

TRADITIONAL MEDICINAL USES OF SMALL MAMMAL PRODUCTS: A CASE STUDY OF THE AFRICAN SAVANNAH HARES, CRESTED PORCUPINES AND ROCK HYRAXES IN SERENGETI DISTRICT, TANZANIA

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ABSTRACT

*Traditional medicines, both plant and animal products, have been used to cure various diseases since time immemorial especially in rural areas worldwide. Many studies have focused on traditional plant products, but little research has been conducted on animal traditional medicines. This study investigated the use of small mammal products for medicinal purposes in three villages bordering Serengeti National Park in Serengeti District, Tanzania. A total of 71 respondents were interviewed in Kisangura, Nyamburi and Machochwe villages in November 2010, using questionnaires. Villagers hunted small mammals mainly by dogs for cultural and ornamental reasons. Products of African savannah hare (*Lepus microtis*), crested porcupine (*Hystrix cristata*) and rock hyrax (*Procavia capensis*), were the most commonly used materials for believably curing nearly 11 different ailments including stomach pain, diarrhoea, convulsions and bleeding nose. Use of traditional medicines from these animals was significantly higher than other uses combined ($p < 0.001$), indicating that these small mammal products are important alternative medicinal products. However, although the small mammals utilised for medicinal purposes in the study area are categorised as Least Concerned (LC) presence and utilization of rare or threatened species in the same area cannot be ruled out. Therefore sustainable utilization of small mammals needs to be advocated.*

Keywords: Traditional medicine, small mammal, Serengeti Ecosystem, Tanzania

INTRODUCTION

Until around 12,000 years ago, humans derived food and raw materials from wild animals and plants (Serpell 1996). A variety of traditional medicines from both plants and animals were also used widely, although some tribes did not take certain plants or animals, due to their cultural beliefs. The World Health Organization (WHO) defines traditional medicine as “health practices, approaches, knowledge and beliefs incorporating plant, animal and/or mineral-

based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness” (Gray 1997). WHO estimates that most of the world’s population relies primarily on animal and plant-based medicines (WHO 1993). Although plant materials are most commonly used in traditional medicines, animal products are also widely used (Scarpa 1981, Msigwa *et al.* 2015). Most ancient cultures throughout the world have

practiced the therapeutic use of animals and animal products (Weiss 1947, Simoons 1974; Anageletti *et al.* 1992;

, Lev 2003), and such practice continues to be prevalent within many modern societies. Traditionally, humans often consumed animal products that were thought to have a healing or preventive effects (MacKinney 1946, Msigwa *et al.* 2015). Animal products such as skin, horns, nails, tails, teeth, ivory, honey, milk, antlers, spider nets, fish scales, urine, faeces, oil and eggs, are of vital importance in curing many diseases (Alves and Rosa 2005, Jamir and Lal 2005, Magige *et al.* 2009). More than 1,500 animal species have been identified as having therapeutic use in China, (Mahawar and Jaroli 2008). In India, at least 109 animals have reportedly been used for traditional medical activities, while in Northeast Brazil, about 250 animal species are used medicinally (Alves and Rosa 2005). In Africa, Maliehe (1993), Adeola (1992) and Ntiamoa-Baidu (1992) reported a number of animals that are believed to cure various diseases in South Africa, Nigeria and Ghana respectively. Furthermore, some animal products have been exported for use in traditional medicine practices abroad, particularly in Asian countries. The cultural use of animal products for medicinal purposes in many societies has led to the development of pharmaceuticals worldwide, although it has been largely responsible for extinction or near extinction of some animals, especially large ones (Cavaliere 2010).

Tanzania is among African countries where people utilise animal products for medicinal purposes, especially in rural areas where diseases are one of the most important factors affecting the quality of life. People commonly use traditional medicines due to poverty, lack of hospitals and is part of their culture (Makombe 1994). In addition, traditional healers are inexpensive, easily accessible and trusted

(Puckree *et al.* 2002), whereas modern medicine has mainly remained accessible to the higher income groups, although they also often believe in traditional medicine for incurable diseases, such as cancer, epilepsy, Acquired Immune Deficiency Syndrome (AIDS) etc. (Odu 1987, Ashwell and Walston (2008).

