




# Knowledge and Use of Traditional Medicinal Animals in the Arba Minch Zuriya District, Gamo Zone, Southern Ethiopia

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## ABSTRACT

**Objective:** To collect ethnozoological data in connection with medicinal animals and their products used by the inhabitants of the Arba Minch Zuriya region of Ethiopia and to put on record information on traditional treatments of diseases and disorders.

**Methods:** The survey was conducted during the months of February to May 2018. Data were gathered through semi-structured surveys and depended on group discussions with 90 people, of which 17 were key and the remainder general informants.

**Results:** Altogether 20 animal species comprising 12 mammals, one bird, three reptiles, two insects, and two fish were used in 30 distinctive ways to treat disorders of the eye and skin ailments such as anaemia and malaria as well as various other disorders and injuries. Twenty percent of all health problems involved the skin. Bovidae were the most important medicinal animals with a use of 14%, and bile was the most widely employed animal product.

**Conclusion:** Traditional therapies involving animal species are still being practiced in rural areas of Ethiopia and this knowledge is of importance and should not get lost. However, Overexploitation and overhunting pose a serious threat to the therapeutic species. For the conservation and management of these species, the local residents' cooperation and understanding are needed.

**Keywords:** Therapeutic animals, ethnozoology, indigenous knowledge, traditional medicine

## INTRODUCTION

Throughout the world, humans and animals have interacted since time immemorial. Animals were feared, hunted, consumed, and used in various ways such as to treat diseases or as part of festivities and subjects in myths and beliefs.<sup>1-4</sup> Animals have played a larger than average scope of roles in virtual all human endeavours and their influence on religion, workmanship, music, dance, literature and other distinctive social articulations of humankind is undisputed. Specifically, focusing on the therapeutic uses of animals and their products in Ethiopia, information has been passed down orally from generation to generation. This knowledge needs to be seen as a major component of the Ethiopian human social legacy, but if unrecorded it is in danger of being lost.<sup>5-7</sup>

Recognizing the natural assets that wild and domestic therapeutic animal species represent, people living in Ethiopia and other developing countries have embarked on safeguarding the resource to render it sustainable.<sup>5,8,9</sup> According to data published by the WHO,<sup>10</sup> nearly 80% of the world's population live in developing countries where they largely depend on cus-

tomary medication for treating sicknesses and ailments of humans and animals. There is not only an interest in the developing world, but also now a worldwide interest in documenting traditional healing methods from different parts of the globe involving animals and their products. Ethiopia is rich in ethnic communities whose languages, cultures, and traditions differ and whose members live in different parts of the country. What unites them all is that they have been using traditional methods of medication for generations, but that despite the long history of their ethnobotanical and ethnozoological knowledge, few attempts have been made in the past to record this knowledge.

To provide an inventory of the traditionally used medicinal animals for certain areas of Ethiopia, those of the Kafta-Humera District, Northern Ethiopia, were recorded by Giday et al.<sup>5</sup> Thirty traditional healers of that district reported that 16 species of animals (44% of which were domestic species) were used to treat 18 different human ailments. The parts and products of the animals that were used therapeutically included bile, milk, blood, pancreas, urine, hair, and fecal matter. Among the Amaro

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Woreda residents of Southern Ethiopia, investigated by Dereje and Meseret,<sup>6</sup> 90 respondents declared that 21 species of animals (14 mammals, four birds, and three reptiles) were used to prepare remedies for 46 ailments and that animal flesh (33.8%) had the highest use, followed by fat (11.5%), bone (8.6%), and blood (8.6%). Python, warthog, crested porcupine, and bushpig were of great relative importance (RI), but only 61.7% of the respondents did and 38.3% did not use traditional medicines, which in the majority of cases were administered orally.

Data based on information from 36 purposively selected respondents formed the basis of an ethnozoological study among the indigenous people of Metema Woreda in Northwest Ethiopia.<sup>7</sup> This study revealed that 51 species were used to treat around 36 different kinds of ailments. Although the majority of the animals used were mammals (27 species), the remainder contained birds (nine species), arthropods (seven species), reptiles (six species), and fish and annelids (one species each). The therapeutic use of rare or protected species, eg, cheetah, gazelle, elephant, monkeys, etc., was of some concern and highlighted the need to have more details on the traditional uses that indigenous people put native species to.

