



Wolkite University
College of Natural and Computational Sciences
Department of Biology

**An Ethnozoological Study of Traditional Medicinal Animals used to treat
Human and Livestock Ailments in Ginnir District, East Bale Zone, Oromia
National Regional State, Ethiopia**

By: Beka Lema

Main advisor: Hirpasa Teressa (Asst. Professor)

Co-advisor: Seyoum Kiros (PhD)

**A Thesis Submitted to Department of Biology for Partial Fulfillment of the
Requirement for Master of Science Degree in General Biology**

August, 2024

Wolkite, Ethiopia

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LISTS OF ABRIVATION AND ACRONYMS

FL = Fidelity level

ICF = Informants' Consensus Factor

IK = Indigenous Knowledge

TMA = Traditional medicinal animals

UV = Use values

WHO = World Health Organization

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ABSTRACT

In Ethiopia, many ethnic communities use traditional medicine for primary health care. Indigenous medicinal practice is being neglected and continues to be lost due to poor documentation as they are transferred from generation to generation through oral tradition. Thus, this study aimed to carry out animal-based traditional medicinal uses in the Ginnir district, Eastern Bale Zone, south East Ethiopia. A purposive sampling method was carried out from December 2023 to March, 2024. The data were collected through semi-structured questionnaire and interview from 112 selected respondents. Descriptive statistics was employed for the analysis of data. A total of 33 medicinal animals species were reported to be used to treat 34 ailments. Out of these 57.58% were mammals followed by 15.15% of reptiles and birds. Of 33 medicinal animals five of them were used to treat both human and animals ailments. The most frequently used animals parts were external body parts (42.86%) followed by products (19.05% and) excreta were the least. The most commonly used applications of medicinal animal were tying (37.5%) followed by eating (20%) and drinking (7.5%). The skin of a hyena used to treat evil eyes and bad spirit has the highest fidelity level 100%, whereas lesser kudu has the lowest fidelity level (22.2%) used to treat evil spirit and chill. The ICF values were varied from 0.7 up to 1. Animal-derived medicines are an alternative source of medicine to treat various ailments both in rural and urban the study area. Different illegal practices like hunting today are a big pressure on many animal species, a cause of habitat degradation, increase the vulnerability of wild animals, and affect the knowledge of practitioners on traditional medicinal animals. Further research should be done to test the products scientifically for product development and design effective conservation and management strategies.

Keywords/Phrases: indigenous knowledge, Ethnozoology, Ginnir district, human and livestock disease, medicinal animal, zotherapy

1: INTRODUCTION

1.1 Background of the study

Ethnozoology deals with how human beings perceive, manage, classify and use animal species as well as different relationships and interactions between human and animal resources (Alve, 2011). It is the study of the relevance of the people in the society and the animal richness they may utilize for beneficial purposes (Gomez *et al.*, 2021). Zootherapy is an essential part of ethnozoology that its treating/healing process of human ailments by using medicines prepared from different animals and/or their products (Chaudhury *et al.*, 2016 and Jaroli *et al.*, 2010). Animals are used as a medicine for human tribe and communities across the globe (Dedeke *et al.*, 2006). According to Yuan *et al.* (2016), traditional medicinal knowledge constitutes an important alternative in health care system. WHO estimated that around 80% of the world population primarily depends on animal and plants-based medicine as well as their products (Borah and Prasad, 2017). About 70-80% rural world population uses traditional medicine as primary healthcare (WHO, 2008). WHO (2014) identified that; 60-90% of population uses traditional medicine for their primary health care in developing countries.

In different European and African cultures, animal medicines have a huge role in healing different diseases as well as their products are used for both medicine and food (Alves *et al.*, 2010). In addition, wild and domestic animals and products derived from their bodies are not only used in traditional medicines, but are also increasingly valued as raw materials in the preparation of modern medicines (Kang, 2003). Of the 252 essential chemicals that have been used by the WHO, 11.1% come from plants and 8.7% from animals (Marques 1997 and Rivera *et al.*, 2010). Therefore, ethnozoological investigations are crucial in the development of novel drugs (Alves and Rosa, 2005). Even though, Zootherapeutic practices had been recorded in different parts of the world (Alves *et al.*, 2018), the type and application of medicinal animals were varied from place to place. As stated by Alves *et al.* (2010) a single species can be used in different ways by different societies

The product of animals was mostly used to treat various human diseases in many cultures (Mishra *et al.*, 2011). A wide variety of animals and animal products derived from different organs of animals have constituted part of the medicinal substances for traditional and modern medicine (WHO, 2008). Body parts of wild and domestic animals such as hooves, skins, bones, feathers and tusks form important ingredients in the preparation of curative, protective and preventive medicines (Anageletti *et al.*, 1992). In Africa also, different reports described the use of different animal species and their body parts and products for different traditional medicinal purposes (Izah and Seiyaboh, 2018; Lawal and Banjo, 2007; Setlalekgomo, 2014). Out many faunal species, some of them are important to treat different human ailments (Lavrenchenko *et al.*, 2017). A diverse set of ecosystems found in Ethiopia support a wide diversity of life forms (Ethiopian Wildlife and Natural History Society, 1996). The Ethiopian is rich in its faunal diversity which has over 320 species of mammals, above 860 species of birds, 200 species of reptiles, 63 species of amphibians and 145 species of fish have been identified (Afework Bekele and Yalden, 2013)

Ethiopia has ancient history in ethnozoological studies and zootherapeutic investigations (Mola Genet *et al.*, 2020). However, few reports in Ethiopia described that different animal species and their products are used for medicinal purposes (Kenate Tadese, 2020). About 16-51 animal species are used for the treatment 18 to 6 different health problems (Zerabruk Samuel and Gidey Yirga, 2011; Tsegazeabe Haileselesie, 2012; Dereje Yohanis and Meseret Chane, 2014; Kendie Fasil *et al.*, 2018; Kenate Tadese, 2020). In addition, most researchers focus on medicinal plants and therefore, medicinal animals are less explored (Abay Solomon, 2009). In contrast to this, the use of animal in traditional medicine, animals have nearly paramount importance as plants since 8.7% from animals and 11.1% from plants essential chemicals that have been used by the WHO to make modern medicine come from animals (Rivera *et al.*, 2010). This indicates that traditional medicinal animals are a base to prepare modern medicine. Therefore, preserving indigenous knowledge and traditional medicinal animals and conserving traditional medicinal animals are fundamental urgent issues in Ethiopia. The available literature has no information about the use, treat and conservation of traditional medicinal animals in the study area. The present study initiated to add one more new document concerning traditionally used medicinal animals for the treatments of human and livestock diseases in Ginnir District, East Bale Zone, Oromia National Regional State of Ethiopia.

1.2 Statement of the problem

The development of technology or modernization is a cause for fast disappearing of knowledge with the traditional healing practices using animals (Aswani *et al.*, 2018). However, teaching a traditional practitioner of medicinal animals through technologies is one of the most important things to keep the traditional knowledge of local communities and to document. Many ethnic communities of our countries are dispersed throughout the country and these communities are more knowledgeable about medicinal value of animals (Zhuo *et al.*, 2013). However, lack of strategies and principles, educated practitioners on traditional medicinal animals and animal conservation priority as well as insufficient documented and published articles on traditional medicinal animals are a major problem in Ethiopia.

The development of modern medicine is being affected due to loss of traditional knowledge (Zerabruk Samuel and Gidey Yirga, 2011). This indicates that, traditional knowledge is a base for the development of modern technology. In developing countries like Ethiopia, the indigenous knowledge about traditional medicinal animal was transferred secretly from generation to generation orally. Due to this, there is a gap in the documentation and records on medicinal animals by the community in the country. Furthermore, the indigenous knowledge on the usage of medicinal animals is also getting lost because of industrialization, expansion of modern education and specialized healers do not convey their knowledge to next generation. In addition, research has not been done on traditional use of medicinal animals and their products for medicine as well as the impact on conservation of biological resources in Ginnir District.

Conservation is the target issue to transfer the indigenous knowledge of communities to the next generation as it is alive. Climate change, excessive exploitation, habitat destruction due to urbanization, fire and intensive agricultural practices are factors that affect population of wildlife with therapeutic properties (Izah and Seiyaboh, 2018). The decline and local extinctions of some wild animal species is posing serious threats on the existence and continuation of the traditional uses for future generations. Furthermore, there are widespread factor influencing the knowledge about wild animals especially among young people. Moreover, no scientific research has been done on traditional use of medicinal animals and their products for medicine as well as the impact on conservation of biological resources in Ginnir District. Therefore, the present study was aimed

to assess the an ethnozoological study of traditional medicinal animals used to treat human and livestock ailments in ginnir district, east bale zone, Oromia national regional state, Ethiopia.

1.3 Objectives of the Study

1.3.1 General objective

The general objective of the study was to assess Zootherapeutic healing practices of local communities in Ginnir District, East Bale Zone, Oromia Regional State, Ethiopia

1.3.2 Specific objectives

The specific objectives of the study were:

- To identify the main medicinal animal species in the Ginnir district.
- To assess the major human and livestock's diseases treated by traditional medicinal animals.
- To identify the major animal products/parts and their mode of preparation, mode of applications, and ingredients added to treat human and livestock's diseases.
- To assess the major threats and conservational status of traditional medicinal animals in the study area.

1.4 Research Questions

1. What are the major species of medicinal animals utilized by the local community of study area?
2. What are the diseases treated by traditional medicines from animal body parts and products?
3. How the local community of study area prepares, apply, and administer traditional medicinal animals?
4. What are the major threats and conservational status of traditional medicinal animals in the area?

1.5 Significance of the Study

Different researches are being carried out in many countries with the aim of raising the use of traditional medicinal animals to cover the prevalence of medicine crisis and increase baseline

information for the development of modern medicine. Therefore, the outcome of this study is help to give important information for government and non-government organization as well as other concerning bodies. Furthermore, the finding of this study will also act as a reference material for the other researches and the development of modern medicine. In addition, the finding of this study recommends the possible management practices for the conservation of traditional medicinal animals.

1.6 The Scope of the Study

This study was conducted in Ginnir district. The district has 33 kebeles. Of these around 6 kebeles are pastoralists and the remaining are agrarians. The research is limited to seven kebeles of Ginnir district namely: Caffé Nagaya, Sabuna, Oda Malka, Ginnir 01, Dello Sebro, Abursha and Mumicha Fato. These kebeles were selected due to availability of the traditional healers, easily accessibility of the area, and availability of the traditional medicinal animals. This study identified, assessed the preparation methods and ways of administration, the major threats and conservation status, and documented the uses of medicinal animals that are in use by people to treat human and livestock diseases in the study area. Generally, this study was focused on ethnozoology of traditional medicinal animals that used to treat various human and livestock ailments in the study area.

2: REVIEW OF RELATED LITERATURE

2.1 Indigenous Knowledge Systems

IK is one of the signs of having available facts about local environment and provides guiding practices that are indispensable for sustainable development (Gupta, 2011). On the other hand, indigenous knowledge is an informal education that is nearest to nature (Ezeanya-Esiobu, 2019). This means, it is a body of knowledge made by a group of people through generations of living in close contact with nature. Mawere (2014) defined indigenous knowledge as the established knowledge of indigenous society, their world views, and the customs and traditions that direct them. In addition, Institute of Advanced Studies Indigenous Knowledge Initiative (Boven and Morohashi, 2002) defined IK as the knowledge, innovations and practices of indigenous and local communities throughout the world. In other words, it is the accumulation of knowledge such as skills, standards, rule and mental sets that reflected by indigenous people in a specific area (Quanash, 1998). Therefore, indigenous knowledge is the interaction of human with their environment through time testing (Martin, 1995).

