicine by the Manobo Umayamnon in the area.

2 Materials and Methods

Description of Study area

Loreto is a river town of the second district located southwest of Agusan del Sur. According to the Philippine Statistics Authority (PSA), the municipality has a land area of 1462.74 km² (564.77 sq mi), consisting of 14.64% of the 9989.52 km² (3856.98 sq mi) total district of Agusan del Sur and a population 42, 501 population and 9,028 households as of 2015. The municipality is composed of 17 barangays, in which six barangays were selected for the study, including barangay Magaud, San Vicente, Sto. Tomas, Violanta, Waloe, and Sabud (Figure 1). It is surrounded by mountains and forests, where most of the inhabitants are the Lumad of Loreto or the Manobo Umayamnon (Buenconsejo 2010).

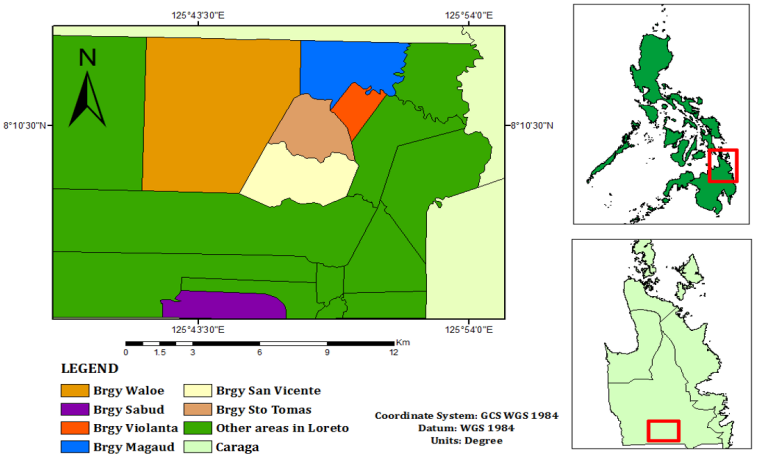

Figure 1. Map of Loreto, Agusan del Sur, the Philippines, with the six barangays participating in the study.

Data Collection

The sampling was done in the selected barangays of Loreto, Agusan del Sur, where most Monobo Umayamnon is residing. A total of 100 respondents belonging to the Manobo Umayamnon tribe with the age range from 18-80 years old above were interviewed for the study. The selection of the respondents was based on the following criteria: (a) availability of the respondents; (b) willingness to participate; (c) being a member of the Manobo-Umayamnon tribe; and (d) and accessibility of the participant's area. The survey was performed in January and February 2019 using a semi-constructed questionnaire. The survey questions were checked and validated by a sociologist to increase data quality and credibility. The ethnomedicinal data about animals' use were collected using a participatory rural appraisal (PRA) method, where the informants also sometimes become the investigator themselves. The PRA involves an interview, informal meetings, open and group discussions with a semi-structured questionnaire translated orally into their dialect. During the field interviews, the locals act as translators during actual data gathering.

Ethical considerations

In keeping the views of the local community's cultural values, the data collected were handled with care. The respondents were informed that the study was carried out for academic reasons and not for commercial purposes. A Free Prior Informed Consent (FPIC) was secured from the National Commission of Indigenous People (NCIP) before the conduct of the study. A list of all the members of the Manobo Umayamnon Tribe was secured from the tribal leader and the local government unit (LGU). An individual informed consent was also obtained from the respondents before the face-to-face interview, allowing the researcher to collect data for the study.

Species identification

The local name of the animals and their associated medical attributes were recorded in this study. Some animal samples available during that time were not photo-documented because respondents refused, believing it would lessen its effectiveness. Other animal samples shown by the respondents have already undergone some processing or are already incorporated with their medicinal products, making it challenging to identify and describe the specific animals used. Thus, the species identification was up to family level and local name only.