This present study was initiated to collect additional information on the uses of traditional medicinal practices from tribal areas within the Arba Minch Zuriya, Gamo Gofa Zone, Southern Ethiopia. Since until now no ethnotherapeutic uses had been reported from this rather remote region of Ethiopia, all our observations can be regarded as new. The main aim of this study was to enrich the country's database of medicinal animals and to provide additional information on the indigenous knowledge of ethnic communities in Ethiopia on how to use the species therapeutically without endangering their continued survival in the future.

## METHODS

### Description of the Study Area

Arba Minch is the capital of the Arba Minch Zuria district (Figure 1), around 437 km from Addis Abeba, the capital of

Ethiopia. Arba Minch's longitude and latitude are 06°2'N and 37°33'E, respectively, and its altitude ranges from 1200 to 1285 masl. The temperature of the district ranges between 17 and 30°C. Precipitation is bimodal and amounts to 900 mm annually. The wet season covers the months March, April, and May, and September, October, and November but may extend up to December, January, and February.<sup>11</sup> According to the latest data available, ie, the 2007 census, the district had a population of 165,680 of which 82,774 were male and 82,906 were female.

### Reconnaissance Survey and Study Site Selection

The surveillance was conducted from March 2017 to April 2018. Prior to the study, authorization to carry out the investigation was obtained from the local governing body. The approved methodology was followed, and the consent of the interviewed members was acquired. A decision on the choice of the study site depended on prior information that had been gathered from community pioneers, proficient seniors, and a number of customary healers of the area.

### Informant Selection

Ninety informants (45 males and 45 females) between 30 and 85 years of age were contacted during this research. Among these, 17 (nine males and eight females) were key informants, while the remainder of 73 were general informants. Random and purposive sampling strategies were employed to choose respective general informants and traditional healers. Affiliated pioneers and respected old individuals assisted with identifying the key informants. The general informants were randomly chosen during field and house visits. All interviews were administered after obtaining voluntary consent of every informant and assuring them that the data collected were used only for academic purposes.