One of the systematic applications of indigenous knowledge is the sustainable use of resources (Lam *et al.*, 2020). However, modernization is reducing knowledge with the traditional practices of using organisms in medicine (Yuan *et al.*, 2016). As a result, the development of modern medicine has been affected due to loss of traditional knowledge (Ayyanar and Ignacimuthu, 2005). Since modern medicines used traditional medicine as raw materials or ingredients sources from wild plants and animals (Kang, 2003). Loss of traditional knowledge has impact on the development of modern medicine and it could be important to record or document the traditional knowledge of human societies to prevent the loss of their socioeconomic and cultural characteristics (Alves and Rosa, 2005).

Indigenous knowledge has its own characteristics and incorporates all aspects of life including spirituality, cultural practices, history, language, social interactions, and healing. Hart, (2010) explained the characteristics of indigenous knowledge as personal, oral, experiential, holistic, and conveyed in narrative or metaphorical language. Similarly, Aikenhead and Ogawa, (2007) described three characteristics of indigenous knowledge such as oral, holistic, and local.

2.2 Indigenous knowledge and healing practices in Ethiopia

Indigenous knowledge refers to accumulation of knowledge, rule, standards, skills and mental status, which are possessed by local people in particular area (Quanash, 1998). Bojuwoye, (2020) stated that, cultural and religious beliefs are intertwined with African indigenous healing and focused on the psychological, spiritual and social aspects of individuals, families and communities; it doesn't focus only on the physical condition. Indigenous knowledge on remedies in many countries including Ethiopia passes from one generation to the next verbally with great secrecy (Gidey Yirga, 2010).

According to Zemedet Asfaw and Mesfin Tadesse, (2001), the indigenous knowledge of the community about traditional medicine in Ethiopia was distributed hierarchically and unevenly. Furthermore, Lulekal *et al.* (2014) identified that Ethiopians have been heavily relied for centuries on a system of indigenous health care knowledge for different physical and mental disorders. Similarly, (Demissie Dawit *et al.* 2010) identified that without indigenous knowledge, medical therapeutic or biomedicine therapeutic couldn't solve the communities' health problems alone. In relation to this some scholars have conducted studies on the various issues of indigenous knowledge of medicine in Ethiopia (Dehnet Abebe *et al.*, 2022; Issa, 2015; Kefalew shembo *et al.*, 2022; Kenate Tadele *et al.*, 2020). For example, a study carried out by Mesfin Yohanis *et al.* (2017) indicated that world view of health, health problems and 33 healing systems is closely linked to their day to day cultural lives in North Eastern Amhara communities. Similarly, the Kunama people in Northern Tigray utilize indigenous medicine and treatment for a range of diseases (Gidey Yirga *et al.*, 2015). Indigenous health practitioners use indigenous medicine and most people use indigenous medicine at least once in their life time and both biomedical workers and indigenous healers expressed their willingness to collaborate among each other in Shirka district, Arsi zone, Oromia region (Addis Yalew *et al.*, 2002).

A recent study, in Konso people of South Western Ethiopia, the study showed that the importance of medicinal animals, understanding and perceptions towards health and illness in relation to the local customs, religion and environment were reported (Workneh Fekede *et al.*, 2018). In western part of Ethiopia, in Sibule district of Oromia region, around forty-five species of medicinal animals and their parts, products and by-products were used to prepare remedies for 38 different ailments (Kenate Tadesse, 2020). This includes different body parts, products and by-products of

certain animals like hyena, bush cow and goat that were used to treat different types of human ailments (Kenate Tadese, 2020). On the other hand, in northern part of Ethiopia, in Humara district, various medicinal animals such as *hens, cats, honey bee, camels* were used to treat various human ailments (Zerabruk Samuel and Gidey Yirga, 2011). Similarly, in Northwest Ethiopia, different body parts and by-products of medicinal animals such as cheetah, camel, hyena, and lizard were used to treat different human ailments (Kindie Fasil *et al.*, 2018).

2.3 Traditional Medicinal Animals

WHO (2014) defined traditional medicine as the total accumulation knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, either verbally or in written form. Physical and mental illness are treated, improved, prevented and diagnosed through the sum total of traditional medicine of knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures (Kandari *et al.*, 2015).

Alves *et al.* (2010) revealed that, different societies use one species in various areas in different ways. In addition, Fasil Kibebew (2001) reported that knowledge varies from region to region and from community to community. The use and application of traditional medicine to veterinary medicine is mainly concerned with folk beliefs, knowledge, skills, methods and practices which are used in the health care of human and livestock. In different part of the world, species of animals used for traditional medicine are reported. For example, in Brazil as study reported that 283 animal species have been used in traditional medicine (Alves and Rosa 2007). In Nigeria, study reported that different human ailments are cured by using 21 various species of arthropods and three species of Mollusca (Lawal and Banjo, 2007). In china alone, more than 1,500 animal species have some medicinal importance as reported in china's traditional medicine (Jaroli *et al.*, 2010). According to (Lohani, 2011), Jirels people of Nepal have used 49 animal species in which their products were used therapeutically. In addition, in India, around 24-34 animal species were used for the treatment of about 12-41 different diseases such as asthma, fever, arthritis (Jaroli *et al.*, 2010).

Using animals and their products for medicinal purposes is part of a body of traditional knowledge (Alves and Rosa, 2005). Wild and domestic animals and products derived from their bodies are not only used in traditional medicines, but are also increasingly valued as raw materials in the preparation of modern medicines (Científico *et al.*, 2009) contributing about 8.7% of essential chemicals for drug preparation (Marques, 1997). Altaf *et al.* (2017) stated that fats, flesh, blood, milk and eggs are the most commonly utilized body parts and by-products of medicinal animals. In Botswana, blood, scales, tail, head, and paws of pangolins body parts are used in traditional medicine to treat different human disease (Setlalekgomo, 2014). In addition, in Angola, bones, fur, skin, fat, and feces were applied in the form of ashes, cooked to use grated to eat decoction and oil as part of medicinal animals for massage (Braga-Pereira *et al.*, 2017).

Across the globe identifying living organisms that are important for treating human health problems and livestock ailments are based on traditional medical knowledge of indigenous people (Gidey Yirga *et al.*, 2011; Mekonen Kirubel, *et al.*, 2011). Natural resource and indigenous knowledge that locally available is a basis for global practice of traditional medicinal animals (Awas Tesfaye and Demissew Sebsebe, 2009). According to Gidey Yirga *et al.* (2020), in all corners of the world, animal parts and their products are used for medicinal purposes. However, the application and type of medicines varies in different areas and cultures.

2.4. Traditional medicinal animals used in Ethiopia

Ethiopia is a country characterized by a wide range of climate and ecological conditions, possessing extremely large diversity of fauna and flora (Zerabruk Samuel and Gidey Yirga, 2011). Faunal resources have played significant roles in human life from the earliest days of recorded history for medicinal purposes to treat and cure diseases and to improve the health and well-being of humans and livestock (Wendimu Abenezer and Tekalign Wondimagegnehu, 2021). Around 80% of human population in Ethiopia used traditional medicines only as a source of therapeutics (Mesfin and Obsa, 1994). Traditional medicine is not only concerned with curing of diseases in Ethiopia but also the protection and promotion of human physical, spiritual, social, mental and material wellbeing as well as different cultures and the skill of traditional health practitioners is 'given by God' and knowledge on traditional medicines is passed orally from father to a favorite child, usually a son or is acquired by some spiritual procedures (Kenate Tadese, 2020). According to Deribe Kebede *et al.* (2014) some certain tribes or social groups keep the knowledge of

traditional healing. On the other hand, Addis *et al.* (2002b) reported that because of sociocultural background of the different ethnic group and historical growth such as migration, religion and introduction of foreign culture, Ethiopian traditional medical system has been shaped. In Ethiopia, indigenous traditional medicines are practiced essentially based on a private agreement between consenting parties, and the knowledge of traditional practice in most cases as descended through oral folklore (Eshete Ashagre *et al.*, 2016).

2.4.1. Animals body parts/products used

Few Ethiopian medicinal animals have been identified from very limited areas and cultures when compared to other countries such as China in which more than 1,500 medicinal animal species have been used to treat countless ailments regardless of the country's size (Jaroli *et al.*, 2010). The indigenous people of the country have used meat, blood, excrete, bone/teeth and whole body to treat human livestock diseases for generations. Mola Genet *et al.* (2020) stated that, meat/fat, blood, visceral organ, whole body, excreta, and bone/teeth were grouped under body parts/products of medicinal animals and other body parts of wild and domestic animals like hooves, skins, bones, feathers, and tusks are important ingredients in the preparation of curative, protective, and preventive medicine. Different scholars reported that, the skin of hyena) is used for the treatment of evil eye and highest fidelity level followed by blood of pig to treat stomach problems as a whole and they use certain animals for the same ailments (Goshu Kumera *et al.*, 2022).

The body parts and by-products of different medicinal animals like milk of for cough and eye disease, the meat of porcupine for stomach problem, the honey of bee to treat cough, the skin of rabbit to relieve wound, and the meat of owl to increase intelligence (wisdoms), are the well-known traditional remedies for achieving higher fidelity level in Ethiopia (Goshu Kumera *et al.*, 2022). Different studies showed that significant number of animal species was reported to heal different ailments. For example, in humera district of northern Ethiopia 16 species of medicinal animals are identified and reported for treating 18 different human ailments (Gidey Yirga *et al.*, 2011). About 51 animal species are identified to treats around 36 various ailments in north-western Ethiopia (Kendie Fasil *et al.*, 2018). In this report, 27 species were mammals, 9 were birds, 7 arthropods, 6 reptiles, and 1 species each represented fish and annelids (Kendie Fasil *et al.*, 2018). In addition,

21 animal species were identified to prepare traditional medicines to treat 46 various ailments in southern Ethiopia. From these traditional animals, 14 species are mammals, 3 species reptiles and 4 species birds (Dereje and Meseret, 2014). According to (Gidey Yirga *et al.*, 2011; Kendie Fasil *et al.*, 2018; Kebebew Mulugeta *et al.*, 2021; Kenate Tadese, 2020) various traditional medicinal animals are used to treat different diseases from their body parts and by-products through different mode application in Ethiopia. For instance, they use products and body parts of hyena to treat diseases such as epilepsy and bad spirit through tying its skin on an individual (Kendie Fasil *et al.*, 2018). In addition, in this area the bee product, honey, is used to treat allergic, common cold, and inflammation through drinking and eating (Kendie Fasilet *et al.*, 2018).

In another study, (Gidey Yirga *et al.*, 2011) reported that to treat 18 different human ailments, people use different parts and products of 16 species of medicinal animals such as bile, milk, blood, pancreas, urine, hair and faecal matter in Kafta-Humera District, Northern Ethiopia. Similarly, in other studies in western part of Ethiopia, Sibu Sire district, the products of bat (meat) is used to treat folk illnesses by using anointing external and internal part of nose and tortoise meat is used to treat evil spirit applied through fumigation lion and warthog are medicinal animals in which their body parts such as head, skin and teeth are used to treat a disease known as evil spirit and burning, respectively (Kenate Tadese, 2020).

In southern part of Ethiopia, in Arbamich district, bile from sheep is used to treat malaria disease through drinking fresh bile, and skin of lizard is used to treat skin problems when used as pounded fecal matter, dried and with secret ingredients applied to swellings, meat of rabbit and catfish is used to treat a disease like skin problems, rheumatism through different mode of application like rubbing dried meat over the injury and consuming directly, the body part of python such as bone is used to treat rabies, swellings through crushing the bone, tying and banding mode of application (Kebebew Mulugeta *et al.*, 2021). Fassil Kibebew, (2001) reported, cheetah, cow, gazelle and vulture are used to treat different diseases such as hemorrhage, anemia, malaria, trachoma, wart, urination problem and epilepsy through different mode of application like tying, drinking, eating and fumigation, respectively, in northern part of Ethiopia, Metema District.