Relative Frequency of Citation (RFC)

The relative frequency of the citation index shows the local importance of each species. The RFC value was calculated using the formula RFC=FC/N, where FC is the number of informants mentioning the use of species, and N is the number of informants participating in the survey (Vitalini et al. 2012). This RFC index varies from 0 to 1, where the RFC index is 0, which means that the animals are helpful. When the RFC index is 1, all informants in the survey refer to the animals as applicable (Mohomodly and Mootsamy 2014).

Fidelity Level (FL)

Fidelity level (FL) is determined to identify the residents' most preferred species for treating specific ailments. It was calculated using the formula

$$FL(\%)=Np \times \frac{100}{N}$$

where Np is the number of informants claiming the use of a particular animal species to treat a specific ailment, and N is the total number of the informants who utilized the animal medicine to treat any given disease (Freedman et al. 1986).

Informant Consensus Factor (ICF)

The informant consensus factor (Logan 1986; Heinrich et al. 1998) was calculated to evaluate the level of agreement amongst respondents regarding which animals to use for each category. It estimates the relationships between the use reports in each category or disease cluster (Nur) minus the total number of species used (Nt), over the number of use reports in each category minus one. The formula is ICF= Nur – Nt / ur -1. The values of ICF range 0 to 1, wherein the highest value close to 1 indicates that relatively few taxa are used by a large proportion of the informants. In contrast, a low value indicates that the informants disagree on the taxa used in the treatment within a category of illness.

Statistical Analysis

Microsoft Excel and SPSS version 14 were utilized for the statistical computation, analysis, and visualization of the data. The significance level is considered at alpha = 0.05. The comparison of species variation was then analyzed using the ANOSIM or the analysis of similarity (Table 1).

Table 1. ANOSIM Coefficient Interpretation (Sop et al. 2012).

Range	Verbal Interpretation
0.00 to 0.25	No difference/Similar
0.26 to 0.75	Some Separations/Some Dissimilarities
0.76 to 0.99	Well Separated/Well Dissimilarities
1	Totally Dissimilar

3 Results and Discussion

Respondent's profile

The 100 Manobo Umayamnon respondents of the six different barangays were selected because of their knowledge of the medicinal animals. Most of the respondents came from Barangay Sto. Tomas (30%), and most of them were females (51%) and were wives (42%). The family size of respondents mostly ranges from 4-6 (46%); the majority are self-employed (40%), and only 42% obtained an elementary education. The age of the participants ranges from 55-65 (33%) (Table 2).

Differences in educational background, profession, especially the respondents' life status, do not significantly impact their knowledge about ethnomedicine that cures various ailments (Tantengco et al. 2018). Similar to Dapar et al. (2020), the medicinal knowledge among respondents was not significantly related when grouped according to education, gender, social position, occupation, and civil status. During the survey, it was observed that the knowledge of the Manobo Umayamnon was passed on to their generation through oral tradition and practices. This tribe is very resourceful, and every time they encounter diseases, plants from the wild or cultivated or even animals, if available, are used to cure their ailments (Olowa et al. 2012). Part of the success of efficacious treatment and management of many health problems may be attributed to the resourceful utilization of indigenous medicinal species, several of which contain chemical substances that may be curatively effective against some diseases as claimed (Halberstein and Saunders 1978).

Medicinal animals

The use of ethnomedicinal animals is believed to treat various types of ailments. In this study, animals such as goats, deer, turtles, monkey, snakes (python and cobra), electric eel, chicken, cat, lizard, and even part of the newly born baby were reported by Manobo Umayamnon to have ethnomedicinal benefits (Table 3). Snakes of the Family Pythonidae, locally known as "baksan," are used by the tribe to cure multiple diseases, including stomachache, diarrhea, and asthma, have the highest RFC values. The skin, bones, flesh, and internal organs such as liver and bile are the most utilized body parts from the reticulated python. These body parts can be orally ingested directly or processed through decoctions and taken once a day.