### Data Collection and Identification

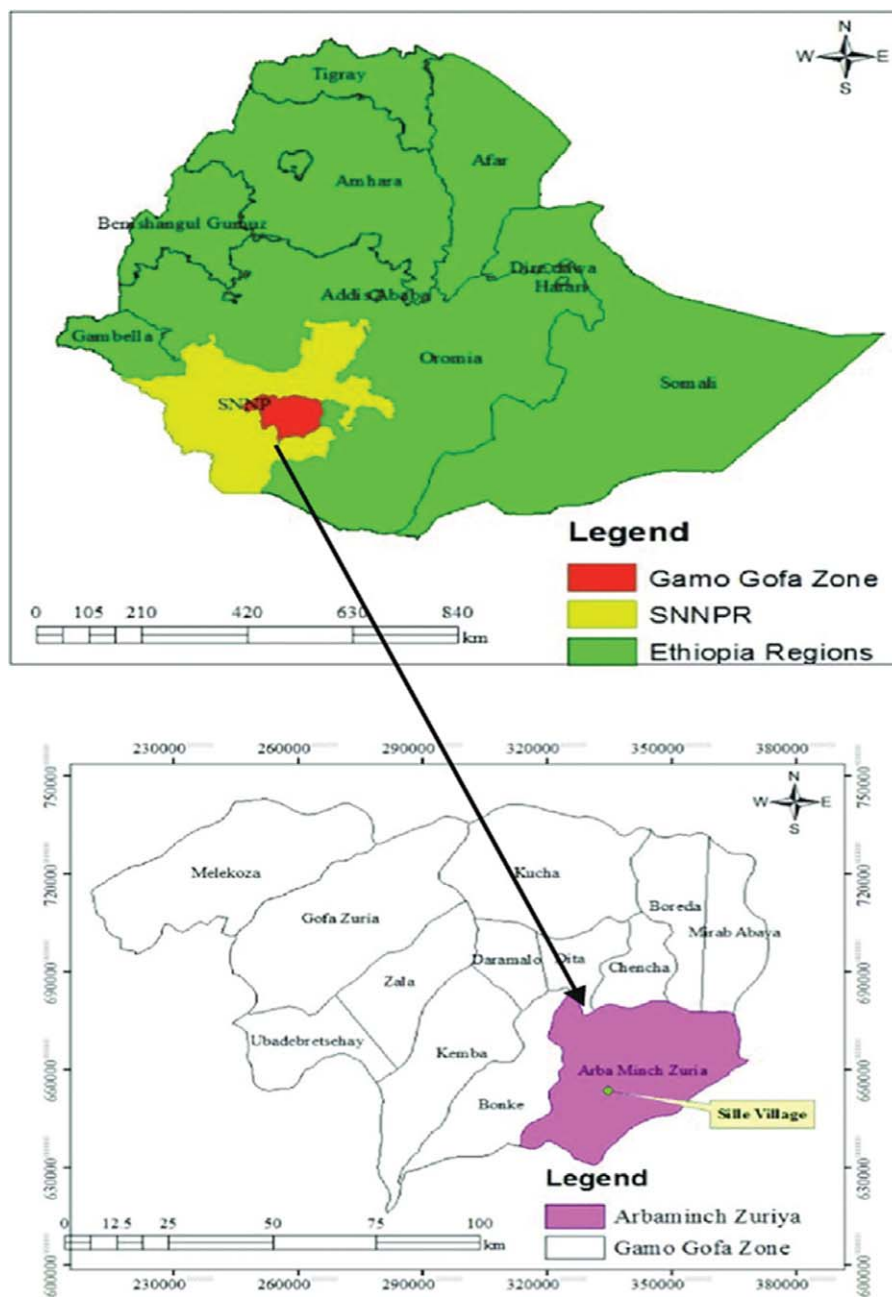
Following standard methods,<sup>5–7,12</sup> ethnozoological data assortment was accomplished from February to April 2018 by living in close contact with the community in the study region. Semi-structured interviews, guided field walks, direct observations, and focus group discussions with key informants and other knowledgeable community members were carried out. The responses of our informants were copied down. The semistructured interviews contained a checklist of questions focusing on the vernacular names of medicinal animals, their habitats, parts of the animals or their products used, medication preparation methods, materials utilized during preparation, condition of preparation, additives/ingredients used during preparation and administration, dosage administered, and route of administration. Moreover, reaction to the medication (assuming there was any) was likewise included.

Observations with informants on field walks took place to see and watch in their habitats those animals the informants referred to and produced voucher specimens of.<sup>5</sup> Besides focus group discussions with conventional healers, conversations with local knowledgeable people and key informants were held to obtain additional data and to check the reliability of their statements. On some occasions, the preparation methods of the therapeutic animals were meant to remain secret and were,

### Main Points

- Traditional therapies involving animals and their products are still being used in rural parts of Ethiopia.
- Altogether 13 species of the therapeutic animals of the region (65%), involving mainly mammals and reptiles, were obtained from the wild, and seven (35%) represented domestic animal species. With a relative importance index of RI = 0.912, the fox *Vulpes vulpes* turned out to be the most versatile species.
- Thirty different kinds of preparation methods to treat disorders were recorded. The most important routes of administration were oral, dermal, and nasal.
- Overexploitation and overhunting pose a threat to the therapeutic species. For the conservation and management of these species, the local residents' cooperation and understanding are needed.

Figure 1. Map of Ethiopia and the study region



therefore, excluded from the discussion. Most field observations were directed with only one informant at a time in order to safeguard the secret information; this was what the healers specifically requested. Specimens were gathered on site, and together with the information of the local name and photographs, the dead skin, hair, fur, and other characteristic materials were taken to Arba Minch University (AMU) for inspection. Formal identification of the therapeutic animals was conducted by zoological experts of AMU, comparing the collected material with internet images and published animal keys. Molecular

analyses of the collected therapeutic animals were not possible and not deemed necessary.