2.4.2. Preparation and administration of body parts and products

The parts and products of medicinal animals and knowledge of their uses provide a vital contribution to human and livestock health care needs through different methods of preparations. In different parts of the world animals, in European and African cultures use animals and their products have been used in the preparation of traditional remedies (Lev, 2003). Most people use various animals and their body parts as a healing medicine (Alves, 2011; Borah and Prasad, 2017). In addition to this, throughout the world, medicinal animals and their products have a huge role in magic, rituals, healing practice and religious societies (Anageletti *et al.*, 1992). In the recent studies, in modern era, zootherapy is used as alternative means for many known therapeutic practices in the world. Naturally occurring biological materials are used as a source for preparation of modern pharmaceuticals (Blakeney, 1999). By-product of wild as well as livestock like skins, hooves, feathers, bones and tusks are used as a source for preparation of protective curative and medicine (Anageletti *et al.*, 1992). According to Dedeke *et al.* (2006) reported that from the 252 essential chemicals producing from natural products around 9% of them coming from animals. Starting since prehistoric times, animals, their parts, and products have been used as part of an inventory of medicine in numerous cultures (Lev and Amar, 2000). According to a study reported in Pakistan, animal products and their different parts like blood, excreta, urine, feather, fat, hair, spines, flesh, bones and shell were used after cooked for the healing of various ailments (Ahmad *et al.*, 2023). In addition, different by-products of animals such as fats, flesh, milk, and eggs were the most commonly utilized body parts in the same country (Altaf *et al.*, 2017).

Medicines that prepared from various animals or from their products are used to treat different human ailments (Tolossa Ketema *et al.*, 2013). The medicinal animals have various methods of preparation for different types of ailments in which various preparation and techniques were used. These include using fresh, cooking, crushing, drying and powdering and burning to make traditional remedies (Kinate Tadese, 2020). Likewise, according to Gidey Yirga *et al.* (2011) medicinal animals have various methods of preparation for different types of ailments like crushing, powdering, squeezing, direct use and cooking. The preparation methods of traditional medicine varied based on ailments treated, ingredients required for extraction and routes of application.

On the other hand, the preparation of traditional medicine does not require additive substances such as sugar, butter, salt and spice as reported by (Kendie Fasil *et al.*, 2018). However, in recent study by Kebebew Mulugeta *et al.*, (2021) local healers employ a great variety of methods to prepare traditional medicines and 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.

In Ethiopia, different studies reported that the preparation of traditional medicines have been administrated orally (eating and drinking), topically/dermally (anointing, banding, heating, massaging, tying) and nasally (fumigation, nasal drop) (Birtukan Dereje and Meseret Derbew, 2014; Gidey Yirga *et al.*, 2011; Kendie Fasil *et al.*, 2018). Other study also reported that ethnozoological and ethnoveterinary traditional medicines are mainly administered by drinking, eating, anointing, tying, branding, fumigation and massaging (Muhammad *et al.*, 2005). In addition, bones, skin, and teeth were some parts of animals that believed to be a medicine by tying on the neck or other parts of the body (Mola Genet *et al.*, 2020).

2.5. Conservation of Medicinal Animals

The impacts of zootherapeutic practices on wild populations should be carefully investigated, since, unlike herbal remedies, the use of zootherapeutic products most often occurs after an animal is sacrificed. As a result, understanding the trend and multiplicity of therapeutic use of animals is a particular concern from a conservationist point of view (Alves *et al.*, 2017). Conservation issues are neglected even though certain animal species sacred and foster their conservation by most traditional culture (Adu-Gyamfi, 2011). On the other hand, when the conservation actions are applied, human groups can use animals and animal organs universally in many various mechanisms (Albuquerque and de Sousa, 2016; Alves *et al.*, 2010). Preserving genetic diversity of natural resources and biodiversity through conservation is a guaranty to have large population throughout the world (Alves *et al.*, 2010). However, it is difficult to create strategies of meaningful animal conservation without understanding the effect of human uses of animals especially on ethnozoological studies (Alves *et al.*, 2008). Local animals should be collected for medicines by indigenous people without threatening the species (Alves *et al.*, 2010) since overhunting and overfishing bring a massive loss of wildlife across the globe (Bennett *et al.*, 2002).

However, particularly conservationist has been concerned on understanding of the trend and multiplicity of therapeutic use of animals (Petitpas and Bonacic, 2019). Studies indicated that lack of awareness has increased the unsustainable use of medicinal animals and this contributes to the risk of extinction of some species (Alves *et al.*, 2008). But, improving the awareness about medical systems in a historical context can potentially bring new insights into the medical importance of fauna in the past. In addition to these, they may have open new therapeutic significance in the future and sustained use of naturally occurring compounds (Alves, 2011). Furthermore, many wild edible species are endangered due to genetic erosion (Akhalkatsi *et al.*, 2012).

The country has been rich in indigenous knowledge and biodiversity with many traditional plant and animal remedies that are under risk as it has been mainly conveyed orally along generations without being properly and scientifically recorded (Lulekal *et al.*, 2008). In Ethiopia, there is a massive loss of wildlife that have been causing severe constraints on the availability and accessibility of plant and animal species used in medicine (Zerabruk Samuel and Gidey Yirga, 2011). Moreover, in Ethiopia, indigenous societies medicinally used animal species for millennia; however, they have given a little attention to the conservation of those medicinal animals. These phenomena are more prevalent in countries like Ethiopia where high rate of human population growth is concentrated by insufficient documentation and conservation of living organisms (Zemedede Asfaw and Mesfin Tadesse, 2001). Even, people are unaware of about the function of zootherapeutic and economic, cultural, medical as well as ecological importance of medicinal animals due to lack of ethnozoological studies (Kendie Fasil *et al.*, 2018). As a result, the traditional knowledge about traditional medicinal animals and their products used by different societies and cultures is at risk (Birhanu Hadush 2013; Kendie Fasil *et al.*, 2018). To explore more and design appropriate conservation recommended further studies concerning the conservation and management of the medicinal animals and giving training for the local people on resource use, value, management and conservation would be of paramount importance since it helps animals' resources to be utilized in a sustainable way (Gidey Yirga *et al.*, 2011).

3. MATERIALS AND METHODS

3.1. Description of the study area

This study was conducted in Ginnir District, East Bale Zone of Oromia National Regional State, Southeastern Ethiopia. The district has latitude of 7° 8' 18" N and longitude of 40° 42' 42"E (Figure 1). Ginnir is the capital town of the district and East Bale Zone and located at 557 km from Addis Ababa, the capital city of Ethiopia. The total area of the district is about 2384 km². It is bordered the North by the Sewena and Gololcha Districts to the South west Goro and Dawe Qachen Districts, to the East by Rayitu and to the west by the Gasera District. Based on the 2007 national census projection, the estimated population of the district was 186,709. Of these, 91,487 are males and 95,222 are females. The altitude of Ginnir district is extended from 1200 m above sea level in its southern extreme corner to 2406 m above sea level which in the northern margin of the district. The minimum and maximum temperature of Ginnir district is 23.2 and 27.7°C, respectively. The minimum and maximum rainfall is 200 and 1200 mm, respectively (Assefa Belete *et al.*, 2019).

Many of the farmers in the study area depend on both livestock production and crop cultivation (Mekuanint Gashaw and Girma Defar, 2017). Ginnir district has 33 kebeles; of these, Dobu, Oda Roba, Harawa 05, Harawa 07 and Oda Malka are pastoralist kebeles, five town kebeles and the rest of kebeles are agrarian. The study area lies in the moist evergreen mountain forest and desert area in Southeastern of Ethiopia and the areas contain different reptiles, birds and mammals. However, there are very fast encroachments of the forest area due to high population pressure.

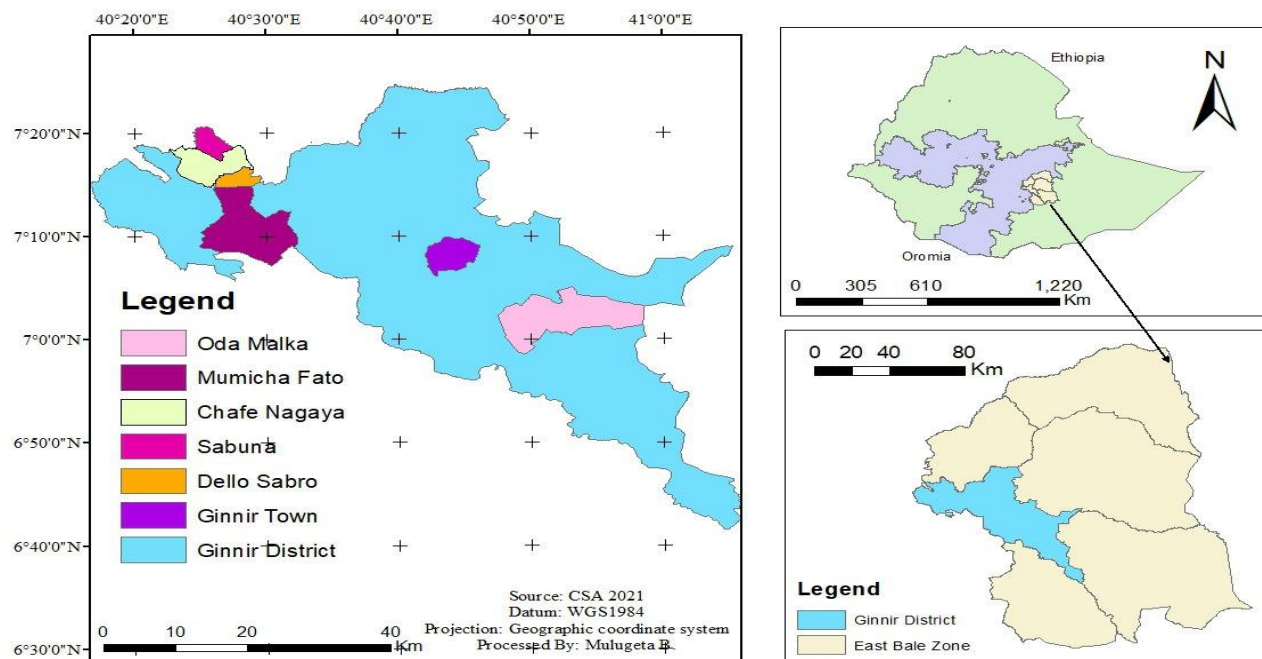


Figure 1: Map of study area

3.2. Study design and population

The study population constitutes the traditional healers of Ginnir District, East Bale Zone of Oromia Region, Ethiopia. Both rural and urban communities were involved in the study. A cross-sectional study design was performed to collect data on traditional medicinal animals used by the local people in Ginnir district. This study was conducted from December 2023 to March, 2024.

3.3. Sample size determination and sampling technique

Ethnozoological investigation was conducted in seven purposively selected kebeles of Ginnir district. These includes: namely Abursha, Oda malka, Ginnir 01, Dello Sebros, Sabuna, Mummicha fato, Caffee Nagayaa. These seven (7) kebeles encompassed one kebele from pastoralist, five from agrarian and one from town kebeles (Table 1). These seven kebeles were purposively selected based on the availability of traditional medicinal animals, availability of traditional healers in each kebeles and livelihoods of the community. Thus, the total numbers of respondents (traditional healers) selected for the study were 112.

Traditional healers, health extension, and spiritual intellectuals were selected purposively to assess more about traditional medicinal animals and the views of the people in the study area based on the potential of knowledge concerning traditional medicinal animals, experience of traditional healing practices recognition as expert, the presence of spiritual intellectuals and their year of living in district ranged from 18 and above in the study area. Kebeles' manager, kebele administration, village community elders, District Health Office, and health extension workers were involved in the selection of traditional healers.