The traditional medicinal knowledge of indigenous people worldwide has played an essential role in identifying living organisms endowed with medicinal values important for treating human health problems (Kendie et al. 2018). Wild and domestic animals and their products, such as bones, skins, blood, and internal organs, serve as essential ingredients in preparing curative, protective, and preventive medicines to cure ailments (Pigeons 1992). In this study, pythons were the most used animal by the Manobo Umayamnon. Skin, meat, blood, and marrow are among the python body parts utilized in medicine, in addition to bile. Individuals who consume python bile utilize it by ingesting it directly or drying it, then cutting it into pieces and ingesting it with water or putting it in an empty capsule and drinking it (Zulkarnain et al. 2021). The reticulated python is the world's longest snake, and it grows over 8.5 lengths and weighs a mass of about 145 kg. This animal is prevalent among the people living in Asia. The species ranges from India in the west part, across to Indo-china, going to Vietnam, and south into the Indonesian archipelago. In this part of the world, people traditionally captured reticulated python as a source of income. They sold the meat, skin, fat, and other snake parts to supply the growing demand for protein through traditional medicines. Approximately 300,000 to 450,000 skins of reticulated python from Southeast Asia were gathered every year due to the increasing demand for medicine (Natusch et al. 2016).

Table 2. Demographic profile of the respondents of Manobo Umayamnon from the six barangays of Loreto, Agusan del Sur, Philippines

Profile	Frequency (n=100)	Percentage (%)
Sex		
Male	49	49.0
Female	51	51.0
Age		
25 to 35	12	12.0
36 to 45	9	9.0
46 to 55	19	19.0
56 to 65	33	33.0
66 to 75	15	15.0
76 to 80	11	11.0
Above 81	1	1.0
Role in the Family		
Husband	47	47.0
Wife	42	42.0
Child	11	11.0
Family Size		
3 and Below	11	11.0
4 to 6	46	46.0
7 to 9	32	32.0
10 and Above	11	11.0
Occupation		
Farming	21	21.0
Housekeeping	31	31.0
Self-employed	40	40.0
None	8	8.0
Educational Attainment		
Elementary graduate	17	17.0
High school graduate	17	17.0
Elementary level	42	42.0
High school level	8	8.0
None	16	16.0
Barangay		
Barangay Sto. Tomas	30	30.0
Barangay Magaud	10	10.0
Barangay Waloe	23	23.0
Barangay Violanta	20	20.0
Barangay San Vicente	10	10.0
Barangay Sabud	7	7.0

Table 3. List of ethnomedicinal animals that were used by the Manobo Umayamnon in Loreto, Agusan del Sur.

Animal family	Local/Common name	Part used	Treatment process	Disease treated	Mode of preparation	Dose / Day	RFC
Bovidae	Kanding/ Goat	Feces	Grilled, fried, crushed, decoction	Measles, fatigue	Grilled feces is crushed into a powder, added with hot water and served as tea	Once or Twice	0.44
Cervidae	Usa / Deer	Horn	Crushed & decoction, paste	Wounds, swelling, bites	Topically applied on the affected area	Once or Twice	0.24
Geoemydidae	Bao / Turtle	Bone, flesh, internal organs, shell, liver	Decoction, ingestion, steam bath, fried, ointment	Stomachache, asthma, rheumamatism, diabetes, malaria	Boiled with water and serve as a tea	Once or Twice	0.55
Cebidae	Unggoy/ Monkey	Jaw	Fried, roasted, crushed, decoction	Teething	Grilled jaw is crushed into powder, added with water and serve like tea	Once or Twice	0.08
Pythonidae	Baksan / Reticulated Python	Bone, flesh, internal organ, skin, fats, liver, bile	Decoction, ingestion, ointment, steam bath	Headache, stomachache, fever, diarrhea, asthma, rheumatism, high blood, diabetes, malaria	Decocted bile is taken orally, fats is used as ointment and rub into the affected area	Once	0.74
Anguillidae	Kasili / Eel	Tail	Patch	Pregnant	Tail is patched with bandage to the hip		0.07
Phasuanidae	Manok / Chicken	Blood, Egg	Ingestion, offering	Fever, measles	Blood from the chicken is used as an offering	Once or Twice	0.29
Hominidae	Bata / Infant	Umbilical cord	Decoction	Diarrhea	Decocted umbilical cord is taken orally	Once	0.10
Elapidae	Kobra / Cobra	Bone, flesh, skin, blood	Chewing, ingestion	Headache, stomachache, diarrhea, spasm, swelling, rheumatism, bites, high blood, diabetes	Blood of the cobra is taken orally	Once	0.18
Felidae	Iring / Domesticated Cat	Paw	Topical rubbing	Throat pain, stucked fish bone on throat	Paw of cat is rubbed on the throat several times	Once	0.24
Gekkonidae	Tiki / House Lizard	Bone, flesh, internal organs, skin, tail, blood	Grilled, fried, crushed, decoction	Headache, fatigue	Grilled and then crushed into powder,added water and served as tea	Once	0.15

