

VOLUME 9

ISSUE 2

2023

ISSN 2454 – 3055



**INTERNATIONAL
JOURNAL OF
ZOOLOGICAL
INVESTIGATIONS**

***Forum for Biological and
Environmental Sciences***

Published by Saran Publications, India



International Journal of Zoological Investigations

Contents available at Journals Home Page: www.ijzi.net

Editor-in-Chief: Prof. Ajai Kumar Srivastav

Published by: Saran Publications, Gorakhpur, India



ISSN: 2454-3055

Ethnozoological Studies of Medicinal Animals and Their Products Used by the Velip Tribal Community in Goa, India

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Received: 2nd August, 2023; **Accepted:** 10th September, 2023; **Published online:** 14th October, 2023

<https://doi.org/10.33745/ijzi.2023.v09i02.097>

Abstract: Ethno zoological study emphasizes the significance of the traditional knowledge and the roles played by animals in human society. It is a hybrid discipline that integrates both the natural and social science that examines the historical, sociological, anthropological, economic and environmental aspects of the relationships between humans and animals. It can be understood broadly, from ecological, cognitive and symbolic perspectives. Zoo-therapy is healing of human ailments by using medicines prepared from different animals and animal derived by-products. Animals are vital to research that has direct or indirect effects on human health, in addition to being used in traditional medicine and as a source of pharmaceuticals. In India, 109 animal species are used for medicinal purposes, such as monkey's excreta, porcupine spine, pangolin scales, cow urine, cow dung, scorpion, frog, bison milk, turtle, earthworms, honey and invertebrates. Several researchers have made an attempt to study and document the traditional knowledge of ethno zoological aspects including usage of medicinal animals by traditional healers and indigenous inhabitants. However, there is no authentic documentation on the use of medicinal animals in the treatment for various diseases in primary health care system by the tribal communities in Goa. Hence present survey was conducted to record the medicinal animals used by Velip community of Goa.

Keywords: Ethnozoology, Goa, Tribes, Medicinal animal, Zoo therapy, Velip

Citation: Velip Anjali, Gaonkar Akshita, Gaonkar Harshada and Kulkarni Rajender Rao: Ethnozoological studies of medicinal animals and their products used by the Velip tribal community in Goa, India. Intern. J. Zool. Invest. 9(2): 865-874, 2023.

<https://doi.org/10.33745/ijzi.2023.v09i02.097>



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Introduction

Various Ayurvedic practices, usage of medicinal animals and plants in therapeutic traditional medicines have been reported and documented in ancient texts such as Agnivesha Samhita, Charaka Samhita, Ashtanga Hridayam and Ashtanga Sangraha Bhava Prakasha and Madhava Nidanam.

The traditional medicinal knowledge among indigenous tribal communities all over the world has played a crucial role in discovering floral and faunal resources of commercial utilization and also to conserve them. About 15 to 20% of the Ayurvedic medicine in India is based on animal

derived substance such as milk, cheese, eggs, chicken and other animal's parts. (Unnikrishnan, 1998). Studies of the traditional medicine have established a significant role in developing art of bio-prospecting for pharmaceutical compounds (Costa Neto, 2005).

India has a rich biodiversity of medicinal plants and animals with great cultural diversity with many indigenous communities who are dependent on the traditional medicine for their health care (Padmanabhan *et al.*, 2008) Ethno zoological aspects and their usage by traditional healers was reported from Assam (Borah and Prasad, 2017).

Goa is India's smallest state in terms of area and also the fourth smallest state in terms of countries population. The Western Ghats, which make up the majority of eastern Goa, have gained recognition as one of the world's biodiversity hotspots. Goa is flourished with rich diversity of flora and fauna resources which predominates with many tribal groups that use animal body parts as traditional medicine (Chinlapianga *et al.*, 2013) and this can lead to endanger species, used in ethno medicine due to killing of animals. Goa has four major ethnic tribal communities with advantage for evolving knowledge on ethnozoology. They have developed their own medicinal practices through their traditional knowledge system.

Goan tribes are grouped into four communities viz, Gawda, Kunbi, Velip and Dhangar. There is continuity in their lifestyle, customs, practices, traditional, religious beliefs, etc. Velip are Worshippers of Mallikarjuna an incarnation of Lord Shiva and Gaonkars are the people whose ancestors settled in a Goan villages. Velips practice the joint family system, which is not observed among the other tribes. They follow the Budhavant (Wise Elder) system (Romesh Bhandari, 1999). Velip community clan is derived based on occupation; for example Vaiz means medicine man (Bezbaruah, 2003). They mostly live in remote areas or found in forest regions like Sanguem, Quepem and Canacona.