Table 1: Total number of informants taken from each kebeles

Name of kebeles	Total number of respondents in each kebeles	Type of life style
Abursha	16	Agrarian kebele
Oda malka	18	Pastoralist kebele
Ginnir 01	21	Town
Dello Sebro	19	Agrarian kebele
Sabuna	16	Agrarian kebele
Mummicha Fato	12	Agrarian kebele
Caffee Nagayaa	10	Agrarian kebele
Total	112	

3.4. Data collection method

The techniques employed for data collection were field observation, questionnaires, and interviews with purposively selected respondents were employed to obtain data on local name of medicinal animals, mode of preparation and administration of traditional medicines, part of the animal used and ingredients added, and disease treatment, threats and conservation of medicinal animals in the study area.

3.4.1. Semi-structured interview

Semi-structured interview was employed to obtain information on their general knowledge of medicinal animals, local name of these animals, diseases treated, body parts of animal/product

used, and mode of preparation and administration, ingredients added. In addition, during an interview with selected respondents on the conservation methods of the medicinal animals were recorded.

3.4.2. Questionnaire

Both open and close ended questionnaire was distributed to purposively selected respondents. The questionnaire was selected because; it helps to gather data and emerging information to develop themes from the views and opinions of participants about conservation of medicinal animals. Moreover, most of the respondents were literate; so, they can read and answer the questionnaire more freely to express their idea on the issue. In addition to this, the questionnaires were translated to Afan Oromo language for simplicity and to get more facts related to the issue.

3.4.3. Observation

Guided field observation was done with the traditional healers. Animals were observed and representative images were taken. Observation was carried out to identify habitat of the animals, and take photograph of the animals and parts/products. During the field observation necessary points such as the former and current status of the medicinal animals in each kebeles, indigenous knowledge that help to encourage medicinal animals by the local people and ways of conservation were well recorded.

3.5. Data analysis

The ethnozoological data collected were analysed with both statistical and ethnozoological analysis method. Quantitatively collected data for traditional medicinal animals was cleaned, entered and analyzed using Microsoft Excel spreadsheet. Ethnozoological data was analyzed by descriptive statistics such as frequency and percentage. Then, the results were presented with graphs, tables and pi-charts.

3.5.1. Informant consensus factor (ICF)

The method rests on the assumption that the greater the degree of group consensus regarding the use of ethnomedicinal species for treating certain conditions are, the greater the probability that the specific treatment is physiologically active or effective (Nieman *et al.*, 2019).

Informant consensus factor (ICF) was calculated to determine the effectiveness of medicinal animals in each ailments category and to identify the agreement of the informants on the reported use of medicinal animals to treat ailments using the formula used by (Uddin and Hassan, 2014).

$$\text{ICF was calculated as } ICF = \left(\frac{\text{Nur}-\text{Nt}}{\text{Nur}-1} \right)$$

Where, ICF= Informants' Consensus Factor

Nur = is the number of use reports from informants for a particular animal-use category and

Nt =is the number of taxa or species that are used for that animal-use category for all informants.

ICF Values range between 0 and 1, where '1' indicates the highest level of informant consent.

3.5.2. Fidelity level (FL)

The Fidelity level (FL) quantifies the importance of a species for a given purpose. FL is determined to identify the most important species of animal and/or its part used to treat a particular ailment (Tumoro and Maryo, 2016). In addition, Friedman *et al.* (1986) reported that fidelity level was a classification of the healing potential of medicinal animals, based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev desert, Israel.

$$FL = \frac{NP}{N} \times 100$$

Where, FL= Fidelity Level

NP= is the number of informants that mentioned the specific animal species used to treat certain ailments and

N = is the total number of the informants who utilized the animals as medicine for treating any given ailment.

3.5.3. Use-Values

The use value (UV) is used to prove the relative importance of species. Use-values (Vitalini, 2013) were determined based on the following formula:

$$U_v = \frac{\sum U_{vi}}{N}$$

Where, U_v = Use – values

U_{vi} = is the number of use reports cited by the informants for that particular species and

N = is the total number of respondents' interview.

4. RESULTS AND DISCUSSIONS

4.1 Socio-demographical characteristics of the respondents

Different animals and animal parts by products were used by local people of Ginnir District, Southeastern Ethiopia for the curative purpose of various diseases by using their own indigenous knowledge. In this study, 99 (88.4%) males and 13 (11.6%) females were participated (Table 2). Similarly, in different parts of Ethiopia the participation of both sexes in traditional medicinal activities are also reported (Dehnnnet Abebe *et al.*, 2022). However, the number of males informants was higher than females both as general informants. The result showed that most traditional practitioners transferred their ethnozoological knowledge as an inheritance to their male children. This indicates, males were always lead by their father or elder and participating in outside house working activities such as agriculture, keeping farm animals, wood collection, hunting, and other working activities related with forests that may help them to have in depth knowledge about medicinal animals around them and participating in collecting medicinal animals and treatment of the given ailments.

In other way most of the females in the study area more participating were housewives and have no obtaining an opportunity in to participate in traditional medicinal practices and hence, the number of healer female in this study were few in number than males. A similar study conducted in northern part of Ethiopia also reported, a few female respondents participation in such activities is mainly due to most of the time engaging inside house activities and have inherit methods of remedy preparation, administration and techniques from her husbands or fathers (Gidey Yirga *et al.*, 2011). Similarly, in current study females are inheriting methods of remedy preparation, administration, and techniques from father and her husband. In fact, males are more acceptable and have capacities of hunting animals for food as well as medicine while keeping their farm and livestock, or purposefully for treating various therapeutic indications, which could be explain our findings. In contrary to this study, Ahmad *et al.* (2021) revealed that in Khyber pakhunkhwa, Southern area of Pakistan, female respondents are more knowledgeable than male respondents about use of ethnomedicines to cure children and families in general. In this study age of the respondents were categorized into five groups to understand which age groups were actively involved and knowledgeable about traditional medical care and acceptable by population (Table 2).

Therefore, Most of the traditional healers in the study area were above 45 years old in which lower ages (18-24) have lower contribution. The result of this study showed that as the age of traditional healers' increase their knowledge towards collecting, preparing and using traditional medicine also increases and becomes better and holds their indigenous knowledge in secret system. This finding agrees with Borah and Prasad, (2017) Ethiopian traditional practitioners hold their indigenous knowledge in secret system applying the knowledge gained from their family or older people of their society. Most respondents described that persons in this age range are more experienced and have detailed knowledge in animal healing practice and keep it in secret.

Regarding to education level, out of the 112 respondents, 11.6 % were illiterate and 29.5% attended primary education (Table 2). In terms of the informants' education attainment, 57.2% of the total respondents had formal education attended primary education and can read and write. However, in different parts of the country majority of the Ethiopian traditional healers are illiterate or had a primary education level (Dehnet Abebe *et al.*, 2022). This contradiction may be because of that respondents of the current study get education informally from religious organization and formally from government schools.

Marital status of the respondents, 4.465% and 9.821% were divorced and single respectively and 85.714 were married. In terms of religion, 2.68% were Waqefata, 5.4% Protest, 16.96% and 75%, were Orthodox and Muslims, respectively. In relation with the ethnic distributions of respondents, 96.43% were Oromo and 3.57% Amhara (Table 2). Majority of traditional healers in the study area were farmer and merchants which accounts 91.07% and 8.93%, respectively.

Table 2: Socio-demographic characteristics of the respondents

S.N	Socio-demographic Characteristics	Frequency	Percent (%)	
I.	Sex	Male	99	88.4
		Female	13	11.6
II.	Age	18-24	2	1.9
		25-35	9	8
		36-45	43	38.39
		46-70	51	45.54
		>71	7	6.25
III	Education level	Illiterate	13	11.6
		Can read and write	31	27.7
		Primary education (1-4)	33	29.5
		Junior(5-8)	21	18.75
		Secondary	14	12.5
IV	Marital status	Single	11	9.821
		Married	96	85.714
		Divorce	5	4.465
V	Religion	Orthodox	19	16.96
		Muslim	84	75
		Protestant	6	5.4
VI	Ethnicity	Waaqefata	3	2.68
		Oromo	108	96.43
		Amhara	4	3.57
VII	Occupation	Farmer	102	91.07
		Merchant	10	8.93

4.2 Animals traditionally used to treat human and livestock ailments

In the study area, 33 medicinal animals were identified to treat about 34 different kinds of human and livestock ailments which are closer to other findings in different parts of Ethiopia (Dereje Yohanis and Meseret Chane, 2014; Tsegazeabe Haileselesie, 2012). However, the numbers of medicinal animals are varied from area to area in different parts of Ethiopia. For instance, Kendie Fasil *et al.* (2018) reported 52 medicinal species in metema district, northwestern Ethiopia, Mekides Tesfaye and Mosissa Geleta (2020) 17 medicinal species in Leka Dullecha woreda, western Ethiopia. Birhanu Hadush, (2013) conducted a study in Gonder zuria about 70% of human and 90% of livestock population depending up on traditional medicine.

Moreover, traditional medicines are used in South Omo as it is dependent locally available animals, which are easily accessible and capitalizes on traditional wisdom repository of knowledge, it is simple to use and affordable (Tolossa Ketema *et al.*, 2013). For example around 584 animals' species have been used in traditional medicines in Latin America (Alves and Rosa, 2005) and 31 medicinal species in Northwestern Africa (Budjaj *et al.*, 2021). There were variations of the number of traditional medicinal animals in different areas. Medicinal animals were categorized into domestic and wild animals (Appendix 1). This indicates that wild animals are predominantly used in traditional medicines in the study area. In different parts of Ethiopia, more than half of the medicinal animals are belonging to wild animal species (Kebebew Mulugeta *et al.*, 2021 and Gidey Yirga *et al.*, 2011). Similarly, study conducted in semi-arid regions of northern Brazil revealed 77.7% wild animals are used as source of animal- based complementary medicines (Alves, 2011). This showed that, most traditional medicinal practitioners and indigenous people are primarily depending on wild animals to prepare traditional medicines.

4.3 Classes of Traditional Medicinal Animals

From 33 medicinal animals identified in the study area, 54.55% were belonged to mammals followed by reptiles and birds (Figure 2). This might be due to their evolutionary closeness to humans implying related body physiologies and higher abundance on land. Similarly, in Diguna Fango District, large numbers of mammalian species are used in traditional medicine by local community (Dereje Yohanis and Meseret Chane 2014; Kendie Fasil *et al.*, 2018). Kebebew Mulugeta *et al.* (2021) also revealed that mammals are the most widely employed animals in traditional medicine in different parts of Ethiopia. Alonso, (2014) also stated that mammals are the most commonly used medicinal animal species followed by birds and reptiles in the Mexican traditional system. Alves *et al.* (2010) found that different animals including mammals, fish, reptiles, birds, mollusks and insects including threatened species were the most animals that used in traditional medicines. In the study area, most birds and reptiles were mostly engaged in spiritual activities. Similarly, Mustafa *et al.* (2020) revealed that birds and reptiles are mostly engaged in spiritual activities probably due to their elusive nature in the physical realm in Nigeria.