Substantial research in Tanzania has focused on ethno-botany (Kisangau *et al.* 2007, Mathias 1982), while very little emphasis has been put on ethnozoology (Vats and Thomas 2015). People residing near protected areas, such as the Serengeti National Park, interact with both large and small mammals, both in their residential areas when the animals cross park borders or inside the park when villagers go for illegal hunting. Small mammals like hares, porcupines, rats, mice and hyraxes, are commonly found in human settlements and hence are easily caught or trapped, and used for food and other purposes (Magige 2012). However, a possibility that such animals are also used for traditional medicinal practices in the area cannot be ruled out. The current study therefore, aimed at investigating such possibility in Serengeti District and subsequently use the knowledge gained for conservation purposes.

MATERIALS AND METHODS

The study was conducted in November 2010 in Serengeti District, in northern Tanzania (2° 0' 0''S, 34° 49' 60''E). The district shares borders with the Serengeti National Park (SENAPA) in the east.

Three villages namely Kisangura, Nyamburi and Machochwe were selected for the study, on the basis of their closeness to the SENAPA (Fig. 1). The study area is composed of highland savannah mainly thorny woodland trees dominated by Acacia, Commiphora, Ficus, Combretum and Podocarpus species, and extensive grassland plains (Herlocker 1976).

Over 90% of the respondents in this study were entirely dependent on agriculture as their sole or main source of livelihood. Agricultural

including carbohydrate staples, such as maize (*Zea mays*), cassava (*Manihotesculenta*), sorghum (*Sorghum bicolor*) and finger millet (*Eleusinecoracana*).

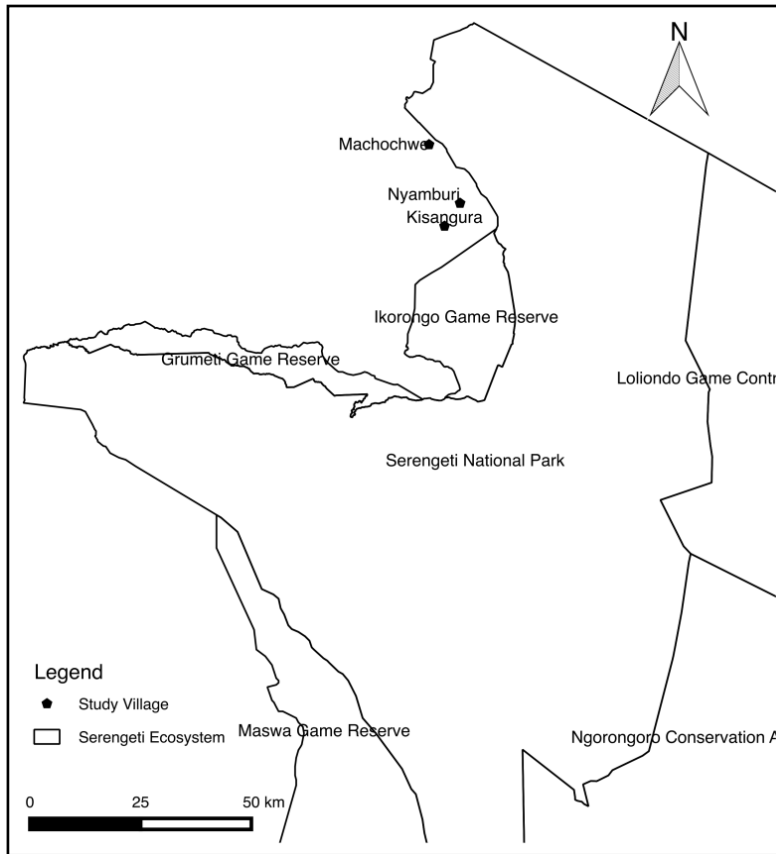


Figure 1: Map of the protected areas in the Serengeti ecosystem with approximate locations of studied villages.

activities included crop production and livestock keeping, although small-scale business and hunting were also practised. The people of the selected villages are mainly Kurya, although there are also immigrants from neighbouring villages and other places in the country. The villagers grew a variety of crops,

Procedures

Data on the utilization of products from small mammals were collected by using questionnaires administered to a randomly selected sample comprising of 5% of the total households in each village, obtained from village office. A total of 71 households were selected where only one individual per household, aged 15 years and above, was interviewed. Both males and females were involved in the interview. Each respondent was interviewed privately to avoid influence from other family members during the interview session.