Traditional medicine includes practices based on the theories, beliefs, skills and experiences, unique and indigenous to different cultures, which are used to diagnose and treat illnesses of both physical and mental (Verma *et al.*, 2014; Kandari *et al.*, 2015; Bagde and Jain, 2017). The knowledge of indigenous traditional medicine in most cases is practiced and preserved through oral folklore (Eshete, 2016). Thus, it is time-tested practice of careful observation of trial and error experiments that develop and change with time and space in the process of human interaction with their environment. It is the result of long years of experience of several generations. However, this knowledge can be lost with the death of the knowledgeable elderly persons as different ethnic groups transfer the traditional medicinal knowledge orally from elderly persons from generation to generation. Loss of traditional knowledge of indigenous communities had impact on the development of modern medicine (Martin, 1995). Important ingredients for the preparation of protective, curative, and preventive medicine are domestic and wild animals and their by-products such as skins, hooves, tusks, bones, feathers (Angeletti, 1992; Vedavathy, 2002).

Industrialization, urbanization and the so called modernization are the important unavoidable changes and have tremendous impact on our traditional ethno zoological knowledge of medicinal animal usage in the rural population, mainly in the tribal communities of Goa. It is evident if our traditional knowledge of therapeutic use of medicinal animals is not properly studied and preserved it may vanish forever. For the up gradation of this knowledge, it is very essential to document the tribal traditional therapies involving medicinal animals. Hence, present investigation was designed to document medicinal animals and their products used by the tribal communities in Goa.

Materials and Methods

The present investigation was carried out from September 2022 - January 2023. Surveys were undertaken in Velip communities of Goa, India.

The presentation is based on information gathered through interview with village or community elders having the knowledge of identifying the wild life and their traditional use in their society and are popularly known as “Voktoli”.

Before starting survey we introduced ourselves, objectives of our research and asked for permission to record the data and to take photographs. The questionnaire included the local name of the medicinal species, parts used to treat diseases, process of medicine preparation and administration. The length of each interview lasted for approximately two hours.

According to them, their knowledge of traditional medicines was acquired through parental heritage and/or they have gained experience of usage of medicinal animals and their values in treatment of different ailments. In addition to medicinal animals we also come to know that each community in Goa has their unique customs and traditions, life style and their interaction with animals. At the end of the survey we took their details including name, place and age. The age of the tribal interviewed ranged between 40 to 80 years. They all had answered in Konkani and we translated it to English.

From the collected data fidelity level and used values were determined using the below mentioned formula:

$$\text{Fidelity Level} = \left(\frac{NP}{N} * 100 \right) \%$$

Where Np is the number of informants that mentioned the specific animal species used to treat certain ailments and N is the total number of informants who utilized the animals as medicine for treating any given ailments.

$$\text{Use value (UV)} = \frac{\sum iUV_i}{N}$$

Where Uvi is the number of particular animal species use reports, cited by the informants and N is the total number of informants interviewed.

The study areas are Adnem, Barcem, Morpirla, Subdolem, Maina, Sirvoi in Quepem; Colamba,

Kongarem, Valkini, Potrem in Sanguem ; Navar, Gulem and Cola in Canacona, villages from south Goa.

Results

33 medicinal animals were used to treats 42 different ailments in Velip community. Altogether, 14 informants had responded to this study. From all 33 animals' species, 25 species belongs to vertebrates group and 8 species belongs to invertebrate group.

The medicinal animals used by velip community are - 15 species of class Mammalia, 4 Aves, 3 Reptilia, 1 Amphibia, 2 from each class Fishes, Clitellata, Insecta, 1 species of each Arachnida, Malacostraca, Bivalvia and Cephalopoda (Table 1).

In Velip community, whole body of Earthworm used to relieve wound healing has the highest fidelity level of 100% .Excreta of Monkey used to relieve slender has the lowest fidelity level of 33% (Table 2).

The present study reported Honey bee (*Apis mellifera*) as the commonly cited medicinal animal with %UV = 100%, and Indian Pangolin (*Manis crassicaudata*) with %UV= 3.5% as a least common cited medicinal animal in Velip community (Table 3).