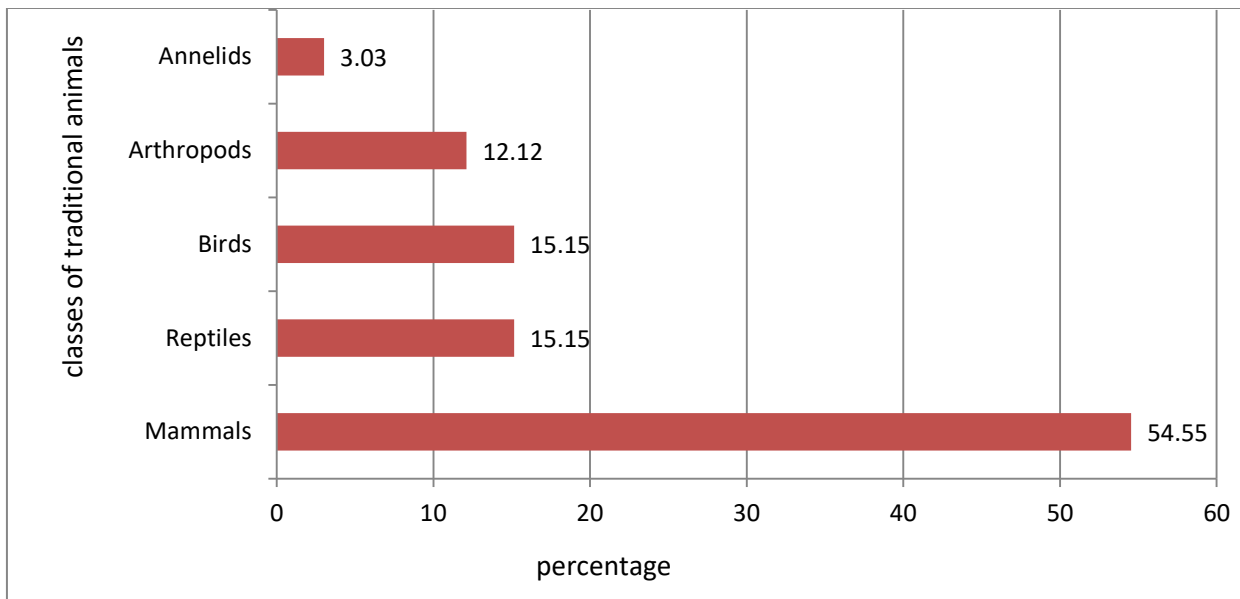


Figure 2: Classes of traditional medicinal animals documented in the study area

4.4 The use of medicinal animals among the study participants

In the study area, agrarian, urban and pastoralist communities used traditional medicinal animals. Out of 112 respondents, 65.18% were agrarian (Figure 3). The present result indicated that most agrarian people are dependent on traditional medicinal animals and used traditional medicines. This might be because agrarian and farmers have been far away from health centers since ancient time and have accustomed the use of traditional medicines. Similarly, other studies revealed that poverty, lack of health center and due to their culture people usually use traditional medicines (Tefera Nigussie and Kim, 2019).

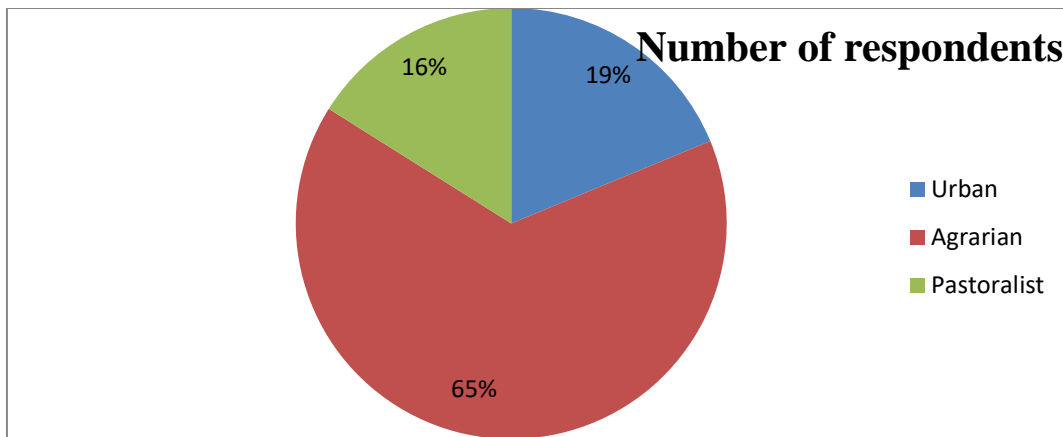


Figure 3: Number of respondents using medicinal animals in urban, agrarian and pastoralist area

4.5 Availability of Traditional Medicinal Animals

The result of the current study indicated that out of 112 respondents 45.54% respondents said that traditional medicinal animals are common followed by abundant (Figure 4). This indicates that majority of traditional medicinal animals were common in study area. Even though, traditional medicinal animals are commonly available in the study area and other parts of the country, the knowledge with the traditional healing practices using animals is now disappearing due to modernization (Misganaw Manaye *et al.*, 2021). This showed that loss of traditional knowledge has much impact on the development of modern medicine.

In the area of low level of harvesting, indigenous people have been collecting medicines from local plants and animals without threatening the population dynamics of the species (Aswani *et al.*, 2018). This mechanism is helped to traditional practitioners to prevent the loss of medicinal animals. However, because of over hunting there is massive loss of wildlife across the globe (Bennett *et al.*, 2002). In addition, massive loss of wildlife across the globe has been using severe constraints on the availability and accessibility of plant and animal species that are being used for medicinal treatment (Gidey Yirga, *et al.*, 2011). Interviewed with practitioners shown that, most medicinal animals are threatening due to human population growth, deforestation firewood, and charcoal and agricultural expansion in the study area. Especially, agricultural activities basically expanding from time to time due to rapid growth of human population and existing forest coverage are minimizing as a result of such activities.

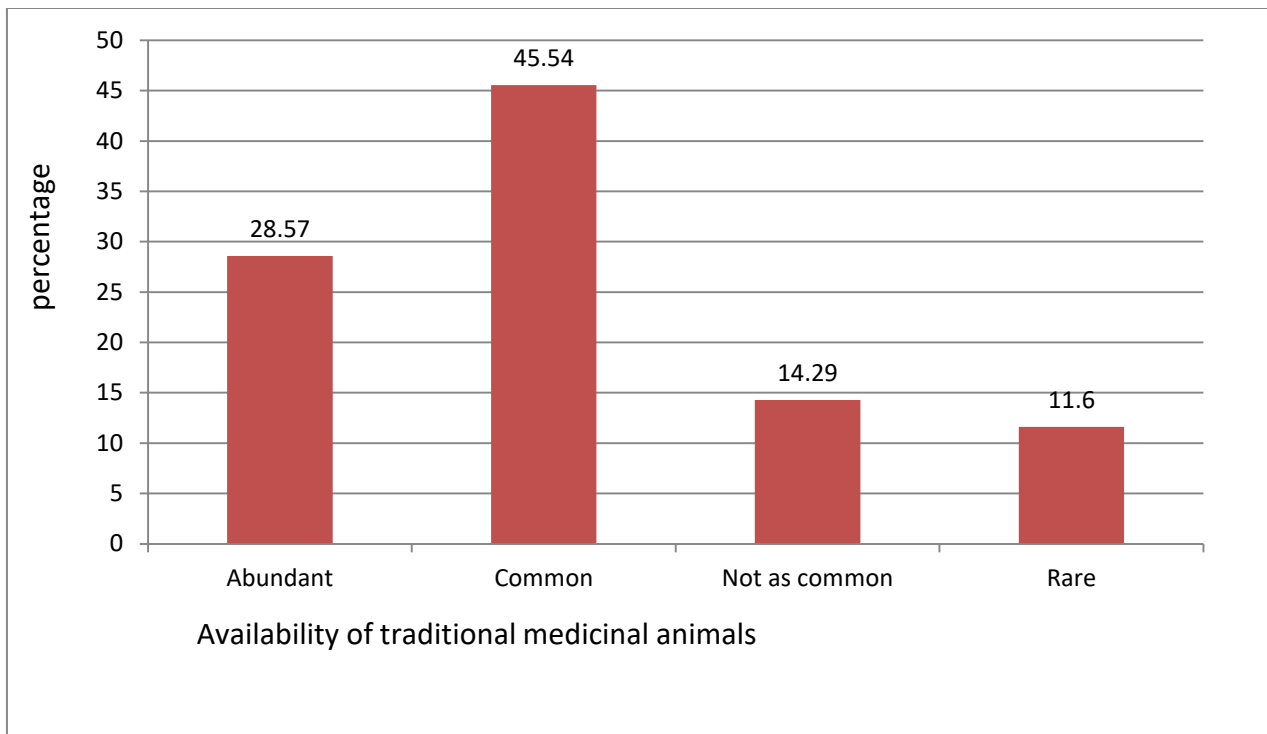


Figure 4: Availability of traditional medicinal animals in the study area

4.6 Medicinal animals used to treat diseases

The results of the present study showed that, Ginnir district have a high diversity of medicinal animals used to treat different diseases of humans and livestock living in the area. The current study also indicate that, animals and their parts/products were found to be used for the treatment of 34 different kinds of diseases including evil eye, bad sprit, teeth diseases, wound, asthma, earache, coughing, epilepsy, wart, heart disease, chill, nipple of disfunctioning of cows, urination problems, intestinal parasites, walking problem, horse and mule fracture, inflammation, rheumatoid arthritis, armpit sweating, sleep urination, and lung disease. The study revealed that from 33 medicinal animal's hen, dog, snake, hyena, lesser kudu, bush big, warthog, stingless bee, African civet and crow were used to treat more than one disease (Appendix 2). Animal's products like milk, blood, organ, meat, teeth, and honey also used for the treatment of various ailments. In this study various medicinal animals are identified such as sheep for teeth diseases, hen, snake, hyena, bat and crow are for bad sprit, donkey, warthog, bush pig and stingless bee were for asthma. Milkessa Edae and Kamil Mohamed, (2018) also reported that in Macca Oromo of Southwestern Ethiopia donkey, hyena, rabbit and bat are considered as medicinal animals used to treat asthma, evil eye, wound and evil spirit, respectively.

However, kenate Tadese (2020) stated that different animals have medicinal values porcupine for stomach ache, lion and hyena for evil spirit, snake for snake bite, bush pig for hepatitis, lesser kudu in protecting man from snake bite, bat for folk diseases and fat of Black tailed python for healing skin itch. Antipyretic, anxiolytic and wound are treated by using chicken as medicinal sources (Nadeem *et al.*, 2021).

4.7 Medicinal Animals Used to Treat both Human and Livestock Ailments

The data collected from study areas shows that out of the total traditional medicinal animals five of them were used to treat both human and livestock ailments (Table 5). Honey bee has traditionally used to treat asthma of human disease and intestinal parasites of livestock and chicken are used to treat wound of human disease and coughing of livestock disease. Lesser kudu has been used to treat evil spirit of human and refused farm cattle of livestock ailments and nepos for the deaf ears and nipple disfunctioning in cows. Porcupine is used to treat human wound and horse and mule fracture. Honey, egg, horn, fat and meat are the part/products of honey bee, hen, lesser kudu, nepos and porcupine respectively which were used to treat both human and livestock ailments. Likewise, in different part of Ethiopia, local communities are using many animal species to treat both human and livestock diseases (Kebebew Tolcha *et al.*, 2021; Abebe Tesfaye *et al.*, 2022). Ahmad *et al.* (2021) revealed that, cough, weakness, nasal congestion and bleeding of both human and livestock are traditionally treated by using egg of *hen*.

