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Zootherapy and ethnozoological studies of Medicinal animals and their products used by the tribal communities in Goa

Research Article

Harshada Gaonkar[1], Akshita Gaonkar[1], Anjali Velip[1], Kulkarni Rajender Rao[2*]

1. Project student, 2. Associate Professor and Head,
Department of Zoology, Government College of Arts, Science & Commerce, Quepem, Goa. India.

Abstract

Ethno-zoology deals with socio-cultural aspects of tribal people, medicinal animals, thus focusing on the direct relationship of animals to mankind. Traditional medicine is also known by several other terms such as alternative or complementary or folk medicine. It includes the sum of the total knowledge, health practices approaches and beliefs incorporating plants, animals, minerals, medicines, spiritual therapies, yoga and physical exercises used by different cultures for generations to prevent, diagnose and treat physical and mental illness or to maintain health in a holistic sense. Field survey was carried out from September 2022 - January 2023 by personal interviews through pre-designed questionnaires with tribal peoples. The study recorded 19 different animal species which are used for the treatment of 22 different ailments. Some researchers have made an attempt to study and document the usage of medicinal animals by traditional healers. However, there is no scientific documentation on the use of medicinal animals in the treatment for various diseases in the primary health care system by the tribal communities in Goa. Present study is aimed at documentation and evaluation of this indigenous remedial knowledge of zoo therapeutic medicinal animal utilization in the traditional health care system among the *Gawda* and *Dhangar* community.

Keywords: Dhangar, Ethno medicine, Gawda, Medicinal Animal, South Goa.

Introduction

Ethno-zoology deals with socio-cultural aspects of tribal people, medicinal animals, thus focusing on the direct relationship of animals to mankind (1). It emphasises the significance of this traditional knowledge and the role played by animals in human society. It is a hybrid discipline that integrates both the natural and social sciences that examines the historical, sociological, anthropological, economic and environmental aspects of the relationships between humans and animals. Zoo-therapy constitutes a significant substitute among many other known therapies practiced worldwide (2). Recently, it is widely understood that society and nature are interconnected and that environmental health is crucial for human health (3) drawing attention to the fact that biodiversity loss can also have indirect effects on human well-being. For many newly developing infectious illnesses, the majority of which are zoonotic in nature, wildlife serves as an essential but little-known reservoir (4). Billions of animals of many kinds are captured and sold in the wildlife trade for use as pets, food, and medicine, among other purposes. Animals can be sensitive indicators of environmental risks since they experience a comparable range of illnesses as humans do (5)(6).

Ever since our early ancestors began exploiting natural compounds to improve and enrich their own lives, chemicals from nature have become very important constituents of human civilisation (7). The traditional knowledge all over the world, about ethno-zoological medicines among tribal communities has played an important role in discovering medicinal animals worthy of commercial utilisation and also to conserve them. For instance, using animals to test new pharmaceutical effectiveness and potential side effects, create novel surgical techniques and assess the diseases prevention and treatment benefits of new medications; examine the safety considering fresh substances employed in the food sector; assess the caliber of fresh batches of medicines and drugs (8).

Since time immemorial, animals and their products have been used in the preparation of traditional remedies in cultures (9). Ethno-zoological studies of medicinal animals and their usage by traditional healers and indigenous inhabitants was reported from Mauritius by (10). Four major tribes viz, *Gawda, Kunbi, Velip* and *Dhangar* are documented as native communities of Goa having continuity in their lifestyle, customs, traditional, religious beliefs and cultural practices etc. (11).

The *Gawdas* are the aborigines of Goa. They have migrated from South East Asia into Assam, Orissa, Bengal, Kerala, Malabar and Goa belong to the Munda section of the Australoid race. They are Goa's first settlers. Agriculture is their main occupation. Christian

*** Corresponding Author:**
Kulkarni Rajender Rao
Associate Professor and Head,
Department of Zoology,
Government College of Arts, Science & Commerce, Quepem, Goa. India.
Email Id: raok1963@gmail.com

Gawdas, Hindu *Gawdas* and *Nav-Hindu Gawdas* are the main categories.