Discussion

India has an immense faunal, floral, as well as cultural diversity with many ethnic communities who are primarily dependent on the traditional medicinal system for their primary health care. (Alves and Rosa, 2005; Vijaykumar *et al.*, 2015).

The tribes gain the knowledge of traditional medicine from their parents or elderly people of their village mainly through practice and experience. From the present study, it is concluded that the medicinal animal's knowledge is in direct proportion to the age of the practitioner. Similar observation was made by Das (2015). According to informants of different age group, 65-75 years' practitioners were with the

Table 1: Ethno zoological studies of medicinal animals and their usage by traditional healers in Velip Community

S. No.	Phylum/Class/Zoological name	Common name/ local name	Disease treated	Part used	Medicine preparation	Mode of application
1	Chordata/Mammalia/ <i>Semnopithecus entellus</i>	Monkey/ <i>Maakad</i>	Chicken pox Heavy cold slender	Excreta	Mix with water +monitor lizard bile juice +medicinal plant. Dried and mix with water	Oral administration
2	Chordata/Mammalia/ <i>Felis catus</i>	Cat/ <i>Maanjor</i>	Bitten by rat	Bone	Bone is boiled in water (soup)	Oral administration
3	Chordata/Mammalia/ <i>Rattus norvegicus</i>	Rat / <i>Undir</i>	Bitten by cat Paralysis	Bone Meat	Bone is boiled in water(bones soup is made) Meat is boiled in water	Oral administration
4	Arthropoda/Insecta/ <i>Apis mellifera</i>	Honey Bee/ <i>Mhovamoose</i>	Cough Cold Cure eye infection Heal burnt skin	 Honey	Collect honey from the hives	Oral administration Oral administration Directly put into eye Apply on skin
5	Chordata/Mammalia/ <i>Homo sapiens</i>	Human/ <i>Manis</i>	Eye infection Antiseptic for wound healing	Milk Urine	Collecting products from human	Put directly into eye Apply on wound
6	Chordata/Mammalia/ <i>Bos taurus</i>	Cow/ <i>Gaay</i>	Weakness due to fever Diabetes Stomach pain Jaundice Diarrhoea	Urine Urine Milk Bile Bile	mix with little amount of water. Drink Directly. Tender guava leaves paste + mixed with urine. Cashew tender leaves paste + mixed with milk. for human. Dry and mixed with water.	Oral administration
7	Chordata/Mammalia/ <i>Hystrix indica</i>	Indian Porcupine/ <i>Sal</i>	Bitten by snake Skin disease	Spine Bile	Dried and rubbed on stone with water.	Oral administration Apply on skin
8	Chordata/Mammalia/ <i>Urva auropunctata</i>	Mongoose/ <i>Mungus</i>	Snake bite (Cobra)	Bone	Bones are rubbed on stone with water.	Oral administration.
9	Chordata/Reptilia/ <i>Varanus bengalensis</i>	Monitor Lizard/ <i>Saanp</i>	Rheumatic pain Fever, sudden Paralysis, Headache, Stomach pain. Chicken pox	Meat Bile Brain	Meat is boiled Bile mixed with water Rubbed with water	Oral administration
10	Annelida/Clitellata/ <i>Pheretima posthuma</i>	Earthworm/ <i>Gayndol</i>	no lactation after pregnancy Wound healing Snake bite	Whole body	live earthworm are mixed with water Dried body is boiled with water	Oral administration.
11	Chordata/Mammalia/ <i>Bos gaurus</i>	Gaur/ <i>Gavo redo</i>	Vaginal discharge Brush the tongue of the small children. Asthma Hair loss	Milk Dung	Dried and rubbed on stone with water. Dried milk directly used to brush the tongue. Collect fresh dung	Oral administration. Apply on hair.
12	Chordata/Aves/ <i>Pavo cristatus</i>	Peacock/ <i>Mor</i>	Paralysis Skin problem	Meat	Make curry and eat.	Oral administration.

