CONSERVATION STATUS OF TRADED WILD FAUNA FOR TRADITIONAL MEDICINE IN OSUN STATE, NIGERIA

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Abstract
Health care delivery remains a basic need for human survival, and the use of wild fauna species as ingredients for traditional medicine cannot be overlooked. This paper examines the diversity and conservation status of wild fauna species traded for use in traditional medicine in Osun State, Nigeria. A multi-stage stratified random sampling technique was employed to select respondents. An open-ended questionnaire was administered to vendors (hunters and traditional medicine sellers) in twelve out of thirty local government areas of the state. Four Local Government Areas (LGAs) were randomly selected from each of the three senatorial districts giving a total of 12 LGAs. A total of 120 respondents made up of six trado-medicinal ingredient vendors (lekuleja) and four hunters were randomly selected from each of the 12 LGAs. Data on wild fauna traded were collected and analyzed using descriptive statistics. A total of 37 species belonging to four classes, 21 orders and 28 families of vertebrates were documented to be traded for utilization. Aves (45.9%) were the most utilized class. This was followed by mammals (31.6%) and reptiles (21.6%) with majority of species classified as least concern under IUCN but with varying population trend. Alternative replacement of ingredients in local remedies should be done with caution as successful integration of traditional medicine into public health framework and modern science will influence wellbeing and reduce illegal exploitation of the wild fauna species.

Keywords: Conservation status, traditional medicine, wild fauna, wildlife species, wildlife trade

INTRODUCTION

The use of wildlife in tropical areas has important livelihood aspects and serves multiple roles (SCBD, 2011). Wild fauna has always provided a source of nutrition and traditional medicine for local people (Soewu *et al*., 2012). However, this important resource is becoming increasingly under pressure due to forest loss (Daskalova, 2018), over-exploitation of wild mammals (CBD, 2011), resulting from rising demand from growing population and trade (legal and illegal). Traditional medicine (TM) is one of the causes of over exploitation of wild fauna around the globe (Alves and Rosa, 2007). The procurement and availability of these resources sometimes requires long travel (Alves and Rosa, 2007), and high

risk such as possible detection by anti-poaching patrols, injuries and broken bones especially when sourced illegally (Knapp, 2012). In some cases, especially in West African States due to free movement within the Economic Community of West African States (ECOWAS), source country may differ from the export country (UNODC, 2016), as well as country where it is being utilized. Maintaining human wellbeing through dependence on traditional medicines will exert more pressure on wild fauna and biodiversity at large if basic amenities are not provided (Soewu *et al.,* 2016), thus replacement of products is of interest from a conservationist perspective, with the context of reducing the pressure on overexploited populations (Chen *et al.,* 2016). Traditional medicine using wildlife products is deeply embedded in many cultures around the world. In Africa, it plays a very important complementary role in healthcare delivery. In Ghana, as between 70 – 80% (Boakye *et al.,* 2015, Asante and Avornyo, 2013) and 90% of the Ethiopia population (Mahomoodally, 2013), depend on traditional medicine for their primary health care needs The World Health Organization (WHO), stated that traditional medicine refers to health practices, approaches, knowledge and beliefs incorporating animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being. Traditional medicine was further defined by WHO as the sum total of all knowledge and practices, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experiences and observations handed from generation to generation, whether verbally or in writing (Soewu and Adekanola, 2011). Health care purpose forms a section of which these traded species are utilized especially in the production of traditional medicines in the rural areas with use of wild fauna species as primary ingredients (Soewu *et al*., 2012). As human population increases, there is an increasing tendency for wild fauna to be commercially traded (Cawthorn and Hoffman, 2015), demand and dependence on bush meat and traditional medicines will continue to increase (Souto *et al.,* 2018). These animal-based medicines are either consumptive or non-consumptive, which may require harvesting a whole animal for a fraction of its body, skin, horn or whatever needed for medicine poses a threat to their survival at the long run. Therefore, there is an urgent need to document the wild species utilized for traditional medicines and their conservation status for effective sustainability.

MATERIALS AND METHOD

Study Area

This study was conducted in Osun State, which comprises of thirty local government areas (LGAs) with its capital at Osogbo (Oyegbami *et al.*, 2017). It is located between longitude $4^{o}15'$ to $4^{o}45'$ East of the Greenwich Meridian and latitude $7^{o}35$ to $7^{o}55'$ North of the equator. Osun state lies in the west and east of Ekiti and Oyo State respectively and bounded in the North and South by Kwara and Ondo state respectively. The state is located in the rain forest of the south western part of Nigeria. Traditionally, among many other occupations, the people have a rich cultural heritage which is eloquently demonstrated in all areas of their lives. The state vegetation is majorly secondary forest and derived Savannah mosaic.