The *Dhangars* in Goa are recognised as shepherds caressing a semi nomadic lifestyle. When they take cattle for grazing they carry a stick and one or two hunting dogs with them always. *Dhangars* are also called as *Gavli*. One can easily identify them because of their dressing and occupation which separates them from other communities in the region. They worship *'Bira Deva'*. *Dhangar* women wear *Nauwari lugda* and their forehead is beautified with the stripe of *kumkum* and turmeric and men wear a huge turban called *Mundasa*.

The survey was conducted in different villages of *Gawda* and *Dhangar* communities of Goa to document the traditional knowledge of using different animals and their product for treating various kinds of diseases. According to these tribes, traditional healers using their own home-made traditional medicines of both plants and animals used to treat sick people a variety of diseases during ancient times, because in an emergency there were no doctors on call. They diagnose the diseases using their five senses which is remarkable because they live in interior areas of Western Ghats and lack modern scientific treatment (12).

Ethno-zoological exploration and documentation of traditional knowledge among the ethnic groups is very essential for the welfare of entire humanity, because the chances of cultural mixing up and adoption of modern technologies in all fields of life happening. Due to globalisation, the erosion rate of traditional knowledge among the tribal people is evident and chances of forgetting the knowledge and losing it forever if undocumented is very high.(13). Several reports are available from different parts of the country (14)(15)(16). However, no such authentic report is available from the *Gawda* and *Dhangar* communities of Goan tribes. Hence, an attempt is made to record zoo therapeutic methods of traditional knowledge of *Gawda* and *Dhangar* community before it erodes due to the impact of modernisation.

Materials and Methods

Surveys were undertaken in selected *Gawda and Dhangar* community dwelling areas of Goa from September 2022 - January 2023. It is based on information gathered through interview of community elders having knowledge of identifying the wild life and their traditional use in their society popularly known as *"Voktoli"* and also from our faculty through pre designed questionnaire. Each interview lasted for a duration of approximately two hours.

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 use values were determined using the below mentioned formulae

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

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 utilised the animals as medicine for treating any given ailments.

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

Where Uvi is the number of use reports cited by the informants for that particular species and N is the total number of respondents interviewed.

The study areas are *Maina, Ambaulim, Sirvoi* in Quepem; *Panchwadi* in Ponda villages from South Goa.

Results and Discussion

In *Gawda* community, informants reported 12 medicinal animals used to treat 14 ailments out of which 9 species belongs to vertebrates namely Pigeon, Peacock, Cow, Gaur, Pig, Indian pangolin, Rabbit, Indian flap shell turtle and Indian bullfrog, of this 5 animal species are from class Mammalia, 2 Aves and 1 from each class of Reptilia, Amphibia, while only 3 species are invertebrates namely, Apple snail which belong to Phylum Mollusca, Prawn from Phylum Arthropoda and Earthworm from Phylum Annelida. All these animal species are used to treat different ailments including Asthma, burn heal, fracture, etc. using 10 different parts and products of animals like milk, flesh, fat, carapace, etc.

According to the current study in *Gawda* community, the fidelity level values of therapeutic animal species range from 25% to 100%. Indian bull frog for Asthma and cough has a high fidelity level of 100%. The least fidelity level of about 25% is observed in Rabbit for the treatment of fits. (Table.1)

In *Dhangar* community, *voktoli* reported 10 animal species of which 8 animals Vertebrates which belongs to Phylum Chordata are. Among them 6 belong to class Mammalia Gaur, Cow, Goat, Mouse deer, Human and Malabar giant squirrel. Class Aves, consists Hen and Cock. In invertebrate group, 2 species belongs to Phylum Arthropoda namely Prawn and Scorpion. For the treatment of 10 different kinds of ailments including weakness wound healing, tuberculosis, etc. *Dhangar* community people use 7 different body parts and products such as meat, milk, bone, urine, etc.