**Ethics Statement and Consent to Participate**

This investigation was approved by the Committee for Ethical Research of the Department of Biology, Arba Minch University (AMU/021/2017). Prior to collecting the data, in each case of an interview, we obtained oral informed consent to proceed. All informants were given detailed information on the objectives

**Table 1.** Household Characteristics of the Respondents (n = 90)

Variable	Sex		Age group (in years)					Educational status				
	M	F	20-30	31-40	41-50	51-60	>60	Illiterate	1-4 grade	5-8 grade	9-10 grade	11-12 grade
Frequency	45	45	18	37	27	14	4	21	33	32	13	1
Percentage	50	50	18	37	27	14	4	21	33	32	13	1

**Table 2.** Proportion of Animal Species Used in Traditional Medical Treatments

No.	Animal species	Number of species	Percentage
1	Mammals	12	60
2	Birds	1	5
3	Reptiles	3	15
4	Fish	2	10
5	Insects/arthropods	2	10

of the research and understood that it was not carried out for business purposes but for scholastic reasons. All participants gave verbal informed consent to participate in this study; they were allowed to withdraw their information at any point of time. The informants completely accepted the idea and objectives of the study and consented to have their names and personal information published if required.

#### Data Analysis

The ethnozoological data were analyzed using appropriate statistical tools such as Microsoft Office Excel Spreadsheet<sup>®</sup>. Excel was used to calculate sums and percentages and to tabulate and draw graphs. Descriptive statistics, for example, percentage and statistical distribution, were employed for analyzing animal habitat, animal part(s) or product(s) used, methods of preparation medication, dosages administered, and route of administration. Data were presented in graphs and tables, and they were interpreted and discussed. The fidelity level quantifies the importance of a species for a given purpose. It refers to the share of informants claiming the employment of a specific animal species for the identical major purpose was calculated for the foremost frequently reported disease or ailments as FL (%) =  $(N_p/N) \times 100$ , where  $N_p$  is the number of informants that claim a use of the animal species to treat a specific disease and  $N$  is the total number of informants that use the species as a medication to treat a given disease.<sup>13</sup>

The RI value is employed to quantify the variety of medicinal applications; it was computed for every claimed medicinal animal. The formula used was as follow:  $R = NP + NBS$ , where RI stands for relative importance and NP is the computed value obtained by dividing the quantity of properties (specific ailments treated) recognized in connection with a species divided by the overall number of properties attributed to the foremost versatile species (species with the best number of properties).

The number of body systems (NBS) value is obtained by dividing the quantity of the body systems (ailment categories) treated by a given species by the overall number of body system treated by the foremost versatile species.<sup>14</sup>

## RESULTS AND DISCUSSION

#### Socio-demographic Characteristics of the Respondents

Data on the socio-demographic attributes of the respondents with respect to age, sex, and educational status are introduced in Table 1. Of the 90 informants interviewed in the study region, 45 were male and 45 female. The majority of the informants (37%) were in the age group of 31-40, followed by 27% aged 41-50; just 18% of the respondents were in the 20-30-year-old group and 18% were over 50 years of age. Regarding their educational backgrounds, most of the respondents (33%) had completed the first cycle of primary education (1-4 grades), but only 13% had completed secondary high school (9-10 grades).

#### Traditional Medicinal Animals Used by Peoples of the Study Area

Nineteen species of the therapeutic animals were gathered and archived from the study region (Table 2). Mammals registered the highest percentage in both number of animal parts and animal products (60%), trailed by reptiles (15%). In addition, 10% each of the therapeutically used species were identified as fishes and insects, and the sole representative of the birds, the domestic chicken, accounted for 5% of the medicinally utilized fauna-based groups of animals (Table 2). This outcome demonstrates that the interviewed people of the Arba Minch Zuria district have therapeutic uses for only a relatively small number but taxonomically wide range of diverse species of animals to treat diseases and bodily dysfunctions. The presence and usage of such few therapeutic animals by people in the study area suggests that the people of the region may increasingly use

nontraditional medication and drugs. However, conventional medicines are still considered useful and important, especially for the poor who have little access to modern medicines and do not have the money to pay for expensive new drugs. A similar number of diverse taxonomic groups of therapeutic animals and related ethnomedicinal knowledge has been reported from some other regions of Ethiopia.<sup>5-7,12,14</sup>

#### Habitats and Abundance of Medicinal Animals

Altogether 13 species of the therapeutic animals of the region (65%) were obtained from the wild and seven (35%) represented domestic animal species. This shows that the traditional healers rely more on the wild than the domestic species and additionally hints at the possibility that some wild animal species of the study region could be overused. This observation in concert with the perception obtained in interviews affirmed that customary healers generally have less interest in employing domesticated species for their treatments of specific illnesses. Species used primarily as food (like the domestic animals) appear to be less appreciated as a source to treat sick people with. This finding agrees with observations on the therapeutic inventories of other tribes where wild medicinal animals also dominated<sup>5-7,12</sup> and could be driven to some extent by the consumers' preferences for drugs and potions from wild rather than domestic species.