Method of Data Collection

Stratified random sampling technique was used to select respondents. A total of 12 Local governments Areas (Ayedaade, Ede, Egbedore, Ejigbo, Ifelodun, Ife North, Ife Central, Ilesha East, Ilesha West, Olorunda, Osogbo and Orolu) were selected from the senatorial districts (Osun Central, Osun East and Osun West) of the state. Two (2) communities were randomly selected from each of the Local Government Areas (LGAs) based on the intensity of bushmeat trade giving a total of 24 communities. Finally, three (3) Trado-medicinal ingredient vendors *(lekuleja)* and two (2) hunters were randomly selected from each community giving a total of 120 respondents. Open ended questionnaire was used to encourage maximum discussion and optimum extraction of information vital to the survey. Additionally, traded wild fauna species were documented with local names, parts used and prices available at stalls of the different markets visited. Data collected was systematized using Microsoft excel (office 2010) and analyzed using descriptive statistics. The species Conservation Status (CS), the Endangered Species (Control of International Trade and Traffic) (Amended) Act, 2016, Nigeria, International Union for Conservation and Nature (IUCN) categories proposed in the Red List of Threatened Species (IUCN, 2015) and information on international trade regulation extracted from the Convention on International Trade in Endangered Species, (CITES, 2015) were used to determine the present population trend and conservation status of the traded wild fauna species and to draw recommendation to effective conservation.

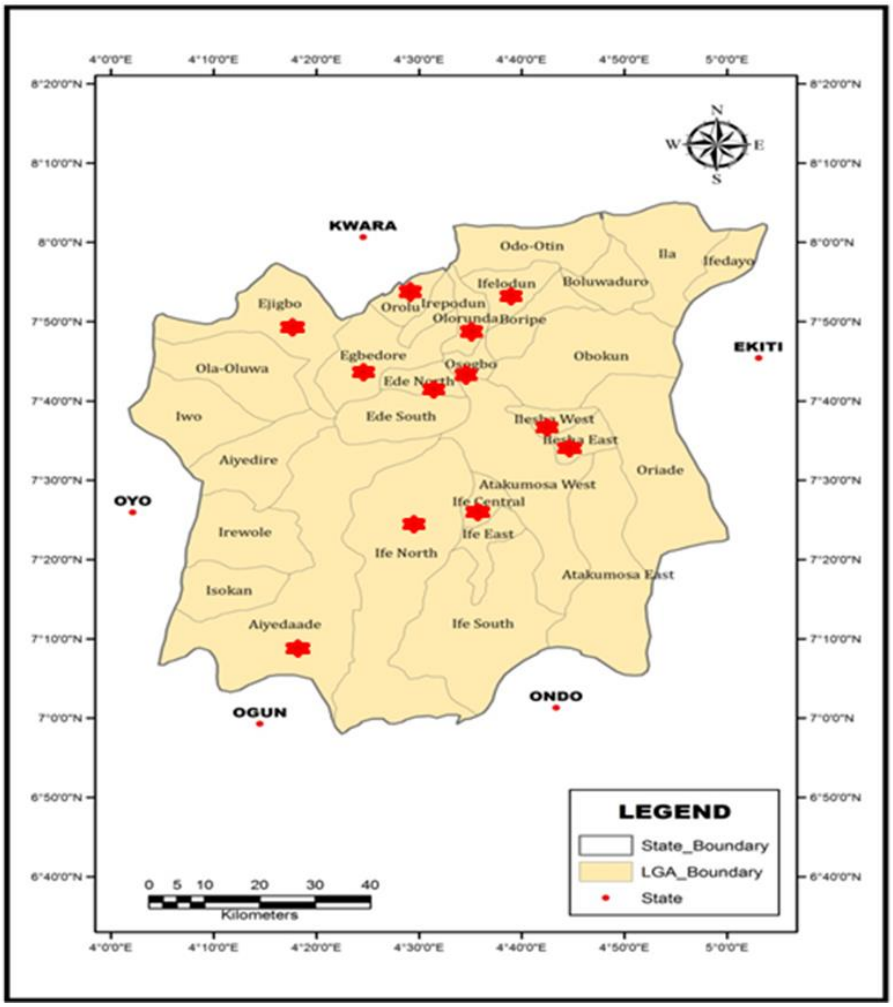

Figure 1: Map of Osun State and selected LGAs

RESULTS

Table 1 shows the demographics of the respondents. Majority of the traditional medicine traders were females (59.2%), and most (44.2%) of them were in the age bracket of 41 – 50 years. Majority (94.2%) were married and 55.8% of the respondents have family size of ≤ 5. Also, 48.3% of the respondents had primary education while 44.2% of the respondents engaged in wild fauna trade for traditional medicine with 21 – 30years of practice.