			Joint pain	Leg	Powder is made of legs and mix with coconut oil.	Apply on joints.
13	Chordata/Mammalia/ <i>Rusa unicolor</i>	Sambar/ <i>Meru</i>	Arthritis	Horn	Powder is made of horns.	Apply on joints.
14	Chordata/Mammalia/ <i>Moschiola indica</i>	Mouse deer/ <i>Pisoi</i>	Vaginal discharge Continuation of period.	Miscarriage fetus	Drying the fetus and rubbed on stone with water	Oral administration.
15	Chordata/Amphibia/ <i>Hoplobatrachus tigerinus</i>	Indian bull Frog/ <i>Bebo</i>	Burnt Wound Asthma	Meat	From meat oil is made. Boiled and eaten.	Apply on wound. Oral administration.
16	Chordata/Mammalia/ <i>Lepus nigricollis</i>	Indian hare or Rabbit/ <i>Soso</i>	To treat fits.	Blood	Fresh blood is used	Oral administration
17	Chordata/Mammalia/ <i>Panthera tigris</i>	Tiger/ <i>Vagh</i>	Cough Breathing problem	Meat Neck bones.	Meat is dried and rubbed with water. Rubbed with water.	Oral administration.
18	Chordata/Reptilia/ <i>Ahaetulla nasuta</i>	Common Vine snake/ <i>Hariyali</i>	Earache	Blood	Take fresh blood and use as medicine	Pour directly into the ear (dropwise).
19	Arthropoda/Arachnida/ <i>Hottentotta tamulus</i>	Scorpion/ <i>Vinchu</i>	Cracks on foot Earache	Body	Body is boiled in coconut oil.	Apply on cracks. Dropwise pouring into ear.
20	Chordata/Mammalia/ <i>Sus scrofa</i>	Wild Boar/ <i>Ranndukkor</i>	Burnt skin	Fat	Oil is extracted out after drying the skin under the sunlight.	Apply on skin.
21	Chordata/Mammalia/ <i>Manis crassicaudata</i>	Indian Pangolin/ <i>Theryo</i>	Skin inflammation	scales	direct	Apply on skin.
22	Chordata/Aves/ <i>Columba livia</i>	Pigeon/ <i>Parvo</i>	Cough, cold	Flesh bloods	Direct consumption	Oral administration.
23	Mollusca/Bivalvia/ <i>Meretrix meretrix</i>	Clams/ <i>Tisryo</i>	weakness	Outer shell	Ash of the shell is made.	Oral administration.
24	Chordata/Reptilia/ <i>Lissemys punctata</i>	Indian flapshell turtle/ <i>Kasov</i>	Headache	Carapace	Shell is rubbed with water	Apply on forehead
25	Chordata/Actinopterygii/ <i>Cirrhinus mrigala</i>	Mrigal carp/ <i>Mori</i>	Good for eyes	Flesh	Boiled and eaten	Oral administration.
26	Arthropoda/Insecta/ <i>Crematogaster subnuda</i>	Acrobat ant/ <i>Huran</i>	Fever	Live ant	Collect ant and stored in container.	Put on head.
27	Chordata/Actinopterygii/ <i>Channa striata</i>	Murrels/ <i>Chikalo</i>	Continuously dripping of saliva.	Whole body	Collect fish and eat directly.	Oral administration.
28	Arthropoda/Malacostraca/ <i>Charybdis goaensis</i>	Crab/ <i>Kurli</i>	Asthma	Whole body	Flesh consume for 2 months	Oral administration.
29	Annelida/Citellata/ <i>Hirudinaria granulosa</i>	Leech/ <i>Kanti</i>	To remove bad blood	Live leech	Live leech is collected .	Suck the blood
30	Chordata/Mammalia/ <i>Paraechinus micropus</i>	Indian Hedgehog/ <i>Thekud</i>	Red urine	Intestine	Intestine is removed and dried and rubbed it with some water.	Oral administration.
31	Chordata/Aves/ <i>Gallus gallus domesticus</i>	Hen or Chicks/ <i>Kombdi</i>	Sty in the eye Retina function and vision.	Saliva Eggs	Saliva is removed from the chicks. Collect the eggs.	Apply on sty. Oral administration.
32	Chordata/Aves/ <i>Spilopelia chinensis</i>	Spotted dove/ <i>kovda</i>	To become thin. Urine stones.	Meat	Curry is made and eaten.	Oral administration.
33	Mollusca/Cephalopoda/ <i>Sepia officinalis</i>	Cuttle fish/ <i>Maanki</i>	Cuts in mouth	Tongue	Tongue is removed and dried.	Apply on cuts.