#### Animal Parts/Products Used as Traditional Medicine

Results of this segment of the survey showed that various parts of the medicinal species were utilized therapeutically by the local practitioners to prepare potions and remedies. Of the 20 kinds of therapeutic material to treat various health problems, meat (18%), bile (10%), and feces/excrement (10%), followed by blood (8%), teeth, bone, and milk (all 6%) of specific animals, were most commonly used (Table 3). The risk of destroying the medicinal animal resource is especially high in connection with meat and bile as these items are used for a wide range of illnesses and usually require the killing of an animal. Collecting therapeutic bile, meat, and teeth has consequences for the survival of an animal, but collecting feces, feathers, eggs, and honey usually has only a minor effect on the survival of an individual animal especially when contrasted with meat, bile, teeth, and bones (or bone fragments). Elsewhere in Ethiopia, meat, bile, teeth, and feces were often also the most commonly used animal parts used to treat medical issues,<sup>5-7,12</sup> although for the West Gojjam Zone of Javittenan, North Achefer, and Bahir Dar Zuria districts' honey and meat had the highest use followed by purified butter, milk, liver, and cheese.<sup>15</sup>

#### Mode of Remedy Preparation

Local healers employ a great variety of methods to prepare traditional medicines. They frequently prepare some food to ingest (e.g. like a soup to which are added a variety of ingredients). However, direct uses dominate (68.97%), and soups with (6.90%) and without ingredients (6.90%) are the three main methods of producing a potent medicine (Table 4). Preparation and application methods vary, based on the types of disease to be treated, the actual site of the ailment, and the animal (or animal part) involved. A minority of preparations are made from mixtures of different animal species with water and a variety of different additives like honey, sugar, butter, salt,

and milk. These added substances have different functions, e.g., to reduce the toxicity, to enhance the flavor, to lessen the chance of vomiting, and to avert diarrhea, and this could be the reason for the observation that one and the same animal part or product can be used to treat sometimes quite different organs or illnesses.<sup>16</sup> Specific herbal remedy preparations with their possible synergistic benefits may be prescribed.<sup>17</sup> Information was also provided that the medicine could be blended with regular food and beverages, so that it would either change in taste or could be taken without being noticed. Although in some cultures the placenta has a therapeutic role to play,<sup>18</sup> e.g., sheep placenta in traditional obstetrics in Nigeria,<sup>19</sup> no such uses were revealed by our informants, but it needs to be reiterated that the healers were very particular about certain treatments and animal uses that were considered too secret to be revealed.

#### Routes of Administration

Various routes of administering the medicinal animal preparations are known to the people of the area. The most important routes of administration are oral, dermal, and nasal. Dermal application in the form of a lotion, cream, or plaster is the dominant route (50.00%), followed by oral application (46.43%) (Figure 2). Oral and dermal routes of administration permit quick interactions of the prepared medicines with pathogens or the inflamed tissue and enhance the medicines' curative power. They have been shown to be the most widely used forms of administration also in other parts of Ethiopia.<sup>5-7,11</sup> Nasal administration involves inhaling fumes and/or introduction of the therapeutic agent into the nose. It is the least common method of treatment.

#### Relative Importance of Species and Fidelity Level

The RI of a species refers to the relative use of it in the preparation of the remedies. Material from the fox (*Vulpes vulpes*) is used to prepare remedies for four ailments, making the fox the most versatile species with an RI of 0.912. The two next most therapeutically important species are the cow (*Bos taurus*) and the chicken (*Gallus gallus*) with an RI of 0.881 each. These animals are followed by sheep (*Ovis aries*) (RI = 0.728), bats (RI = 0.681), goat (*Capra aegagrus*) (RI = 0.681), and *Papio anubis* monkeys (RI = 0.681) (Table 5). As an insect, the honey bee's score on the basis of its multipurpose product honey would be as high as 0.912, but considerably lower if we focused on the direct therapeutic use of its larvae alone.