Table 3: Name of medicinal animals used to treat both human and livestock ailments

No	Name of animals	Name of human disease	Name of livestock ailment	Part/product Used
1	Honey bee	Asthma	Intestinal parasites	Honey
2	Hen	Wound (lesion)	Coughing	Egg
3	Lesser kudu	Evil sprit	Refused farm cattle	Horn
4	Rock tailed python	Deaf ears (for human)	Nipple disfunctioning in cows	Fat
5	Porcupine	Human lesion, asthma	Horse and mule fracture disease	Meat

4.8 Animal Parts or Products Used as a Source of Traditional Medicine

The people in the study area meat/fat, products of animals, bone/teeth, external body parts (such as horn, skin, hair, head, thorn and feather) use as traditional medicine (Figure 6). The highest percentages, 42.86% of medicinal parts/products of animals were external body parts and the second 19.05% were animal products such as honey, milk, and egg) and the lowest percentages, 2.4% used in the study area were excreta. This result in agreement with the findings of Goshu Kumera *et al.* (2022) the local community practices are carried out depending on locally available natural resources and indigenous knowledge for traditional medicine. Other researchers revealed that, blood, hair, bile, stomach, milk, whole animals, feces, honey, meat, urine are used by northern Ethiopian people (Gidey Yirga *et al.*, 2011). Therefore, in different part of Ethiopia peoples use various body parts of medicinal animals to treat various ailments. Furthermore, Kenate Tadese (2020) revealed that, milk, blood, organ, flesh, antler, and feathers whole or body parts or byproducts are used to treat various types of human diseases. Skin, bones and teeth are used as a medicinal sources tying on the neck and other part of the body (Jaroli *et al.*, 2010). Chinese people use the body parts including meat, skin, and scales of *Manis javanica* as traditional medicinal purpose (Zhou *et al.* 2014). Kim and Song (2012) revealed that, in Chinese people ethnomedicine dermal is still incredibly effective to cure bone fractures, joint pain, muscle aches, piles, and wounds. Similarly, in study area external body parts has the highest percentage traditionally as a medicine to cure or treat different illness. According to Supiandi *et al.* (2023) meat, bile, scales, shells, egg, wax, and all parts of animals are traditionally used in Dayak tamamabaloh people.

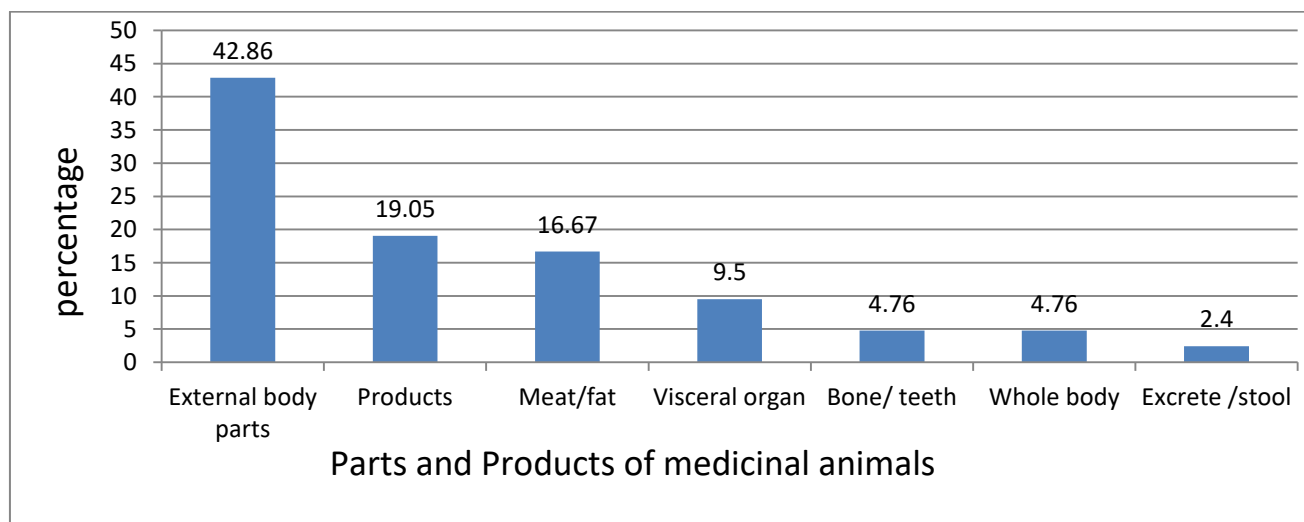


Figure 5: Parts and products of medicinal animals

4.9 Mode of Preparation of the Medicines Obtained from Animal/Animals' Products

Traditional healers of the study area have different mechanisms of preparing medicines obtained from animals for different kinds of diseases. These modes of preparations include drying, cooking, and mixing. Method of preparation mainly depends on the types of medicinal animals and types of human and/or livestock diseases treated. Result obtained from the informants, cooking, burning, mixing, fresh and drying were the most common types traditional medicine of preparation methods depending up on the kind of disease to be treated. Among these methods of preparation applied by traditional healers in the study area drying held the highest 34 (28.5%) the proportional number of respondents followed by fresh which accounted for 22.9% (Table 4). This because of local people around study area use external parts of traditional medicinal animals such as skin, horn, hair, nail, and feather. Similarly, Kendie Fasil *et al.* (2018) revealed that cooking, burning, crushing/grinding, wrapping, powdering, and drying are the most known and common preparations methods of traditional medicines. Crushing, powdering, squeezing, direct use, and cooking are listed as methods of preparation from medicinal animals (Gidey Yirga *et al.*, 2011). This study is also similar with the study conducted in Arba Minch zuria District revealed that, the most frequently used mode of preparation of traditional medicine from animals is drying by mixing with other ingredients (Kebebew Tolcha *et al.*, 2021). The present study indicated that, traditionally to prepare medicine, some of them need different additives while most of them do not need any type of additives. For example, traditional healers in the study area mix meat of bush pig with salt to treat asthma and bone fracture.

Table 4: Mode of preparation of medicinal animal/animals' products

Type of preparations	No. of preparations	Percentage (%)
Drying	34	28.5
Fresh	27	22.9
Cooking	22	18.4
Burning	23	19.3
Mixing	13	10.9
Total	119	100

4.10 Mode of Application/Administration of Traditional Medicine Obtained from Animals

Traditional practitioners in the study area use different mode of application to treat patients. These modes of administrations depend on the types of medicine applied, types of diseases and condition of patients. Tying was the most common mode of application, accounting 37.5% in the study area followed by eating (Figure 6). Traditional practitioners primarily use external parts of the animals for treating human and animal diseases, and this increases the prevalence of tying. Eating was the second mode of application, constituting 20%. Additionally, drinking accounted for 7.5%, while fumigation, pouring, washing, and burning each represented 5% of the presented modes. However, this result disagrees with the study conducted by Gidey Yirga *et al.* (2011) that revealed most traditional medicines are administered orally and dermally.

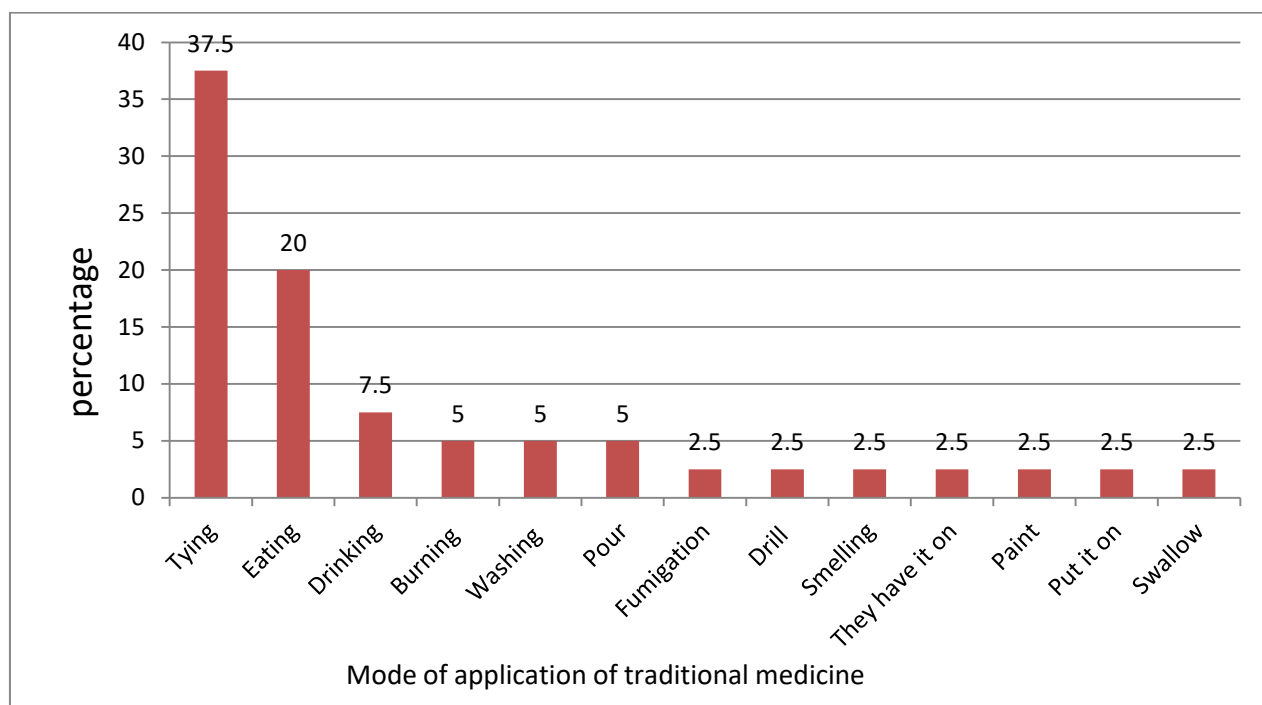


Figure 6: Mode of application/administration of traditional medicine obtained from animals

4.11 Fidelity level of medicinal animals' species to treat the common ailments

The Fidelity level of medicinal animal species was determined for the most commonly reported disease by the informants. In the current study, the FL values of traditional medicinal animal species range from 16.7% to 100%. Species with FL 100 frequently reported ailments was hyena for bad spirit, evil eye and epilepsy. Similarly, the study conducted in Dangila District, North

Western Ethiopia, reported that the skin of Spotted Hyena was used to relieve evil eye and had the highest fidelity level (Yihenew Arega and Mohammed Kasso, 2022). This high fidelity level is due to the use of the species parts for the claimed indication. The second and the third FL was honey bee for the treatment of asthma and intestinal parasite of human, snake for bad sprit, hen for human lesion, bad sprit, ear disease, to cough up animals with FL of 80%, 75%, 75%, respectively (Table 7). In the study area, donkey had the least FL was for the treatment of asthma, lesser kudu for evil spirit, chill, nipple disfunctioning in cow and deafness of human which accounts 16.7% and 22% respectively. In this study, high FL value indicated that the respondents are agreed on the different specific medicinal animal species to treat various ailments.

Table 5: FL of medicinal animal species to treat the common ailments

S. No	Animal species	Indication	Number of informants	Total number of informants using animals or products	Fidelity level
1	Hyena	Bad spirit, Evil eye Epilepsy	5	5	100
2	Honey bee	Asthma Intestinal parasites	4	5	80
3	Cow	Lung disease	4	7	57
4	Bat	Asthma	2	3	66
5	Bush big	Chills Asthma	4	6	66.7
6	Porcupine	Horse and mule fracture	3	8	37
7	Warthog	Inflammation chills, asthma evil eye	3	6	50
8	Bumble bee	Human lesion Asthma Evil spirit Chill	5	9	55.6
9	Lesser kudu	Nipple difunctioning of cow and deafness of human	2	9	22.2
10	Snake	Bad spirit	3	4	75
11	Hen	Human lesion Bad sprit	3	4	75

		Ear disease			
		Coughing (animals)			
12	Donkey	Asthma	1	6	16.7
13	Camel	Intestinal parasite	3	7	42.9
14	Tree squirrel	Walking problem	2	8	25

4.12 Use-value of medicinal animal species for treatment of the common diseases

The relative importance of a species cited by the informants was determined using use-value. Based on the practitioners some medicinal animals were well known than others. However, not all medicinal animals were equally important. The present study identified hyena (*Crocuta crocuta*) as the most common (%UV 0.13%) cited medicinal animal followed by a hen (*Gallus domesticus*) and honey bee (*Apis mellifera*) which accounts to %UV 0.12% (Appendix 3). Similarly, Denet Abebe *et al.* (2022) reported that hyena is the most commonly cited (%UV ¼ 36%) medicinal animals in Motta city administration and Hulet Eju Enessie District, East Gojjam, Northwest Ethiopia. On the other hand, honey bee was the most commonly cited (%UV ¼ 56%) medicinal animals in the semi-region of Northern Brazil (Alves *et al.*, 2012). Other studies revealed that, to treat various diseases the higher use-value of some of the species might be similar with the preparation of different remedies from the different parts of a single animal species (Eminagaoglu *et al.*, 2017).