The questionnaire contained 30 questions and took about 20-30 minutes for each respondent to fill the questionnaire. The questionnaires focused on: (i) level of education,

(ii) main activities in the village e.g. livestock keeping, cultivation or both, (iii) types of small mammals hunted, (iv) methods used in such hunting, (v) types of small mammals used for medicinal purposes, (vi) type of the product or part of the animal body used for treatment, and

(vii) kind of diseases treated with such animals/product.

Data Analysis

Descriptive statistics and non-parametric Chi-square χ^2 test was used to evaluate the significance of differences between data sets at 0.05 significance level. The analyses were performed using the SPSS 20.0 package (SPSS 2010).

RESULTS

A total 71 respondents of whom 61% were males and 39% were females, were interviewed in three villages. People of the Kurya tribe comprised the largest proportion of the interviewees (86%, n = 71) while the rest (14%) were Jita, Sukuma, Ikoma, Kisii or Haya. Most of the respondents had primary education (86%, n = 71) while 10% had secondary, college or university-level education and only 4% had no formal education.

Regarding hunting methods for small mammals, respondents indicated that communities used a variety of methods of which the use of dogs was the most frequently applied methods (Fig. 2) for hunting all sorts of small mammals (Chi square: $\chi^2 = 25.09$, df = 1, p < 0.001).

When asked about the species of small mammals mostly used for medicinal purposes, most villagers indicated that hares and porcupines products were the mostly used not only for medicinal purposes but also for other purposes, whereas for hyraxes only faecal

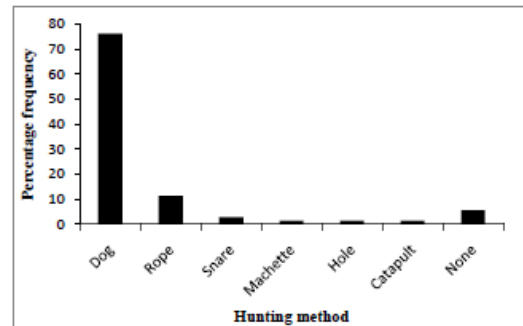


Figure 2: Hunting methods used by villagers to kill small mammals in Serengeti District, Tanzania.

material was utilised for therapeutic purposes (Fig. 3). In addition, the medicinal uses of hare and porcupine products were significantly higher than other uses combined (Hare: $\chi^2 = 38.2$, df = 1, p < 0.001) and (Porcupine: $\chi^2 = 1.9$, df= 1, p < 0.001).

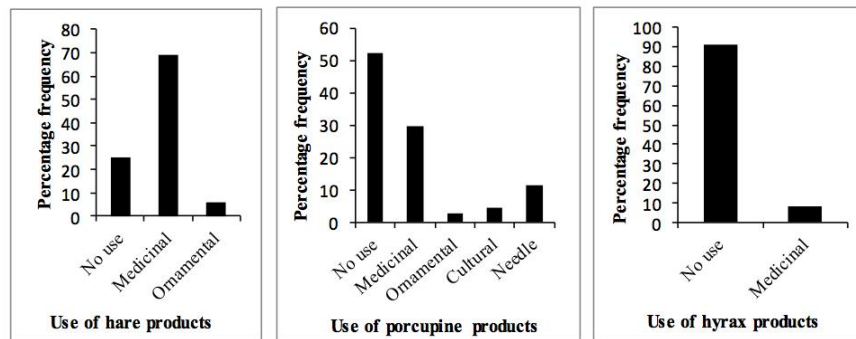


Figure 3: Uses of animal products from hare, porcupines and hyraxes, Serengeti District, Tanzania.

