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Trade in wildlife for traditional medicine in Ghana: therapeutic values, zoonoses considerations, and implications for biodiversity conservation

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ABSTRACT

Overexploitation of wild animals, increasing recognition of pharmacological value of animals and the growing need to protect traditional knowledge and cultural environmental resources, have recently exacerbated the world's interest in zootherapy. In this paper, we provided information on the wild animal species traded for traditional medicine in markets across Accra, the capital of Ghana, their therapeutic values, conservation implications, and zoonoses risk. A total of 43 species of animals were recorded with 47% associated with the treatment of medical afflictions while 70% were connected to spiritual connotations in the form of charms meant for money rituals, protection, spiritual eyesight for prophesying and decoration of shrines. Approximately 15% of the traded species were of conservation concern including the Critically Endangered hooded vulture. The sale and use of the Straw-colored fruit bat, mice, and rats for traditional medicine raised concerns of zoonotic disease transmissions.

KEYWORDS

Wildlife trade; conservation; traditional medicine; zoonoses

Introduction

Animals have been an important part of the pharmacopoeia (i.e., a stock of medicinal drugs) of various cultures from ancient to current times. Given that animal parts constitute the minority of ingredients in most traditional medicines compared to medicinal plants, little is known about zootherapy (i.e., use of animals for medicinal purposes) globally (Alves & Rosa, 2005). Recently, however, the overexploitation of wild animal populations (Still, 2003), increasing recognition of the pharmacological value of some animal parts (Alves & Alves, 2011), and the growing need to protect traditional knowledge and cultural environmental resources have collectively exacerbated interest in zootherapy globally. In this findings abstract, we provide information on wild animal species traded for traditional medicines in markets across Accra (the capital of Ghana) and the therapeutic values of these species, as well as the conservation implications and zoonoses risks associated with this trade.

Methods

We selected the major markets within the Accra Metropolitan Area (Timber, Kaneshie, Nima, Adabraka, Awoshie market, Agbogbloshie, Tesano) for our study. We visited each market between November 2017 and April 2018, identified vendors of animal parts, sought

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their permissions for participating in our study, and then identified and counted the carcasses on sale. These vendors were also interviewed about the nature of the trade, including the sources, therapeutic values, and prices of the animal parts. In total, 34 vendors participated with only one vendor who declined to comment on the prices of her goods.

The animals were checked against the 2018 IUCN Red List Categories (Version 2) and the proportion of species belonging to each category was recorded (i.e., Critically Endangered, Endangered, Vulnerable, Near Threatened, Least Concern, Data Deficient). The therapeutic values of these animals were categorized into: (a) the treatment of medical afflictions through physical application and the preparation of concoctions that are applied or drunk, and (b) spiritual connotation in the form of magical charms.

Results

Inventory of Animal Parts and Nature of the Trade

A total of 43 species of animals were on sale in these markets and consisted of 16 species of mammals, 15 species of birds, 8 species of reptiles, 2 species of mollusks, 1 fish species, and 1 amphibian species. The total number of animal parts was 2,946 with reptiles being the most common (1810 parts [61%]) followed by birds (499 parts [17%]), mammals (406 parts [14%]), mollusks (140 parts [5%]), amphibians (80 parts [3%]), and fish (11 parts [<1%]). The most traded animal was the forest hinged tortoise (*Kinixys erosa*) with 812 shells (representing 28% of the total animal parts), followed by the chameleon (*Chamaeleo*spp.; 705 parts representing 24%) and colubrid snakes (colubridae; 181 parts representing 6%). The most traded birds were the common quail (*Coturnix coturnix*) of which 105 parts (4%) were recorded, followed by the pied crow (*Corvus albus*) with 73 parts (3%), yellow-billed kite (*Milvus migrans parasitus*) with 55 parts (2%), and hooded vulture (*Necrosyrtes monachus*) with 45 parts (2%). With respect to mammals, four-toed hedgehogs (*Atelerix albiventris*) (83 parts [3%]) were the most common, followed by rats (Muridae; 75 parts [2%]).

All of the vendors were female and between the ages of 19 and 60 years with a modal age of 31 to 40 years of age. The animal parts were regularly supplied by middlemen to 92% of the vendors, and these vendors were unaware of the exact sources of the animal parts. Prices of animal parts ranged from 2 Ghana Cedis (GHS) (~0.5USD) for the skin of a cuttlefish (*Sepia spp.*) or shell of a Giant African snail (*Achatina achatina*) to 6000 GHS (~1500 USD) for the skin of a lion (*Panthera leo*). The nails of a lion were each retailing for 40 GHS (10 USD), whereas a cut piece of a tiger (*Panthera tigris*) skin was 10 GHS (2.5USD).

Conservation Status and Implications

In total, 30 out of the 43 species encountered (70%) were of Least Concern according to the IUCN Red List of threatened species. Additionally, 5 species (12%) were not evaluated either because they could not be identified to the species level or were not listed on the IUCN Red List, and 1 species (2%), the forest hinged tortoise, was listed as Data Deficient. The species of conservation concern included 4 (9%) Vulnerable species (elephant [*Loxodonta africana*], leopard [*Panthera pardus*], lion, black-bellied pangolin [*Phataginus tetradactyla*]), 1 (2%) Near threatened species (straw-colored fruit bat

[*Eidolon helvum*]), 1 (2%) Endangered species (tiger), and 1 (2%) Critically Endangered species (hooded vulture). The proportion of the traded animals that was of conservation concern was 15%.