The FL is determined to identify the most frequently treated malady or ailment category as mentioned by the informants. Skin-related diseases, i.e., various forms of dermatoses, vision-related problems, and malaria were the three main categories, scoring respective FL values of 0.5-4.00, 0.88-1.00, and 0.71-0.94. Species with an FL of 1.00 are the pig (*Sus scrofa*), lacertilian lizards, the African warthog (*Phacochoerus africanus*), the goat (*Capra aegagrus hircus*), and snakes. The possibility exists to use different remedies for similar ailments<sup>20</sup> as has been shown for other regions elsewhere in the world, especially given irregular accessibility to particular species.<sup>21</sup> Alves and Alves<sup>22</sup> suggest that various species of therapeutic animals may have comparable restorative properties and that pharmacological scrutiny could possibly confirm their effectiveness as zootherapeutic cures.

**Table 3.** Therapeutic Species and Their Uses in Treating Specific Disorders in Human Subjects

Name	Scientific name	Taxon	Habitat	Condition	Main part(s) used	Mode of preparation and method of administration	Organ or illness treated
Monkey	<i>Papio anubis</i>	Cercopithecidae	Domestic	Dry/dry	Fecal matter	Dried fecal matter is fumigated	Sleeping sickness
					Hind, skin	Hind or skin applied to heal	Broken/displaced bone, burn wound
Cow	<i>Bos taurus</i>	Bovidae	Domestic	Fresh	Bile	Bile massaging around closed eye	Eye/vision
				Fresh	Bile	Drinking the raw bile	Malaria
				Fresh	Gut content	Massaging gut content around male genitals to stimulate the organ	Male sex organ
				Fresh	Horns	Crushed horn taken with injera (traditional Ethiopian atbread)	Malaria
				Fresh	Leg	Leg cuts with ingredients turned into a healthy soup	Wrist fracture
				Fresh	Liver	Eaten directly	Anemia
				Fresh	Spleen	Eaten directly	Anemia, malaria, trachoma
				Fermented	Yoghurt	Eaten or drunk	Gastritis
Goat	<i>Capra hircus</i>	Caprinae	Domestic	Fresh	Oviduct	Mixed with butter and anointed to the head	Eye: vision disorder
				Fresh/dry	Fecal matter	Dried, powdered, mixed with water, and smeared over the head	Fighting dandruff
				Fresh	Milk	Directly given to drink	Eye problems, pain, headache, measles, TB, snake bite, vomiting, rheumatism
Sheep	<i>Ovis aries</i>	Caprinae	Domestic	Fresh	Bile	Drinking fresh bile	Malaria
					Blood	Drinking fresh blood	Anemia
					Milk	Drinking directly	Malaria

Table 3. (Continued)

Name	Scientific name	Taxon	Habitat	Condition	Main part(s) used	Mode of preparation and method of administration	Organ or illness treated
Pig	<i>Sus scrofa domestica</i>	Suidae	Wild	Fresh	Meat	Consuming the meat	Rheumatism and headache
					Blood	Anointing the infected part	Skin infections
Warthog	<i>Phacochoerus</i> spp.	Suidae	Wild	Dry	Teeth	Heating the teeth and apply	Swellings, warts, toothache, and rheumatism
				Fresh	Blood	Drinking directly	Malaria, asthma, and rheumatism
Hyena	<i>Crocuta crocuta</i>	Hyaenidae	Wild	Dry	Skin	Tying skin to the neck	Protection from “Evil eye” and “Bad Spirits”
				Dry	Bone	Tying around the neck	Epilepsy and “Bad spirits”
Fox	<i>Vulpes vulpes</i>	Canidae	Wild	Fresh	Bile	Putting bile once/day on the nose for one week	Heart-related problems
				Dry	Teeth	Tying teeth around the neck	Throat problems
				Fresh	Pancreas	Tying pancreas to the arm	Spleen problems
				Fresh	Blood	Smearing it on the scalp	For hair growth
				Fresh/dry	Brain tissue and meat	Directly consumed	Epilepsy, mental disorders
Cat	<i>Felis catus</i>	Felidae	Domestic	Dry	Teeth	Rubbing teeth on the head	Skull glands
				Dry	Skin	Tying it around part of body	Spiritual problems
Groundhog	<i>Marmota monax</i>	Sciuridae	Wild	Fresh	Meat	Pounded meat to be consumed	Fattening of body
Rabbit	<i>Oryctolagus cuniculus</i>	Leporidae	Wild	Dry	Meat	Rubbing dried meat over the injury	Skin problems
				Dry	Fur	Fur is burnt; ash mixed with butter and creamed onto the burnt body part	Burns
Fruit bat	sp.	Pteropodidae	Wild	Dry	Bones	Inhaling fumes from fumigated bones	Mental illness
				Dry	Meat	Consuming the dried meat	Mental disorder and hepatitis