Table 1: Socio - economic Characteristics of respondents

Gender	Frequency	Percentage
Male	49	40.8
Female	71	59.2
	120	100
Age (in years)		
21 – 30	2	1.7
31 – 40	14	11.7
41 – 50	53	44.2
51 – 60	38	31.7
61 – 70	7	5.8
71 – 80	6	5.0
Marital Status		
Single	7	5.8
Married	113	94.2
	120	100
Level of Education		
No Formal Education	12	10.0
Primary education	58	48.3
Secondary Education	40	33.3
Tertiary Education	2	1.7
Quaranic Education	8	6.7
	120	100
Family Size		
≤ 5	67	55.8
6 – 10	52	43.3
11 – 15	1	0.8
	120	100
Occupation		
Traditional Medicine Vendor	72	60
Hunter	48	40
	120	100
Years in practice		
1 – 10	5	4.2
11 – 20	21	17.5
21 – 30	53	44.2
31 – 40	23	19.2
41 – 50	17	14.2
51 above	1	0.8
	120	100

Table 2 exhibits a total of thirty nine species (39) recorded during the survey that are traded and their prices at which the whole or parts of the species are sold. Result shows that large mammals are sold at higher rates, ranging from 200 – 17000 naira for mammalian skins and 800 - 20,000 naira for whole or live species with variations dependent on the size and weight. Price range for reptiles were between 150 - 7000 naira and 200 – 1500 for live and skin parts respectively. Bird species were sold as live or dead (plumage), while heads of dead reptiles (mostly snakes) were sold at prices dependent on type of species.

Table 2: **Traded Wild Fauna Species and their Prices encountered during the Survey**

S/N	English name	*Scientific name*	Local name (Yoruba)	Whole Size	Unit Price Range (₦)	Parts (P)	Unit Price Range (₦)
	MAMMALS						
1	Bushbuck	*Tragelaphus scriptus*	Igala	Live	18000 – 20000	Skin (W)	1500 – 3000
						Skin (K)	200
2	Maxwell duiker	*Cephalophus maxwelli*	Etu	-		Skin (W)	1000 – 1500
						Skin (K)	200
3	Leopard	*Panthera pardus*	Amotekun			Skin (K)	2000
4	African civet	*Civettictis civetta*	Eta	Live	5000 – 7000	Skin (W)	2000 – 3000
						Skin (K)	200
5	African Buffalo	*Syncerus caffer*	Efon			Head	15000 – 17000
6	Patas monkey	*Erythrocebus patas*	Ijimere			Skin (W)	1500 - 2000
						Skin (K)	200
7	Roan antelope	*Hippogratus equines*	Agbagudu			Head	2000 - 3000
8	Slender Mongoose	*Herpestes sanguinens*	Ofafa	-		Skin (W)	1200
						Head	500 – 700
9	Stripped ground squirrel	*Xerus erythropus*	Okere	Live	700 – 1000	Skin (W)	
						Skin (K)	
10	Four toed Hedgehog	*Atelerix albiventris*	Liili			Skin (W)	800
11	African savanna Hare	*Lepus victoriae*	Ehoro-igbo	Live	800 – 1000		
12	Giant rat	*Cricetomys gambianus*	Okete	Live	1000 – 1500		
	REPTILES						
13	Western pygmy Chameleon	*Rhampholeon spectrum*	Oga	Live	800 -1000		
				Dead	150		
14	African Spurred Tortoise	*Centrochelys sulcate*	Ijapa	Live	1000 – 2000		
15	Black mamba	*Dendroaspis polylepis*	-			Skin (W)	1200 – 1500
						Head	700
16	African Python	*Python regius*	Monomono				
17	Viper	*Viper spp*	Oka			Skin	1,000
						Head	500
18	Black necked spitting cobra	*Naja nigricollis*	Sebe	-		Head	1,000
19	Crocodile	*Crocodylus niloticus*	Oni		5000 - 7000		
20	Monitor lizard	*Veranus niloticus*	Alegba/anta	Live	1500 – 3000	Head	700 – 1500
	AVES						
21	African Marsh Owl	*Asio capensis*	Owiwi	Dead	1200 – 1500		
22	Village weaver	*Ploceus cucullatus*	Eye ega	Dead	150		
23	Kite	*Mulvus migrans*	Asa			Skin	1500 – 1700
24	Quaker parrot	*Psittacus erithacus*	Ayekooto	Live	2000		
25	Cattle egret	*Bubulcus ibis*	Lekeleke	Live	1200		
26	Vulture	*Gypohierax angolensis*	Igun	Live	16, 000	Head	2,000
				dead	6000 – 8000		
27	Straw coloured fruit bat	*Eidolon helvum*	Adan				
28	White rumped swift	*Apus caffer*	Alapadede	Dead	200		
29	Quail	*Coturnix coturnix*	Aparo	Dead	350 – 500		
30	Yellow bill kite	*Milvus aegyptius*	Awodi	Dead	1500		
31	Pied crow	*Corvus albus*	Kowe	Live	1200	Head	300
32	Bronze manikin	*Lonchura cucullatus*	-	Live	100		
33	Guinea fowl	*Numida meleagris*	Eye awo	Live	1500 – 2000		
34	Raven	*Corvus corax*	Kanakana	Dead	300		
35	African Grey Hornbill	*Ocyceros birostris*	Agbigbo	Live	15 000		
			/akalamagbo	Dead	5000		
36	Short tailed hawk	*Buteo bruchyurus*	Asa	Dead	1200 – 1500		
37	Lizard Buzzard	*Kaupifalco monnogaminicus*		Dead	1200 – 1500		
38	GASTROPODA						
39	Snail	*Archatina spp.*	Igbin	Live	150 – 500		