In *Dhangar* community the fidelity level values of therapeutic animal species range from 50% to 100%. Human urine for red eye, Malabar giant squirrel brain for red urine and Scorpion for wound healing has a high fidelity level of 100%. The least fidelity level of about 50% is observed in Goat for asthma, Prawn for Centipedes bite, Gaur and Mouse deer for the treatment of weakness of the person. The present study reported Goat (*Capra hircus*) (%UV=75%) is the most cited medicinal animal followed by Cow *(Bos taurus)*, Hen and cock *(Gallus gallus domestica)* and Mouse deer *(Moschiola indica)* (%UV=50%).

World Health Organization (WHO) and the ministry of AYUSH, Government of India signed an agreement to establish the WHO Global Centre for

Traditional Medicine (GCTM) at Jamnagar, Gujarat from April 21, 2022 to focus on four important strategies, data and analytics; evidence and learning; sustainability and equity and innovation and technology (17).

Traditional medicine is also known by several other terms such as alternative or complementary or folk medicine. It includes the sum of the total knowledge, health practices approaches and beliefs incorporating plants, animals, minerals, medicines, spiritual therapies, yoga and physical exercises used by different cultures for generations to prevent, diagnose and treat physical and mental illness or to maintain health in a holistic sense. It includes several ancient practices such as acupuncture, traditional Chinese medicine, *Ayurveda*, *Kampo*, traditional Korean medicine, and *Unani.* Six recognized systems of medicine -*Ayurveda, Yoga,* Naturopathy *Unani, Siddha,* and Homoeopathy are practiced in India (AYUSH).

In the health care system of this modern society also traditional medicinal knowledge constitutes an important alternative. In developing countries, the percentage of the population using traditional medicines for primary health care is more than that in developed countries (18). Around 60% of commercially available Allopathic drugs are based on bio-active compounds extracted from natural resources and are traditionally used by various indigenous cultures around the globe (19). Major constituents of traditional medicine are medicinal plants. However, in traditional human health care the identification of medicinal animal resources is also very important (20)(21).

Tribes have a specialized knowledge that is unique to them because of their intimate proximity to nature, particularly with regard to the utilization of the local flora and fauna in medicine. Four major Tribal communities- the *Gawda,* the *Kunbis*, the *Velips* and the *Dhangars* live in small groups in segregated villages. Among all these, the *Gawda* is a major tribe of Goa. The tribes gain the knowledge of traditional medicine from their parents or elderly people of their village mainly through practice and experience. Additionally, it was discovered that, compared to other age groups, elderly adults prefer to use these traditional remedies. The development of modern education, globalization, emigration to surrounding towns, perception of the practice as a backward custom, and integration of alien culture are some potential causes of the younger generation's decreased interest in traditional medicinal practice (22).

In this study, we reported a total of 19 species of medicinal animals and their products used to treat about 22 different human ailments. Tribes either use the whole body of the animal or parts like plastron/carapace, head, scales, feet. They also use products extracted from them such as milk, fat, meat, blood, flesh and waste products such as urine and dung for various therapeutic purposes. Majority of the animals had multipurpose use. For example Cow's milk, dung are used to cure mouth infections, burning sensation to cool down. Animals from the mammals and aves make up the majority of the species used for ethno zoological medicinal purposes. According to this finding, the choice of treatments is influenced by the accessibility and faunal diversity of the area. Although insects (arthropods) were reported as the most used and easily available remedies and mammals as the second highest zoo therapeutic animals (15) in the present study, Mammals are the most commonly used animal group as compared to others, possibly they are the most domesticated or easily available animal groups for the local people of the study area and Aves are second important.

From present investigation, it is observed tribal communities collect excreta, feathers and some parts of dead animals. Some animals poached by tribes from the forest are naturally dried and stored for further preparation of different medicines. Earthworms are collected during the rainy season and dried naturally under the sun. Then they are boiled or rubbed with water and used as medicine. Plastron/carapace of Indian flap shell turtle is used to treat different ailments like burn heal, swollen throat by applying on affected area. Earthworms are mostly used to cure Common Indian krait snake bite. Indian Pangolin's scales are used to cure skin inflammation. During the survey we gathered information of all local names for the animals, body parts, and products used for treatment as well as preparation techniques from the informants. This study reveals that in many cases the same animal species were used for the treatment of more than one ailment conditions and vice-versa. According to the study, traditional animal medicine was administered through eating, drinking and massaging or applying. The oral application method was used to treat the most prevalent disorders in the study area. Similar practices of traditional healers in the silent valley of Kerala using animals for treatment of various disorders were reported by (23).