Relative frequency of citation

Snakes of the Family Pythonidae had the highest number of citations (0.74), followed by Geoemydidae (0.55), Bovidae (0.44), Phasuanidae (0.29), Felidae, Cervidae (0.24), Elapidae (0.18), Gekkonidae (0.15), and Hominidae (0.10). The family Cebidae and Anguillidae animals yielded the lowest RFC values (0.08 and 0.07, respectively).

The relative frequency of citation (RFC) index was calculated to determine each species' local importance. The highest value of the RFC index of Pythonidae and Geoemydidae indicates the importance of animal species to the Manobo Umayamnon in the study area as a higher number of informants mentioned it. However, animal species with low RFC values, such as Anguillidae, do not mean they are not locally important. Still, most respondents are not aware of their medicinal properties (Borah et al. 2017).

Animal parts used

Different parts and derivatives from 11 identified species of ethnomedicinal animals used for treating a particular disease were recorded (Figure 2). The most commonly used animal parts were bile (15%), feces (10%), and fats (9%). The inhabitants of the study area used bile as the primary source of medicine. They also used fats and flesh to treat skin diseases and rheumatic pain. The presence of omega-3 fatty acids in fat that

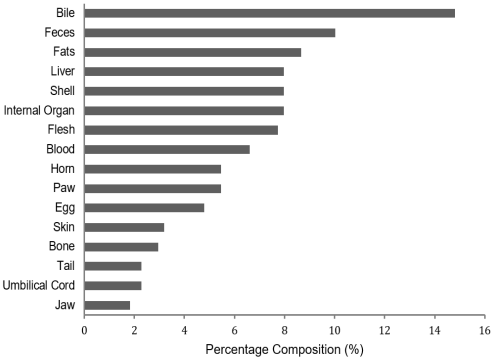

Figure 2. Animal parts and animal derivatives used by the Manobo Umayamnon as ethnomedicine in Loreto, Agusan del Sur, Philippines

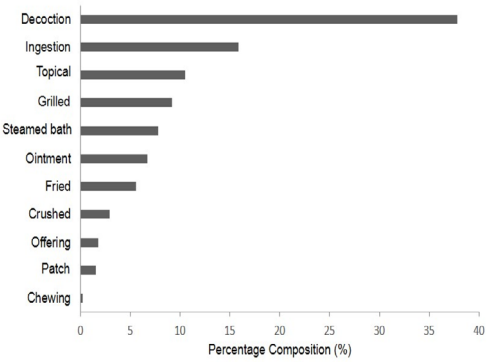

Figure 3. Treatment processes of medicinal animals used by the Manobo Umayamnon in Loreto, Agusan del Sur, Philippines