Table 2: Fidelity level of Medicinal animals in Velip community

S. No.	Animal Species	Part Used	Indication	Number of Informants for the Indication	Total Number of Informants using the Animal/ Products	Fidelity Level (%)
1	Monkey	Excreta	Chicken pox	4	5	80
			Heavy cold	2	4	50
			slender	1	3	33
2	Cat	Bones	Bitten by rat	3	6	50

3	rat	bone	Bitten by cat	2	5	40
		meat	paralysis	5	7	71.4
4	Honey bee	Honey	Cough	12	14	91.6
			cold	10	12	83.3
			Cure eye infection	8	11	72.7
			Heal burnt skin	6	10	60
5	Human	Milk	Eye infection	10	12	83.3
		Urine	Antiseptic for wound healing	8	11	72.7
6	cow	urine	Weakness	8	10	80
		urine	diabetes	9	10	90
		milk	Stomach pain	7	11	63.6
		milk	jaundice	8	9	88.8
		milk	diarrhoea	6	9	66.6
7	porcupine	spine	Bitten by snake	6	11	54.5
		bile	Skin disease	5	8	62.5
8	mongoose	bone	Snake bite	4	5	80
9	Monitor lizard	meat	Rheumatic pain	6	8	75
		bile	Fever, sudden paralysis, headache, stomach pain	4	5	80
		Blood	fits	8	10	80
		brain	Chicken pox	3	5	60
10	Earthworm	Body	No lactation after pregnancy.	7	9	77.7
		Body	Wound healing	7	7	100
		Body	Snake bite	3	4	75
11	Gaur	Milk	Vaginal discharge	4	7	57.1
		Milk	Brush the tongue of small children	4	6	66.6
		Dung	Asthma	3	8	37.5
		Dung	Hair loss	5	8	62.5
12	Peacock	Meat	Paralysis	6	7	85
		Leg	Skin problem	4	6	66.6
		Leg	Joint pain	4	6	66.6
13	Sambar	Horn	Arthritis	4	5	80
14	Mouse deer	Miscarriage fetus	Vaginal continuation of period	6	8	75
15	Indian bull Frog	Meat	Burnt wound	5	6	83.3
		Meat	Asthma	7	9	77.7
16	Rabbit	Blood	To treat fits	7	10	70
17	Tiger	Meat	Cough	2	3	66.6
		Neck bone	Breathing problem	2	4	50
18	Vine snake	Blood	Earache	2	5	40
19	Scorpion	Body	Cracks on foot	4	8	50
		Body	Earache	4	7	57.1
20	Boar	Fat	Burnt skin	4	7	57.1
21	Pangolin	Scales	Skin inflammation	2	5	40
22	Pigeon	Flesh blood	Cough, cold	5	8	62.5
23	Clams	Outer shell	Weakness	5	8	62.5
24	Indian flap shell turtle	Carapace	Headache	4	9	44.4
25	Mrigal carp	Flesh	Good for eyes	7	12	58.3
26	Murrels	Body	To stop Continuously dropping of saliva	8	13	61.5
27	Crab	Whole Body	Asthma	5	8	62.5
28	Leech	Live leech	To remove bad blood	6	14	42.8
29	Acrobat ant	Live ant	To treat fever	5	7	71.4
30	Hedgehog	intestine	Red urine	5	9	55.5
31	Hen	saliva	Sty in the eye	4	8	50

		Eggs	Retina function and vision.	5	9	55.5
32	Spotted dove	meat	Urine stone	5	8	62.5
33	Cuttle Fish	tongue	Cuts in mouth	6	9	66.6