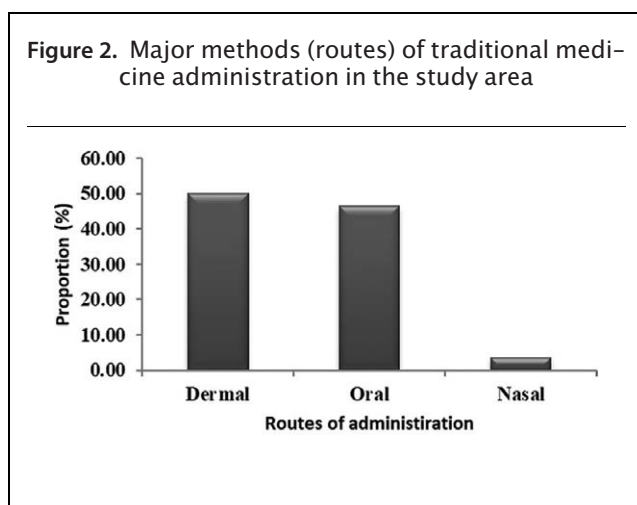
Table 3. (Continued)

Name	Scientific name	Taxon	Habitat	Condition	Main part(s) used	Mode of preparation and method of administration	Organ or illness treated
Chicken	<i>Gallus gallus</i>	Phasianidae	Domestic	Fresh	Whole body	Cooked and eaten	Wound and injury
				Dry	Excrement	Combining excrement with mud and applied to infected skin	Skin problems
				Fresh	Eggs	Drinking raw egg yolk	Heart failure
				Fresh	Liver and fat	Consumed raw	Pneumonia and swellings
Lizard	<i>Lacerta</i> spp.	Tropiduridae	Wild	Dry	Fecal matter	Pounded fecal matter, dried and with secret ingredients applied to swellings	Skin problems
				Fresh	Whole body	Making a drink by adding water and salt	Cough and anemia
Python	<i>Python</i> sp.	Pythonidae	Wild	Dry	Bone	Crushing the bone, tying and banding	Rabies and swellings
				Fresh/dry	Meat	Consumption and for anointing	Rabies, foot crack, and ear disorder
				Fresh	Fat	Applied to infected area	Ear disease, wound
Snakes	<i>Bitis harena</i>	Ophiidae	Wild	Dry	Brain, skin	Used fresh to rub over the eye	Eye: vision disorder
Nile perch	<i>Lates niloticus</i>	Percidae	Wild	Fresh	Bile	Drinking fresh bile directly	Eye disorder
				Fresh/dry	Meat	Consumed directly	Rheumatism
Catfish	<i>Bagrus docmak</i>	Bagridae	Wild	Fresh/dry	Meat	Consumed directly	Rheumatism
Honey bee	<i>Apis mellifera</i>	Apidae	Domestic	Fresh	Honey	Eating or drinking the honey	Swarts, asthma, respiratory, throat pain, diarrhea, cough, TB, mumps, and heart failure
				Fresh	Larvae	Consuming directly	Stomach disorder
Stingless bee	<i>Meliponula</i> spp.	Apidae	Wild	Fresh	Honey	Eating or drinking the honey	Stomachache, eye disorders, and coughs