reduces inflammation may treat human ailments (Siddiqi and Tahir-Kheli 2004). Different animals' blood was effective in abdominal dropsy, arthritis, burning sensation, sexual weakness, and dysentery. The flesh of various mammals and birds was used to cure asthma, epilepsy, joint pain, sexual debility, and skin infections (Altaf et al. 2017). Animals and products derived from different organs of their bodies have constituted part of the inventory of medicinal substances used in various cultures (Alves and Rosa 2005). The Manobo Umayamnon used the cat's paws to remove the stuck fish bone from the throat. The paws of the domesticated cats were gently placed and pressed on the throat area where the pain was felt due to the stuck fishbone. An up and down motion with slow swallowing was executed until the pain was all gone. Still, the local people of Pakistan used the cat's fats to treat skin infection and rheumatic pain (Altaf et al. 2017).

The treatment process of medicinal animals

Animal parts and their derivatives have undergone some sort of mechanical or chemical processing before it is used to treat an ailment. The Manobo Umayamnon had described 11 ways of preparing ethnomedicinal animals for the treatment. It includes decoction of animal parts and their derivatives (38%), direct ingestion (16%), topical application (10%), grilling of animal parts and their derivatives (9%), steamed bath (8%), among others (Figure 3).

Medicinal animals undergo various preparation methods for different ailments like crushing, powdering, squeezing, direct use, and cooking. This study showed that traditional medicines were administered by drinking, eating, or wrapping and massaging. Their method of preparation does not have artificial substances added (Kendie et al. 2018). The most commonly used process is decoction to extract the nutrients and medicinal properties (Tantengco et al. 2018). The Manobo of Eastern Mindanao believed that epidemics are attributed to sea-demons' malignancy, and by way of propitiation and inducement to this plague-spirits to hurry off with their outbreak, offering placed on reflects are launched in the nearest rivers (Garvan 1927). For natural causes, they resort to use herbs and roots, and medicinal animals and their parts or derivatives, such the gall of the snakes. When the ailment is due to spirit or magic causes, they used pulverized bone from a corpse or woman's blood dried in the sun, exposed to the moon, and mixed with finely cut hair. They also use a secrete method to neutralize the effect of magic. The Levantine (found in the portion of Israel and other neighboring countries) made offerings if diseases were believed to originate from some evil spirits in nature (Lev 2003). For the Manobo Umayamnon, they made offerings like fresh chicken blood to cure a specific ailment caused by the spirit.

Informant Consensus Factor (ICF)

The Umayamnons have indicated that some diseases are cured through treatment using their identified medicinal animals and these diseases were grouped into different categories. Among these categories, the dermatological problems yielded the highest computed ICF (0.979) while nervous system-related ailments had the lowest ICF value (0.6) (Table 4). This result suggests

that dermatological problems are commonly experienced by the tribe, and the medicinal animal species traditionally used to treat the dermal problems are worth searching for their bioactive compounds (Canales et al. 2005). The lowest ICF value of nervous system-related ailments may indicate low incidence of this type of ailments in Manobo Umayamnon tribe. In an ethnoveterinary study of remedies of diseases among milk yielding animals in Kathua, Jammu and Kashmir, India, informants had the highest ICF for the use of enthomedicinal animals for treating dermatological ailments (Sharma et al. 2012). This indicates that despite the fact that local residents have access to government-run health-care facilities, therapeutic organisms are valued among the local population.

Fidelity level of animals

Animals with the highest number of fidelity level citations are Pythonidae for the treatment of stomach ache (FL=94.59%), Geoemydidae for the treatment of asthma (FL=92.73%), and Bovidae for the treatment of measles (FL=90.91%) (Table 5). Fidelity level helps identify the most frequently used animals in the treatment of a particular disease. Fidelity level varies from 1.0 to 100% based on the respondent's claims in using individual animals for medicinal purposes (Kendie et al. 2018; Jaroli et al. 2010). A higher FL of 100% or close to 100% for a specific animal indicates that all reports mentioned the same method for using the animals in treating a specific disease. The animals with a higher number of use reports have the maximum fidelity level, while animals with less usage also have the lowest fidelity level values. From this study, the results indicated that in many cases, there are animals reported to be used in the treatment process of more than one disease in many cases. On the other hand, different animals are used to treat the same kind of illness (Borah et al. 2017).