Therapeutic Values

In total, 20 out of the 43 species (47%) were used in treatment of medical afflictions, whereas 30 species (70%) were connected to spiritual connotations mainly in the form of magical charms. Some examples of therapeutic values reported by the vendors in relation to the treatment of medical afflictions included using frogs (*Rana spp*.) for treating wounds, using the oil of the African rock python (*Python sebae*) for treating hearing problems, and using the rat in concoctions for treating a diversity of ailments. In relation to spiritual connotation and charms, examples included chameleons being tied to the hands of infants to prevent early death, hooded vultures being burnt amid incantations to fortify the user against spiritual attacks, and straw-colored fruit bats being used to prepare charms for the protection of children.

Among the species associated with spiritual connotations, 15 (35%; four-toed hedgehog, West African potto [*Perodicticus potto*], spotted hyaena [*Crocuta Crocuta*], lion, leopard, elephant, straw-colored fruit bats, hooded vulture, pied crow, owl [*Tyto alba*], eagle [*Aquila spp*.], nightjar [*Caprimulgus spp*.], Senegal parrot [*Poicephalus senegalus*], chameleon, colubrid snakes) were connected to spiritual protection, 8 (17%; viper [Viperidae], African Rock python, cobra [*Naja spp*.], pied crow, hooded vulture, elephant, black-bellied pangolin, West African potto) were connected to money rituals, 6 (14%; eagle, hooded vulture, owl, pied crow, Senegal parrot, wild cat [*Felis spp*.]) were connected to spiritual eyesight for prophesying, and 2 (5%; Bates' pygmy antelope [*Neotragus batesi*], black-bellied pangolin) were connected to the decoration of shrines.

Discussion

Species Account and Therapeutic Values

The number of animal species obtained in the study was lower than what has been reported in traditional medicine markets in Brazil (Costa-Nato, 2004), South Africa (Whiting, Williams, & Hibbitts, 2011), and southern Vietnam (Van & Tap, 2008), but higher than what has been reported in northern Vietnam (Van & Tap, 2008). Bye and Dutton (1991) reported that traditional medicines in southern Africa consist of two categories: (a) those treating medical afflictions ('white medicine'), and (b) those dealing with ancestral conflict and traditions ('black medicine"). Our results indicated that the trade in animals for traditional medicines in Ghana is more strongly associated with 'black medicine,' as 70% was connected to spiritual connotations.

Implications for Biodiversity Conservation

According to Van and Tap (2008), most species traded in Vietnam were Endangered or worse off. The proportion of species of conservation concern in our study was relatively

low, but still high enough to attract conservation attention. Although the vendors were unaware of the exact sources of the animal parts, it was clear that the parts of tigers and lions might have been imported, as tigers are foreign to Ghana and lions are uncommon in the country. The genuineness of the tiger and lion parts were also in doubt as indicated in the lower than expected prices quoted for the tiger skin and lion claws.

The implications of this trade in animal parts for traditional medicines and spiritual reasons on biodiversity conservation in Ghana is highlighted by the observation of Critically Endangered hooded vultures as the fourth most traded bird with 45 bodies on sale in these markets. The numbers recorded for the other categories of species of conservation concern (i.e., Near Threatened, Vulnerable, Endangered) were between 1 and 4, indicating the trade in these other species was not as widespread as it was for hooded vultures. A major decline in hooded vulture populations has been reported across Africa (Ogada & Buij, 2011). As a Critically Endangered species, hooded vultures are known to have low clutch sizes, so the observation of 45 individuals on sale in these markets brings to light the harmful implications of this trade on the conservation of vultures. Gbogbo, Roberts, and Awotwe-Pratt (2016) reported that the hunting of hooded vultures for consumption in Ghana is a threat to the survival of this species, and speculated that the use of hooded vultures in traditional medicine may equally be a threat. In the current era of noticeable decreases in populations of hooded vultures in Accra and across Africa, the observation of 45 hooded vultures in seven markets in Accra alone appears to confirm this suspicion.

Zoonoses Considerations

We also observed 55 bodies of straw-colored fruit bats on sale in these markets. Besides this species being Near Threatened and thus of conservation concern, human interaction with this species has been linked to the transmission of zoonotic diseases such as henipavirus, lyssavirus, filovirus, Ebola virus, and rabies (Hayman et al., 2010, 2008). As the zoonotic pathogens from bats are potentially transmitted through bites, scratches, body fluids, tissues, and excrements (Gbogbo & Kyei, 2017; Wolfe, Daszak, Kilpatrick, & Burke, 2005), the use of bats in traditional medicine adds to the potential sources of human – bat interactions that can result in the transmission of zoonotic diseases. Additionally, species such as rats and mice on sale for use in traditional medicine are also known for zoonotic disease transmission (Bleich & Nicklas, 2008). Thus, the paradox of getting infected with a disease-causing agent from a potential curative agent exists in the traditional medicine industry and this may require further research.

Conclusions

This study was necessitated by limited information on wild animal species traded for traditional medicines in West Africa and the need for bridging knowledge gaps between biodiversity conservation and the human use of animals in traditional medicine. Our results indicated that 43 species of animals were traded of which 15% were of conservation concern. The majority of these species were connected to magical charms of spiritual connotations rather than the physical treatment of medical afflictions. Some of the traded species are also known for zoonotic disease transmission and therefore highlight the need for further research.

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