Despite being one of Goa's largest tribes, the *Gawda* community reported relatively fewer animal species during the survey as we found few informants of the *Gawda* community. We had great difficulty contacting *voktoli* from this community to conduct our survey. Because of the advancement of healthcare and medical facilities, the majority of the younger generations of this tribe have less exposure to traditional therapies. Even some informants reported that they had forgotten old wisdom because of their advanced age or poor memory. People stopped entering the forest as a result of hunting and killing restrictions imposed by the Forest Department. As a result, nowadays very few people are using animal medicines, leaving this generation *voktoli* with only plant-based remedies.

In this study, flesh of Indian bull frog used for treatment of Asthma and cough achieved the highest fidelity level of 100% Blood of Rabbit for fits treatment has lowest fidelity level of 25%. Use-value of a species cited by the informant indicates the relative importance (24). The present study reported in *Gawda* community, Earthworm (*Pheretima posthuma*) as the commonly cited animal with UV= 86% and least commonly cited is Prawn (*Macrobrachium rosenbergii*) with UV=14%. (Table.1). Similar studies on ethno zoological diversity

and traditional knowledge were reported from Mizoram and Arunachal Pradesh.(25).

The International Union for Conservation of Nature (IUCN) Red list is to convey the emergency of conservation issues to the public as well as help the international community to reduce species extinction. In this survey 19 animal species reported that belong to mammals, birds, reptiles, amphibians, annelids and insects. According to the IUCN list, out of 19 species 3-Critically Endangered (CR), 1-Endangered (EN), 4-Vulnerable (VU), 8-Least concern (LC), 6-Not Evaluated (NE).

According to the informants, the majority of the medicinal animal species are disappearing in the study area, as a result of deforestation and overuse. Other possible reasons for the decrease of medicinal animals may be associated with the animal poaching to collect the blood, organs and meat and other parts which were used to prepare most of the medicinal remedies. To prevent animal extinction, traditional knowledge should be included into conservation measures. The findings of this study suggest that the traditional zoo therapeutic remedial measures followed by the native tribal communities of Goa play an important 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.

The possible benefit of animal-derived medications constitutes a rewarding area of research, particularly in India which has a rich biodiversity of animal resources coupled with a high prevalence and variety of infectious diseases where sustainable utilisation of the biodiversity can be carried out. This wildlife is a valuable, renewable resource which can continue to produce benefits only if adequate habitats and protection is provided. To ensure proper development and harnessing ethno-medicine in India we suggest that the policy makers should integrate this health care system into the existing one. Additionally, scientific awareness, management and conservation measures of animal resources would enhance better connectivity with nature.

Conclusion

In this study 19 animal species that belong to Mammals, Aves, Reptiles, Amphibian, etc. were used for the management of 22 types of ailments. Mammals were the most frequently used. Although the traditional medicinal practitioners and indigenous people are skilled with the preparation and administration of animal based remedies, very little effort has been made to conserve the medicinal animals. Therefore, the local community should be alerted on the significance of biodiversity and sustainable use of species identified as sources of ethno- zoological medicine in the study area. Multidisciplinary experimental approach is to be included in the research studies of the medical uses of animals and their products to identify potential lead compounds.

Table 1: Ethnozoological studies of medicinal animals and their usage by traditional healers in Gawda Community