Frequency of use and effectivity of animals

The frequency of use and effectiveness of animal part's to cure diseases were also identified. Pythonidae was considered the most widely used animal and the most effective. Bovidae was moderately effective, while Cebidae was deemed to be less effective (Table 6). Pythons are typically present and frequently seen in African traditional medicine markets. Many body parts of a python are important due to their medicinal properties, but the skin of this snake is also exported not only for medicinal purposes but also for the fashion industry (Dickson et al. 2017). There are studies that show how snake bile can be used to treat health problems in the community. Furthermore, all components of the snake, including its bile, are high in protein and antioxidants. This could be the foundation for claims of python bile's efficacy for colds/runny nose, malaria, fever, heat, cough, shortness of breath caused by respiratory tract allergies or infection (such as asthma, bronchitis), and aches and pains (Zulkarnain et al. 2021).

Analysis of similarity in animals

The result of this study showed that there are no similarities of samples between paired barangays. Collected samples from Barangay 2-6 (0.796) and Barangay 5-6 (0.946) are dissimilar to each other (Table 7). In a similar study in Tambaba settlement, analysis of communities and their therapeutic uses of animals are very similar (Brito et al. 2017). In a separate study, the ethnic groups surveyed share some level of ethnozoological knowledge (Zanvo et al 2021).

Table 4. Informant Consensus Factor (ICF) values of the diseases cured by identified medicinal animals of the Manobo Umayamnon Tribe.

Category	Diseases	Animal most used	Animal taxa used	ICF	Used citation
Nervous system ailments	Headache	Elapidae	3	.6	6
Digestive system ailments	Stomachache and diarrhea	Pythonidae	4	.971	105
Fever	Fever	Phasuanidae	2	.875	9
Blood-related ailments	High blood, diabetes, and malaria	Elapidae	3	.96	51
Dermatological problems	Wounds, bites, and measles	Bovidae	3	.979	98
Muscle-skeletal ailments	Spasm and rheumatism	Bovidae	4	.942	53
Inflammation and pain	Swelling and teething	Cervidae	3	.92	26
Beliefs	Pregnancy	Felidae	2	.966	31

Table 5. Fidelity level (FL) values for animals claimed to be used by the respondents against the corresponding ailment.

Family	Local/ Common Name	Disease/ Condition	SF	TF	FL
Bovidae	Kanding / Goat	Measles	40	44	90.91
		Spasm	32	44	72.73
Cervidae	Usa / Deer	Wounds	13	24	54.17
		Swelling	16	24	66.67
		Bites	24	24	100.00
Geoemydidae	Bao / Turtle	Stomachache	1	55	1.82
		Asthma	51	55	92.73
		Rheumatism	5	55	9.09
		Diabetes	1	55	1.82
		Malaria	1	55	1.82
Cercopithecidae	Unggoy / Monkey	Teething	8	8	100.00
Pythonidae	Baksan/ Reticulated Phython	Headache	1	74	1.35
		Stomachache	70	74	94.59
		Fever	1	74	1.35
		Diarhhea	22	74	29.73
		Asthma	1	74	1.35
		Rheumatism	4	74	5.41
		Highblood	2	74	2.70
		Diabetes	2	74	2.70
		Malaria	7	74	9.46
Anguillidae	Kasili / Eel	Pregnancy	7	7	100.00
Phasianidae	Manok / Chicken	Fever	8	29	27.59
		Measles	21	29	72.41
Hominidae	Bata / Infant	Diarrhea	10	10	100.00
Elapidae	Kobra / Cobra	Headache	3	18	16.67
		Stomachache	1	18	5.56
		Diarrhea	1	18	5.56
		Asthma	1	18	5.56
		Spasm	3	18	16.67
		Swelling	2	18	11.11
		Rheumatism	9	18	50.00
		Highblood	13	18	72.22
		Diabetes	14	18	77.78
		Malaria	11	18	61.11
Felidae	Iring / Domesticated cat	Fish bone stuck in throat	24	24	100.00
Gekkonidae	Tiki / House Lizard	Headache	2	15	13.33
		Asthma	13	15	86.67