4.13 Common indicators for medicinal animals products used by traditional medicinal practitioners

The level of agreement between the informants of the study was determined using ICF. The value of ICF more close to one shows that the informants were more rely on the traditional medicinal animals to treat ailments in their community and the value of ICF close to zero shows the informants disagreements in the healing potential of traditional medicinal animals in the given area. The result of this study showed that, the diseases such as horse and mule fracture, rabies, chills, intestinal parasites, heart disease, human lesion, wound and teeth disease had highest (1) value because of the high agreement of healers in the prevalence of the diseases and in the healing capacity of the listed medicinal animals in the study area (Table 6).

On the other hand, the respondents have a high level of heterogeneity ICF= 0.7 in the treatment of asthma and ICF=0.9 in the treatment of bad sprit, evil spirit, epilepsy, and chill because of disagreement between the respondents on the use of traditional medicinal animals (Table 8). This study recorded that, horse and mule fracture, rabies, chills, intestinal parasites, heart disease, human lesion, wound, teeth are a diseases that managed by only one species.

Table 6: Common indicators for medicinal animals’ products used by traditional medicinal practitioners

S.NO	Indication	Number of use reports (Nur)	Number of species(taxa) for indication (Nt)	ICF
1	Asthma	31	8	0.7
2	Evil sprit	59	3	0.9
3	Bad sprit	48	3	0.9
4	Horse and mule fracture	34	1	1
5	Epilepsy	21	2	0.9
6	Chills	13	1	1
7	Rabies	7	1	1
8	Intestinal parasites	17	1	1
9	Chill	22	2	0.9
10	Heart diseases	16	1	1
11	Human lesion	5	1	1
12	Wound	8	1	1
13	Teeth disease	13	1	1

4.14 Conservation and protection status of traditional medicinal animals

As indicated in table 8 the conservation and protection status of medicinal animas were low as 52.68% of interviewed respondents said. Albuquerque and de Sousa (2016) revealed that, the interactions and local use of natural resources of humans requires understanding, design and integration of biodiversity conservational plans. In addition, ethnobiological studies cover the economic, traditional, and cultural values in human communities, and providing information about traditional uses in any parts of the country that makes a significant role to animal conservation efforts (Alves *et al.*, 2008).

However, in the study area different illegal practices have been observed these include hunting many animal species, habitat degradation also caused increase the vulnerability of wild animals,

and affect the knowledge of practitioners on traditional medicinal animals. Though, other studies reported that, using the names of wild animals by some tribes improve the value and high chances of protecting the species that set up the culture to play conservation roles for different clans (Kideghesho, 2008).

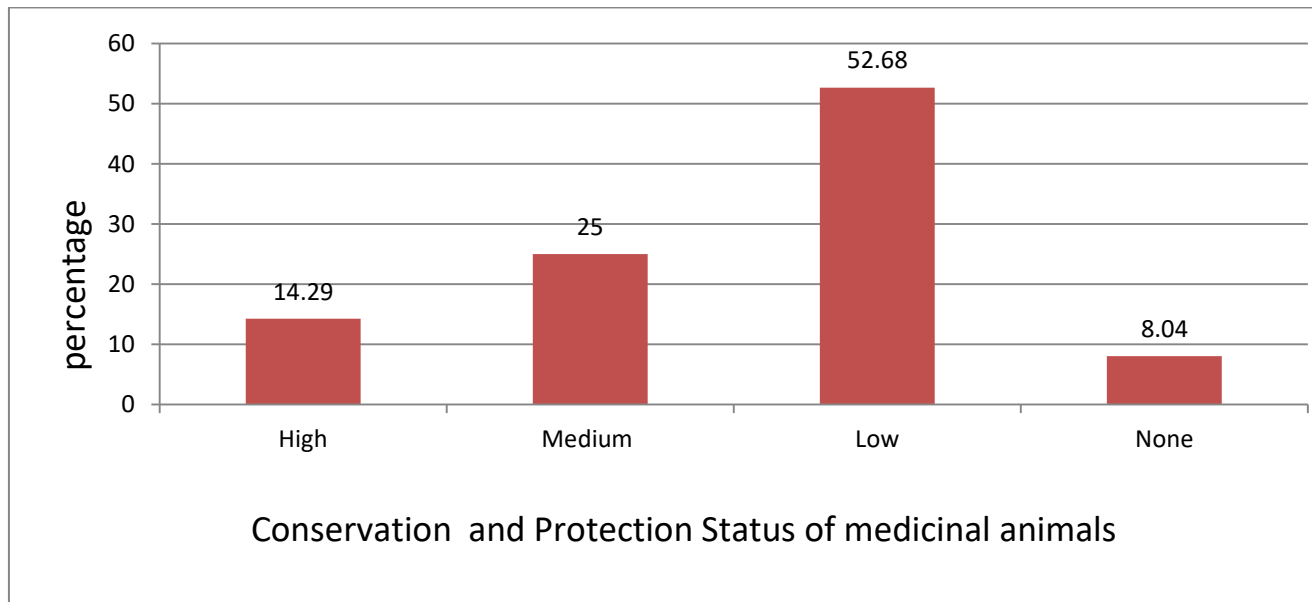


Figure 7: Conservation and protection status of traditional medicinal animals

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Animal-derived medicines are an alternative source of medicine to treat various ailments both in rural and urban areas. Ethnozoological studies showed that local communities of Ginnir District

have traditional medicinal practitioners who use both domestic and wild animal species for remedial preparations. Current study identified that 33 animals belonging to mammals, birds, reptiles, and insects that their body parts /products are used as a traditional therapeutic remedial measure by the local people of Ginnir to treat about 34 various diseases. Mammals are the most frequently source of traditional medicines. Honey bee, hen, lesser kudu, nepos, and porcupine are some of the animals used as a source of traditional medicines to treat various human and livestock ailments. Among the different source of traditional medicine obtained from animals of external body parts, whole bodies, products that used for remedial preparation external body parts like skin, head, thorn, ear, hair and feather are listed. An animal species used as a source of medicine mostly used by traditional healers were hyena, honey bee, bush big, snake and hen. In the study area tying, eating, drinking, fumigation, burning, washing, swallowing, drill, painting and pouring were the common mode of administration of traditional medicines from animal source. Tying had the largest proportion of application/administration of traditional medicine. In the current study, Majority of remedy preparation did not require additives. Bad sprit, evil spirit, asthma, and epilepsy were the most recorded diseases being treated by the identified medicinal animals. The finding of this study reported that the traditional zootherapeutic remedial measures used by the local community of Ginnir district plays an important role in healing and preventing of various diseases. However, efforts to conserve manage and document the indigenous knowledge and skills are less.

5.2 Recommendations

Based on the results of the study, the following recommendations are forwarded:

- The government or non-government organizations should give attention for traditional healers and work on this issue through educate young people and change negative attitude of young people towards traditional medicines in the study area.
- The government should encourage and recognize traditional practitioners
- The traditional practitioners should work without fear of government and non- government organization.
- Provide awareness to traditional practitioners to transfer indigenous knowledge and freely apply their knowledge for local community.
- Wild species composition and abundance study should be conducted in the area to determine more about the level of the threats to wild life and to design effective conservation and management strategies.
- By using this baseline data as a reference other scholars should undergo further and detailed study on the analysis of active ingredients and other pharmacological and ethno zoological aspects of medicinal animals in Ginnir District.

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List of Appendixes

Appendix 1: List of animals used as a source of traditional medicine

S.N	Local name	English name	Scientific name	Source
1	Harree	Donkey	<i>Equusafricanus</i>	Domestic
2	Sa'a	Cow	<i>Bos Taurus</i>	Domestic
3	Re'ee	Goat	<i>Caprindica aegagrus</i>	Domestic
4	Hoolaa	Sheep	<i>Ovis aries</i>	Domestic
5	Waraabeessa	Hyena	<i>Crocuta crocuta</i>	Wild
6	Lukkuu	Hen	<i>Gallus domesticus</i>	Domestic
7	Saree	Dog	<i>Canis familiarizes</i>	Domestic
8	Xaddee	Porcupine	<i>Hystrix spp.</i>	Wild
9	Karkaroo	Warthog	<i>Phacochoerus africanus</i>	Wild
10	Booyyee	Bush pig	<i>Potamochoerus larvatus</i>	Wild
11	Bofa	Snake	<i>Naja naja</i>	Wild
12	Qocaa	Tortoise	<i>Testudo graeca</i>	Wild
13	Leenca	Lion	<i>Pantera leo</i>	Wild
14	Titiisa	House fly	<i>Musca domestica</i>	Wild
15	Nama	Human	<i>Homo sapiens</i>	Domestic
16	Qeerransa	Serval	<i>Leptailurus serval</i>	Wild
17	Naacha	Crocodile	<i>Crocodylus spp</i>	Wild
18	Qubursoo	White grub	<i>Phyllophaga spp.</i>	Wild
19	Buutii	Black python	tailed <i>Python molorus</i>	Wild
20	Guchii	Ostrich	<i>Struthio camelus</i>	Wild
21	Osolee	Tree squirrel	<i>Sciurini Spp.</i>	Wild
22	Quuraa	Crow	<i>Corvus spp</i>	Wild
23	Kanniisa	Honey bee	<i>Apis mellifera</i>	Wild
24	Kanniisa daamuu	Stingless bee	<i>Trigona spp.</i>	Wild
25	Xirinyii	African civet	<i>Civettictis civetta</i>	Wild
26	Huummoo	Abyssinian Ground Hornbill	<i>Bucoryus abyssinicus</i>	Wild
27	Gadamsa	Lesser kudu	<i>Tragelaphus imberbis</i>	Wild
28	Quubsaa	Eagle	<i>Polemaetus bellicose</i>	Wild

29	Simbira halkanii	Bat		<i>Cynopterus sphinx</i>	Wild
30	Illeettii	Rabbit		<i>Lepus starcki</i>	Wild
31	Sarariitii	Spider		<i>Achaearana tepidariorum</i>	Wild
32	Jawwee	African Python	Rock	<i>Python sebae</i>	Wild
33	Gaala	Camel		<i>Camelus dromedaries</i>	Domestic

Appendix 2: List medicinal animals and diseases treated

S.No	Name of animals	Name of diseases treated	Part/products	Additive	Mode of application
1	Sheep	Teeth disease	Bile		Putting
2	Goat	For someone whose eyes are affected with Euphorbia milk	Milk		Pouring into the eye
3	Rabbit	Wound	Hair		Putting
4	Donkey	Asthma	Milk		Drinking
		Human lesion			Tying
5	Hen	Bad sprit	Fat		
		Earache	Whole body		Swallowing
		Coughing (for animals)	Rotten egg		egg(for animals)
6	Dog	To remove leeches (for human)	Feces		Eating
7	Snake	Rabies	Liver		
		Bad sprit	Skin		Tying
		Evil eye	Skin		Tying
8	Hyena	Epilepsy	Bile, eyebrow		Pouring the nose
9	Lion	Bad Sprit	Skin		Tying
		Wart	Teeth		Piercing
10	Human	To remove the thorn	Milk		Concussion
			Earwax		Paint (anointing)
11	Serval	Heart disease	Skin		Tying
12	Cow	Lung disease	Lung		Eating
13	White grub	To malaise pus	Skin		Tying
14	Bat	Asthma	Meat		Eating
		Evil sprit	Horn		Fumigation
15	Lesser kudu	Chill, nipple disfunctioning cows and earache	Fat		Tying (busting)