**Table 4.** Mode of Preparation of Traditional Medicines in the Study Area

No.	Mode of preparation	No. of preparation	Percentage
1	Direct use	20	68.97
2	Soup	2	6.90
3	Ingredients added	2	6.90
4	Crushing	1	3.45
5	Heating	1	3.45
6	Binding	1	3.45
7	Drying	1	3.45
8	Pounding	1	3.45

**Figure 2.** Major methods (routes) of traditional medicine administration in the study area

### Risk of Zoonotic Disease

Zoonosis alludes to illnesses, known zoonotic diseases, which are passed from animals to people. Animals can transmit harmful pathogens like viruses, bacteria, fungi, and parasites and consequently make people ill and ingestion of bile, for instance, as reported by Costa-Neto and Motta,<sup>23</sup> can transmit *Salmonella* spp., and lead to chronic diarrhea and even toxic shock. Zoonotic diseases may be mild or severe but may spread in the human population and lead to epidemics. Therefore, information on animal diseases (diseases transmitted between animals and humans) was sought.

We found that few respondents knew about the risk of zoonotic diseases and then only those that could read and write. This shows that the literate informants are likely to be less at risk of being contaminated with animal disease than those informants who are illiterate (uneducated). Although using therapeutic animals in treating diseases is generally considered a risk-free affair by consumers, zoonotic diseases are, nevertheless, increasing according to some of the illiterate (uneducated) respondents.<sup>5,24</sup> Thus, it seems necessary to warn of the dan-

**Table 5.** Relative Importance (RI) of a Species

Common name	Scientific name	Relative importance (RI)
Fox	<i>Vulpes vulpes</i>	0.912
Cow	<i>Bos taurus</i>	0.881
Chicken	<i>Gallus gallus</i>	0.881
Sheep	<i>Ovis aries</i>	0.728
Flying fox	<i>Cynopterus sphinx</i>	0.681
Goat	<i>Capra aegagrus hircus</i>	0.681
Monkey	<i>Papio anubis</i>	0.681

gers and the possibility to contract some of the more widespread zoonotic diseases like tuberculosis or rabies from animals, an aspect of considerable importance when dealing with animals and their tissues as remedies for human illnesses.

### Threats to Medicinal Animals

In the Arba Minch Zuria district, the biggest threats for the future of the use of animals and their products in traditional remedies were according to our informants in the order of importance: (1) habitat loss and degradation, (2) overexploitation, (3) exotic species, (4) climate change, and (5) pollution. Ethnobotanical and ethnozoological research from elsewhere in Ethiopia had revealed very similar results.<sup>5,25</sup> Realistically, the incentive to conserve therapeutic animals within the area was seen to be very poor. However, a start is the awareness of the role of preservation in maintaining a sustainable use of the therapeutic animals in the Arba Minch and that needs to be supported in the region. It should be possible to find ways to halt the decline of the number of therapeutic animal species of the region by providing funds as well as land for domesticating therapeutic animals and helping the Traditional Healers Association in their activities with professional guidance.

## CONCLUSION

The results of the present study are new and have shown that people of the Arba Minch Zuria district traditionally use a variety of therapeutic animals. As elsewhere in Ethiopia, specific animal-based medicines are prepared by Arba Minch Zuria healers using wild and domestic species of not only primarily mammals but also reptiles and birds. Most practitioners obtain their animals and their products from the wild by hunting, which could affect the distribution and abundance of the untamed species. An accurate estimation of the effect is not possible until a systematic ecological inventory of the study area has become available. It was noted that the men of the region possessed a greater knowledge of the traditionally used medicinal animals than the females. The proximity to Nech Sar National park created access to interact with diverse wild animal species. Relatively small numbers of the urban and rural inhabitants within the study area rely only on traditional medicine, which suggests that the fashionable health service plays a significant role in filling the gap between traditional and modern medical care. However, as Meyer-Rochow<sup>16</sup> points out, what we must not do is to belittle or outright dismiss without any evidence a treatment method that for centuries has been an accepted way to confront a disease simply because it seems to be based on superstition or subscribes to the tenet of “let likes be cured by likes.”

**Ethics Committee Approval:** Ethics committee approval was received for this study from the Ethics Committee of Arba Minch University (AMU/021/2017).

**Informed Consent:** An informed consent was obtained from all informants, and approval to carry out the study was given by the Ethics Committee of Arba Minch University.

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