Regarding the types of diseases that are traditionally treated with animal products most respondents indicated that such products or excrements were used to treat appropriately 11 different

diseases (Table 1). It was also reported that whole animals, some parts of animal bodies or excrements, are used for curing or treating of various diseases and ailments either solely or in combination with some plant materials. The medicine can be eaten raw or processed by boiling, steaming, burning or soaking in water. Besides products of these small mammals being utilised as traditional medicines, skinned and stuffed hares were used as ornaments in houses. Porcupines were used in cultural events, but also their spines were used for decorating homes and in traditional dances or used as needle for sewing sacks and mats.

Adeola 1992, Ntiamoa-Baidu 1992, Negi and Palyal 2007, Soewu 2008, Glover and Glover 2014). Other small mammals, such as mice and rats, were considered as pests in the District (Magige 2012), although Vats and Thomas (2015) documented that a number of mouse and rat species are traditionally used for medicinal purposes by the Sukuma tribe, in the northern Tanzania. This indicates that variation in the use of small mammals exists within the same country and same zone, i.e. the Lake Zone. Surprisingly similar products were used to treat different ailments in different areas, or people of different cultures; or similar products treated

Table 1: Diseases traditionally treated with small mammal products in Serengeti District, Tanzania.

Animal species	Common name	Part of the body	Medicinal use
<i>Lepus microtis</i>	African savannah hare	Blood	Treat diarrhoea
			Treat stomach ache
		Fur	Cure burns and wounds
		Bones	Cure burns and wounds
<i>Hystrix cristata</i>	Crested Porcupine	Spine	Prevent and treat bleeding nose
			Increase appetite
			Treat painful breast
		Fats	Chest pain treatment
		Faecal pellets	relieve neck pains
		Skin	Treat painful breast
<i>Procavia acapensis</i>	African rock hyrax	Faecal pellets	Cure convulsions

DISCUSSION

African savannah hare, crested porcupine and rock hyrax, were reported to be used in traditional medicines in the studied villages of Serengeti District. Same animals are also used in other societies in Africa (Maliehe 1993,

the same ailment, but the processing of the medicine differed within the same zone. For example in this study, hyrax faecal pellets were reportedly used to treat convulsions, whereas in Busega same pellets were used to treat syphilis (Vats and Thomas 2015). With regards to

similar product treating same ailment, in the studied villages, unprocessed hare fur was used to treat wounds and burns, whereas in Busega, Sukuma people used burnt fur (Vats and Thomas 2015). The effectiveness of animal parts to treat these ailments warrants investigation. The indigenous knowledge of the use of animal parts that is embedded in local people, especially the folk practitioners might be very important. Unfortunately, this knowledge is rarely documented and is difficult to be evaluated scientifically. However, adequate information on such knowledge can be used to ascertain the effectiveness, potentialities and proper use of traditional medicines originating from animals in the development of modern medicines and consequently bridge the gap between traditional health practitioners and scientists (Mbwambo *et al.* 2007). But more importantly, is that, there is a need to gather information about the traditional use of animals for healing and apply the same for conservation of the species. The unsustainable use of medicinal animals has been documented as a potential threat to many species populations as most of the time animal parts used in traditional medicines require the killing of the animals, which has contributed to the rarity of certain animal species (Lee *et al.* 1998, Cavaliere 2010). Vats and Thomas (2015) documented that traditional hunting for medicinal use alone is not a serious threat to wildlife, but the same small mammals are also used for food (Magige 2012), and thus a combination of the two factors may impose a threat to some species. Although the small mammals utilised for medicinal purposes in current study villages are categorised as Least Concerned (LC) by the International Union for Conservation of Nature (IUCN), presence and utilization of rare or threatened species in the same area cannot be ruled out.

CONCLUSION

The study has revealed that different parts or products of small mammal origin are used differently from one culture to another. Documentation of the use of these animals and the integration of traditional and modern medicines may determine and extract the active ingredients or healing compounds, if any, from the animals and use the same in developing drugs. It is also important to design and implement an awareness campaign about the importance of biological diversity for sustainable utilization.

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