16	Rock tailed python	Earache	Fat		Tying
17	Bush pig	Chills, asthma	Meat	Salt	Eating
18	Tortoise	Urination problem	Skin		Tying
19	Honey bee	Intestinal parasite, asthma	Honey		Eating
20	Tree squirrel	For children who cannot walk (walking problem)	Skin		Fumigation
21	Porcupine	Horse and mule fracture	Meat	Water	Feeding and wash it with its broth
22	House fly	Human lesion	Head		Tying
23	Warthog	Inflammation Chills, asthma ,for the eye	Tusks Bile , Meat	Salt and water	Washing Eating Drinking Tying and Drinking
24	Stingless bee	Human lesion, asthma	Honey	Bean	Drinking respectivel y
25	Ostrich	Rheumatoid arthritis	Feather		Tying
26	Spider	Spider bite	Spider product		Tying
27	African civet	Armpit sweating Headache	Skin Meat		Tying Smelling
28	Crocodile	Sleep urination	Skin		Tying
29	Eagle	Lung disease	Egg	Water	Drinking
30	Crow	Evil sprit Wart	Feather Feet		Tying Tying
31	Black tailed python	Bite	Skin		Fumigation
32	Abyssinian Ground Hornbill	Epilepsy	feather feet		Tying
33	Camel	intestinal parasites	Milk		Drinking

Appendix 3: Use-value of medicinal animal species for treatment of the common diseases

S.No.	Scientific name	Common name	$\sum_i U_{vi}$	UV	UV%
1	<i>Equusafricanus</i>	Donkey	3	0.02	2

2	<i>Bos Taurus</i>	Cow	7	0.06	6
3	<i>Capra indica aegagrus</i>	Goat	3	0.02	2
4	<i>Ovis aries</i>	Sheep	3	0.02	2
5	<i>Crocuta crocuta</i>	Hyena	15	0.13	13
6	<i>Gallus domesticus</i>	Hen	12	0.12	12
7	<i>Equus asinus asinus</i>	Dog	4	0.03	3
8	<i>Hystrix spp.</i>	Porcupine	5	0.04	4
9	<i>Phacochoerus africanus</i>	Warthog	11	0.09	9
10	<i>Potamochoerus larvatus</i>	Bush pig	9	0.08	8
11	<i>Naja naja</i>	Snake	11	0.09	9
12	<i>Testudo graeca</i>	Tortoise	3	0.02	2
13	<i>Panthera leo</i>	Lion	2	0.01	1
14	<i>Musca domestica</i>	Fly	3	0.02	2
15	<i>Homo sapiens</i>	Human	3	0.02	2
16	<i>Panthera pardus</i>	Tiger	2	0.01	1
17			5	0.04	4
18	<i>Phyllophaga spp.</i>	White grub	4	0.03	3
19	<i>Python molorus</i>		3	0.02	2
20	<i>Polemaetus bellicosus</i>	Eagle	5	0.04	4
21	<i>Sciurini Spp.</i>	Tree squirrel	5	0.04	4
22	<i>Corvus</i>	Crow	4	0.03	3
23	<i>Apis mellifera</i>	Honey bee	12	0.12	12
24	<i>Trigona spp.</i>	Stingless bee	11	0.09	9
25	<i>Civettictis civetta</i>	African Civet	6	0.05	5
26	<i>Crocodylus suchus</i>	Crocodile	3	0.02	2
27	<i>Tragelaphus imberbis</i>	Lesser kudu	2	0.01	1
28	<i>Struthio camelus</i>	Ostrich	2	0.01	1
29	<i>Cynopterus sphinx</i>	Bat	2	0.01	1
30	<i>Lepus starcki</i>	Rabbit	1	0.01	1
31	<i>Achaearanea tepidariorum</i>	Spider	1	0.01	1
32	<i>Python sebae</i>	African Rock Python	3	0.03	3

Appendix 4: Checklist of semi-structured interview questions that will be used for collecting ethnozoological data

Dear respondents the purpose of this interview is to collect data for traditional medicinal animals in Ginnir District. The information you provided in this interview will be kept confidentially and will be utilized only for academic purposes. Your genuine and frank responses to the interview are highly valuable for the accomplishment/achievement of the objective of this work. Thanks for your voluntarily participation and appropriately answered.

Questioners for traditional healers respondents

Personal information

Full name _____ Age _____ Sex _____

Kebele _____ Village _____

I. Educational level.

1. Illiterate
2. Can read and write
3. Primary education (1-4)
4. Junior (5-8)
5. Secondary education (9-12)
6. College
7. Other (specify)-----

II. Marital Status: A. single B. married c. divorce

III. Religion: A. Orthodox B. muslim C. protestant D. waaqefata E. others

Ethnicity: A. Oromo B. Amhara C. other

IV. Occupation: -----

1. What are the medicinal animals that found in your area?
 (list) _____

Where most are found? Wild domestic

2. List the name of medicinal animals and what they treat? Use the following tables.

No,	Name of animal	Habitat	Used to treat human disease	Name of disease	Used to treat animal disease	Name of disease	Used to treat both animal and human diseases	Name of disease
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3. What is the availability of medicinal animals in your area? A. abundant B. Common D) Not so common D) Rare
4. What type of diseases treated by medicinal animals? _____
5. Traditional medicinal animals mostly used by: A. Rural people B. urban people
6. Are Conservation and protection status of traditional medicinal animals are? A. High B. Low C. medium D. none
7. Are there responsible bodies to protect and conserve medicinal animals? If yes list _____

Informants Interview

District _____ Kebele _____ Date _____

Name of interviewee _____

Question for key informants interview

1. What are Mode of preparation of medicinal animal/animals' products to treat diseases? _____
2. What are the indications of the diseases? _____
3. What are modes of Consumption of traditional medicines? _____
4. Are there any added ingredients during preparation? If yes list: _____

5. What are mode of application of traditional medicines?_____
6. Is there any traditional conservation status used to conserve medicinal animals in this area? If yes explain_____
7. Is there any effort made by the government and other organizations other than the local people to conserve the medicinal animal in the area are? If yes, explained?_____
8. What are the Proportions of Parts/products of medicinal animals used in the study area?

9. What are the major problems associated with medicinal animals in the area?

Identification

Study area: Ginnir district

Interviewer: Beka Lema Signature:_____

Date/month/year_____/_____/_____

Appendix 5: Afan Oromo Questionnaire

Gaaffilee ogeeyyii fayyaa aadaa deebii kennitoota

Odeeffannoo dhuunfaa

Maqaa guutuu _____ Umurii _____ Saala _____ Kebele
 _____ Ganda _____

I. Sadarkaa barnootaa

1. Dubbisuu fi barreessuu kan hin dandeenye
2. Dubbisuu fi barreessuu kan danda'u
3. Barnoota sadarkaa tokkoffaa (1-4)
4. Xiqqaa (5-8)
5. Barnoota sadarkaa lammaffaa (9-12)
6. Kolleejjii
7. Kan biroo (ibsi)- _____

II. Haala Gaa'elaa: A. qeenxee B. kan heerumte c. Fuudhee ykn heerumte kan hikee/hiktee

I. Amantii : A. Orthodox B. Muslima C. Protestaantii D. Waaqee'ata E. Kan biro _____

II. Hojii :-----

1. Bineensonni qoricha aadaaf olaan kan naannoo keessanitti argaman enyuu fa'a dha ?
 (maqaa isaanii tarreessi) _____

Irra caalaan isaanii eessatti argamu? A. Daggalaa(bosona keessa) B. Beeylada manati C. Iddoo biro _____

2. Maqaa bineensota qorichaaf oolani, eessaa akka jiraatan, dhukkuba isaan faayisuuf gargaaran/ oolan tarreessi?

No		Bineenensich	Eessaa		Bineenensichii	Maqaa	Dhukkuba	Maqa
----	--	--------------	--------	--	----------------	-------	----------	------

	Maqaa bineensa a	dhukkubba namaa yaaluuf gargaaraa/oola ?	jiraatuu	Maqaa dhukku bichaa	dhukkubba beeyladaa yaaluuf oola	dhukku bichaa	beeyladaa moo namaa yaaluuf oolu	a dhuk kubaa
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27								

3. Naannoo keessanitti bineensonni qorichaaf oolan haali argama isaanii maal fakkata?

A. hedduu B. baratamaa C. Baayee kan barame miti D. darbee darbee kan mul'atu

4. Gosa/ maqaa Dhukkuboota kan kara aadaattin beeyladaraa fayyadamuun yaalaman

tarreessi?_____

5. Namoonni qoricha aadaa yeroo meeqa fayyadamu? A. Yeroo hunda B. Yeroo tokko tokko C.

Haala irrati hundaa'a

6. Beeylada qoricha aadaa irra caalaa kan itti fayyadaman: A. Namoota baadiyyaa B. namoota

magaalaa

7. Haalli kunuunsaa fi eegumsa bineensota qoricha aadaa ta'anii? A. Ol'aanaa B. Gadi aanaa C.

giddu galeessa D. tokkollee hin jiru

8. Bineensota qorichaaf oolan eegu fi kunuunsuuf qaamoleen itti gaafatamummaa qaban jiruu?

Yoo eeyyee ta'e tarreessi_____

Af-gaaffii Odeeffattootaa

1. Maali akkaataa qophii oomishaalee qorichoota beeyladaa/bineensota irraa dhukkuba yaaluuf itti qopheessan tarreessi?_____

2. Agarsiistonni dhukkuboota kanaa maal fa'i?_____

3. Haalli itti fayyadama qoricha aadaa akkamitti akka ta'e naf ibsi?_____

4. Yeroo qorichootni aada kuneen qophaa'an wantoota itti dabalaman maal fa'a akka ta'an tareessi?_____

5. qorichootni aada akkamitti akka laatama naf tarreessi?

6. Naannoo kana keessatti haalli kunuunsa aadaa bineensota qorichaaf oolan kunuunsuuf itti fayyadamnu jiraa? Yoo eeyyee ta'e ibsi_____

7. Bineensota qorichaaf olaan kan naannoo keessan jiran kunuunsuuf mootummaanii fi dhaabbileen biroo ummata naannootiin ala tattaaffiin godhame jiraa? Yoo eeyyee ta'e ibsi:_____

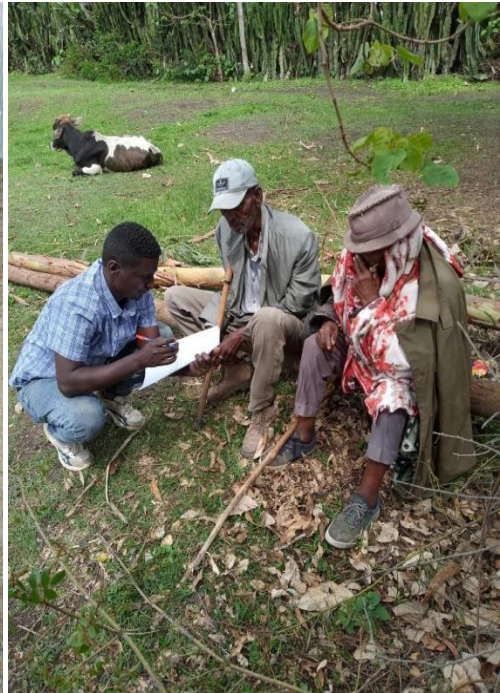
8. Kutaalee/oomishaalee bineensota qorichaaf oolan naannoo kana keessatti fayyadaman maalfa'i? _____
9. Rakkoowwan gurguddoon bineensota qorichaaf oolan naannoo kana jiran waliin walqabatan maali?

Appendix 6: Photograph captured taking during observation and interview

1

2

3



4

5

6

1. Dello sebro kebele traditional healer
2. Mumich fato kebele traditional healer

3. Café nagaya kebele traditional healer
4. Oda malka traditional healer
5. Bile of sheep
6. Sabuna traditional healer