Table 3: Utility Value of Medicinal animals in Velip community

S. No.	Scientific Name	English Name	Local Name (Konkani)	ΣU_i	U_v	%UV
1	<i>Semnopithecus entellus</i>	Monkey	Maakad	7	0.5	50
2	<i>Felis catus</i>	Cat	Maanjor	6	0.43	43
3	<i>Rattus norvegicus</i>	Rat	Umdir	7	0.50	50
4	<i>Apis mellifera</i>	Honey bee	Mhova moose	14	1.00	100
5	<i>Homo sapiens</i>	Human	Manis	12	0.86	86
6	<i>Bos taurus</i>	Cow	Gaay	11	0.79	79
7	<i>Hystrix indica</i>	Indian porcupine	Sal	11	0.79	79
8	<i>Urva auropunctata</i>	Mongoose	Mungus	8	0.57	57
9	<i>Varanus bengalensis</i>	Monitor lizard	Saanp	10	0.71	71
10	<i>Pheretima posthuma</i>	Earthworm	Gayndol	9	0.64	64
11	<i>Bos gaurus</i>	Gaur	Gavo redo	7	0.5	50
12	<i>Pavo cristatus</i>	Peacock	Mor	7	0.5	50
13	<i>Rusa unicolor</i>	Sambar	Meru	5	0.36	36
14	<i>Moschiola indica</i>	Mouse deer	Pisoi	8	0.57	64
15	<i>Hoplobatrachus tigerinus</i>	Indian bull frog	Bebo	9	0.64	54
16	<i>Lepus nigricollis</i>	Indian hare/Rabbit	Soso	8	0.57	57
17	<i>Panthera tigris</i>	Tiger	Vagh	4	0.29	29
18	<i>Ahaetulla nasuta</i>	Vine snake	Hariyali	5	0.36	36
19	<i>Hottentotta tamulus</i>	Scorpion	Vinchu	8	0.57	57
20	<i>Sus scrofa</i>	Wild Boar	Rann dukkar	7	0.049	4.9
21	<i>Manis crassicaudata</i>	Indian pangolin	Theryo	5	0.035	3.5
22	<i>Columba livia</i>	Pigeon	Parvo	8	0.57	5.7
23	<i>Meretrix meretrix</i>	Clams	Tisryo	8	0.57	57
24	<i>Lissemys punctata</i>	Indian flap shell turtle	Kasov	9	0.64	64
25	<i>Cirrhinus mrigala</i>	Mrigal carp	Mori	6	0.43	43
26	<i>Crematogaster subnuda</i>	Acrobat ant	Huran	3	0.21	21
27	<i>Channa striata</i>	Murrels	Chikalo	10	0.71	71
28	<i>Charybdis goaensis</i>	crab	Kurli	5	0.36	36
29	<i>Hirudinaria granulosa</i>	Leech	Kanti	7	0.5	50
30	<i>Paraechinus micropus</i>	Indian Hedgehog	Thekud	9	0.64	64
31	<i>Gallus gallus domesticus</i>	Hen Chicks	Kombdi	9	0.64	64
32	<i>Spilopelia chinensis</i>	Spotted dove	Kovda	8	0.57	57
33	<i>Sepia officinalis</i>	Cuttle fish	Maanki	9	0.64	64

highest knowledge shared followed by 55-65 years and lowest was with respondent age of 35 - 45 years.

In this study, we reported total of 33 species of medicinal animals and their products used to treat about 42 different human ailments. Animals from the classes of mammals, reptiles, birds, arthropods, and annelids make up the majority of the species used for ethno zoological medicinal purpose. According to this finding, the choice of treatments is influenced by the accessibility and faunal diversity of the area. Insects are easily available and highly used remedies and mammals are the second most used zoo therapeutic animals (Borah *et al.*, 2017). However, in some reports, mammals are among the main group of animals used in folk medicine (Kendie *et al.*, 2018). In the present study, Mammals are the most commonly used animal group as compared to others, possibly they are the most domesticated animal group by the local people of the study area and arthropods are second important.

This study revealed that in many cases the same animal species were used for the treatment of more than one ailment conditions and vice-versa. For examples Cow 's urine and milk is used to cure weakness due to fever, stomach pain, diabetes, diarrhoea. According to the study, traditional animal medicine was administered through eating (meat of Mouse deer to cure vaginal discharge), drinking (milk of Gaur for weakness), massaging or applying (bile of Monitor lizard for sudden paralysis), tying (meat of peacock is used to treat paralysis), pouring (blood of vine snake is used to treat ear ache). The oral application method was used to treat the most prevalent disorders in the study area. Similarly, other studies also reported the oral application as the most commonly used administration of medicinal animals (Yirga, 2011; Mahomoodally *et al.*, 2019; Abebe *et al.*, 2022)

After naturally drying, burning, crushing, powdering or making paste by rubbing it on stones, boiling/cooking to extract oil and other preparation techniques like collecting, direct use

were used. Some parts of animals such bones, feather, teeth were believed to be medicine by tying on the neck, leg or other parts of human body. In most of the medicine preparation do not need any additive substance like water, coconut oil and water, tender leaves of guava and cashew, etc. While some need various substances to be beneficial for human diseases. For example, the entire scorpion is cooked in coconut oil to extract the oil, which is then administered topically to the troublesome area of ear ache and foot crack. Similarly, it is reported in some medicinal preparation, both plants and animals are utilized in combination (Alves *et al.*, 2009; Costa Neto, 2011). Cow's urine is mixed with guava tender leaves to cure jaundice, diabetes. Also cashew tender leaves is added in cow's milk to treat weakness due to fever, stomach pain. Most of the animal's parts like dried bone, meat, scales, are rubbed with water to make paste or liquid medicine for applying to affected area or for oral administration.