Animal Species	Part Used	Indication	Fidelity level(%)	Utility value(%)	IUCN	Effect On
Pigeon (*Columbia livia*)	Meat	Paralysis	40	71	VU	Nervous system
Peacock (*Pavo cristatus*)	Feet	Paralysis	50	29	LC	Nervous system
Cow(*Bos taurus*)	Milk	Mouth Infection	50	71	NE	Buccal cavity
	Dung	To cool down burning sensation	66.6	71		Skin
Indian Flapshell turtle (*Lissemys punctata*)	Plastron	Burn heal, swollen throat	33.3	43	VU	Skin and throat
Indian bull frog (*Hoplobatrachus tigerinus*)	Flesh	Asthma, Cough	100	57	LC	Lungs
Pig (*Sus scrofa domestica*)	Fat	Burn wound, fracture	75	57	LC	Skin and bones
Apple snail (*Pila globosa*)	Whole body	Continuous dropping of saliva	50	71	CR	Buccal cavity
Earthworm (*Pheretima posthuma*)	Whole body	Snake bite	33.3	86	LC	Circulatory system
Indian Pangolin (*Manis crassicaudata*)	Scales	Skin inflammation	50	43	EN	skin
Gaur (*Bos gaurus*)	Milk	To Brush tongue of small children	66.6	29	VU	Buccal cavity
Rabbit (*Lepus nigricollis*)	Blood	Fits	25	29	CR	Nervous system
Prawn (*Macrobrachium rosenbergii*)	Head	To treat bite of centipede	50	14	NE	Nervous system

Table 2: Ethno zoological studies of medicinal animals and their usage by traditional healers in Dhangar Community

Animal Species	Part used	Indication	Fidelity level(%)	Utility Value (%)	IUCN status	Effect on
Goat *(Capra hircus)*	Urine	tuberculosis	75	75	NE	Lungs
	Bone	arthritis	75			Joints
	Milk	asthma	50			Lungs
	Milk	weakness	75			Digestive system
Cow *(Bos taurus)*	Urine	jaundice	75	50	NE	Liver
Human *(Homo sapiens)*	Urine	red eye	100	25	NE	eyes
Malabar giant squirrel *(Ratufa indica)*	Brain	red urine	100	25	LC	Excretory system
Hen *(Gallus gallus domestica)*	Egg	foot cracks	66.6	50	LC	Skin
Prawn *(Macrobrachium rosenbergii)*	Head	to treat Centipede bite	50	25	NE	Nervous system
Scorpion *(Hottentotta tamulus)*	Whole body	wound healing	100	25	CR	Skin
Cock *(Gallus gallus domestica)*	Bone	weakness	75	50	LC	Digestive system
Gaur *(Bos gaurus)*	Milk	weakness	50	25	VU	Digestive system
Mouse deer *(Moschiola indica)*	Meat	weakness	50	50	LC	Digestive system

Figure 1: Numerical Abundance of Medicinal animals used by the Gawda community from Goa.

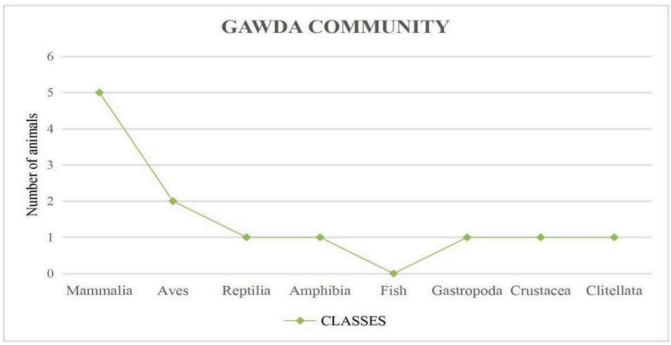
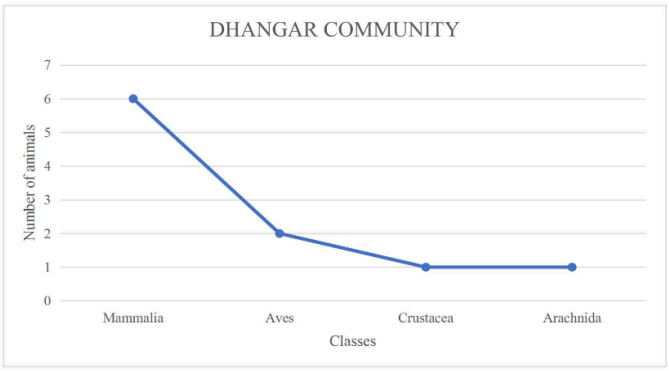


Figure 2: Numerical Abundance of Medicinal animals used by the Dhangar community from Goa.



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