Table 6. Frequency of use and effectivity of cited ethnomedicinal animals.

Family	Local/ Common Name	Frequency of Use			Effectivity		
		Always	Sometimes	No Idea	Fast (1-12 hrs)	Moderate (12-24 hrs)	Slow (Above 24 hrs)
Bovidae	Kanding / Goat	40	4	-	37	7	-
Cervidae	Usa / Deer	16	8	-	24	-	-
Geoemydidae	Bao / Turtle	43	12	3	50	1	1
Cercopithecidae	Unggoy / Monkey	1	7	-	1	3	4
Pythonidae	Baksan/ Reticulated Python	44	30	9	64	1	-
Anguillidae	Kasili / Eel	6	1	1	6	-	-
Phasianidae	Manok / Chicken	18	11	1	25	3	-
Hominidae	Bata / Infant	6	4	1	9	-	-
Elapidae	Kobra / Cobra	5	13	4	11	1	2
Felidae	Iring / Domesticated cat	24	-	1	23	-	-
Gekkonidae	Tiki / House Lizard	7	8	-	15	-	-

Table 7. Analysis of similarity of ethnomedicinal animal species cited among different barangays.

Barangay Pairs		ANOSIM R Coefficient	Verbal Interpretation
1	2	0.526	Some Dissimilarities
1	3	0.512	Some Dissimilarities
1	4	0.554	Some Dissimilarities
1	5	0.745	Some Dissimilarities
1	6	0.539	Some Dissimilarities
2	3	0.665	Some Dissimilarities
2	4	0.427	Some Dissimilarities
2	5	0.664	Some Dissimilarities
2	6	0.796	Well Dissimilarities
3	4	0.387	Some Dissimilarities
3	5	0.683	Some Dissimilarities
3	6	0.541	Some Dissimilarities
4	5	0.584	Some Dissimilarities
4	6	0.605	Some Dissimilarities
5	6	0.946	Well Dissimilarities

4 Conclusion and Recommendations

This study had identified 11 medicinal animals to treat ailments through interviews from 100 Manobo Umayamnon tribe respondents from Loreto, Agusan del Sur. The most commonly used animals belong to the family Pythonidae, Geomydidae, and Bovidae. The most preferred part of the animal to be used is the bile, specifically the bile of *Baksan*. The preparation of the animal parts and the treatment process of medicinal animals varies, but the most common method of preparation was decoction and infusion while driking was the most common way of administering prepared ethnomedicinal animals.

This ethnozoological knowledge documentation could be a valuable basis to provide a catalog of valuable animals utilized by the Manobo Umayamnon. It will serve as a physical record of their culture for the education of the future Manobo generation. It will also strengthen this tribe's culture by recognizing their traditional knowledge of medicinal animals and providing a scientific basis. It can preserve the traditional understanding of the Manobo, which is slowly fading away due to modernization and the influence of the non-Manobo communities. This study serves as baseline knowledge for future functional bioactivity screening of indigenous animals and conservation of threatened animals with potential medicinal applications. The wealth of this traditional knowledge about ethnomedicinal animals has excellent potential for research and discovery. Hence, further scientific assessment of these medicine for phytochemical and biological analyses is needed.

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Statement of Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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