Tribal communities of Goa are living in remote areas, close to forest areas. Most species were used by the Velip community as their traditional remedies. From this survey, we found that Velip community tribes interact more with one another and share their knowledge with each other's. As a result, Tribes can still explain these traditional medicines. Only conventional treatments derived from plants and animals were thought to be employed by them because there were no modern medicines available to them, these were their sole options for treating the majority of ailments.

From the study it is revealed that tribal communities in Goa mostly use plant medicines than the animal medicines. They also mentioned that their oldest family member, a traditional healer, used to treat patients with life-threatening illnesses including tuberculosis and asthma with both plant and animal medicines. However, after the forest department outlawed hunting, people started going to the doctor and using the prescribed medicines. They had to visit a pharmacy or the healthcare system these days,

even for cold or cough illnesses. Similar observations were reported from the Valaiyan community of Piranmalai hills (Reserved forest), Tamil Nadu (Santhya *et al.*, 2006)

In Velip communities, mammals and aves make up the majority of the species of vertebrates because there is a large population of mammals in study areas, and such species were regarded as having the best medicinal values. Amphibians are the least number of medicinal animal species used in these tribes, may due to less population in the study area. Fidelity level demonstrate the percentage of respondents claiming the use of certain animals or its product for the same ailments. In the present study, the fidelity level values range from 33% to 100%.

Use-value indicates the relative importance of a species cited by the informants (Alves, 2009). The present study reported Honeybee (*Apis mellifera*) as the commonly (%UV = 100%) cited medicinal animal and Indian Pangolin (*Manis crassicaudata*) with %UV=3.5% as a least common cited medicinal animal in Velip community.

Preparation of different remedies to treat different ailments from the different parts of a single animal species is related to the higher use value of some medicinal animals (Jaroli *et al.*, 2010) Additionally, tribes revealed that they tie wild boar and tiger teeth around their necks with threads to shield themselves from malevolent gazes. They also use wild boar hair for the same. In addition to using animal resources for medical purposes, tribes sometimes use them for other purposes, like as decorating their traditional homes. This type of decoration is also reported from other part of India.

The majority of the medicinal animal species are disappearing, according to the informants, as a result of deforestation and overuse. Slaughtering the animal species to collect the blood, meat or different body parts which were commonly used to prepare most of the medicinal remedies is associated with the loss of medicinal animals. The present study revealed that the attempt of

conserving animals from extinction in the study area was rare. Similar observations were made by several researchers in the past (Abebe *et al.*, 2022). To prevent animal extinction, traditional knowledge should be included into conservation measures. More research is needed to emphasize more sustainably using these resources as well as to confirm the presence of bioactive compounds in these traditional medicines (Das, 2015). From the present investigation it is evident that the traditional zoo therapeutic remedial measures followed by the native tribal communities of Goa play a crucial role in their primary healthcare. It is very beneficial to record this indigenous knowledge of animal-based remedies in order to develop strategies for the sustainable management and conservation of bio resources, as well as to open the door to the development of human health.

Conclusion

This study demonstrated the persistence of Tribal medicine practices in south Goa. The tribal and rural communities are still dependent on indigenous knowledge for health care which is influenced by culture and socio-economic aspects, providing a cheaper and accessible alternative to the high cost pharmaceutical remedies. This is a baseline data for future studies of ethno zoological aspects of medicinal animals. The studies concerning this subject are scarce. More scientific studies are necessary to preserve the popular medicinal knowledge which is important to enhance our understanding of the relationship among men, society and nature, and also to elaborate more effective strategies for conserving natural resources.

Acknowledgements

Authors are grateful to Prof. Joydeep Bhattacharjee, Principal for his constant motivation and Prof .Susheela Mendes, Dr, Deepa Prajith, Priyanka Velip and Pratiksha Velip members of Tribal welfare committee and all Voktoli for their support during the study period.

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