*Skin (W) represents Whole Skin of the species

*K – Matchbox size (3.5cm x 5cm) for retail sales of specie skin

Table 3 shows the frequency of occurrence of wild fauna traded by their class. Aves had the highest occurrence with seventeen species, twelve species were recorded for mammals, reptiles had eight and snail was the only gastropod

Table 3: Classes of Traded Wild Fauna Species recorded at stalls

Class of Species	Frequency	Percentage (%)
Mammals	12	31.6
Reptiles	8	21
Aves	17	44.7
Gastropods	1	2.63
Total	38	100

Table 4 shows the conservation status of the wild traded species under CITES, Endangered Species (Control of International Trade and Traffic) (Amended) Act, 2016, Nigeria, IUCN and their current population trend. Thirty-seven wild species traded were identified and classified under IUCN, of which twenty-nine (29) were listed as least concern, three (3) near threatened, one (1) vulnerable, one (1) endangered, One (1) critical endangered and two (2) unknown with varying population trends.

Table 4: Checklist of traded wild fauna species in Osun State and their Conservation Status IUCN, CITES and Endangered Species (Amended) Act, 2016 Nigeria status

English name	Scientific name	CITES	Endangered Species Act, 2016 (NIG)	IUCN	Population Trend
Bushbuck	*Tragelaphus scriptus*	II	-	LC	Stable
Maxwell duiker	*Cephalophus maxwelli*	III	2	LC	Decreasing
African civet	*Civettictis civetta*	III	2	LC	Unknown
African Buffalo	*Syncerus caffer*	I	-	NT	Decreasing
Leopard	*Panthera pardus*	I	1	CR	Decreasing
Patas monkey	*Erythrocebus patas*	II	-	LC	Decreasing
Roan antelope	*Hippotragus equinus*	-	-	LC	Decreasing
Slender Mongoose	*Herpestes sanguinens*	III	2	LC	Stable
Stripped ground squirrel	*Xerus erythropus*	-	1	LC	Stable
Giant rat	*Cricetomys gambianus*	-	-	LC	Stable
Four toed Hedgehog	*Atelerix albiventris*	II	-	LC	Stable
African savanna Hare	*Lepus victoriae*	-	-	LC	Stable
REPTILES					
Western pygmy Chameleon	*Rhampholeon spectrum*	II	-	LC	Unknown
African Spurred Tortoise	*Centrochelys sulcate*	II	-	VU	Unknown
Monitor lizard	*Veranus niloticus*	II	1	-	-
Nile Crocodile	*Crocodylus niloticus*	I	1	LC	Stable
Black necked spitting cobra	*Naja nigricollis*	II	1	LC	Unknown
Black mamba	*Dendroaspis polylepis*	-	-	LC	Stable
African Python	*Python sebae*	II	1	-	Unknown
Viper	*Atractaspis irregularis*	-	-	LC	Unknown
AVES					
Village weaver	*Ploceus cucullatus*	-	-	LC	Stable
Fruit bat	*Eidolon helvum*	-	-	NT	Decreasing
White rumped swift	*Apus caffer*	-	-	LC	Increasing
Quail	*Coturnix coturnix*	-	-	LC	Decreasing
Kite	*Milvus migrans*	II	1	LC	Unknown
Bronze manikin	*Lonchura cucullata*	-	-	LC	Stable
Cattle egret	*Bubulcus ibis*	-	-	LC	Increasing
Guinea fowl	*Numida meleagris*	-	-	LC	Stable
African green pigeon	*Treron calvus*	-	-	LC	Decreasing
Lizard Buzzard	*Kaupifalco monogrammicus*	II	1	LC	Stable
African Marsh Owl	*Asio capensis*	II	1	LC	Stable
Vulture	*Gypohierax angolensis*	II	2	LC	Stable
Pied crow	*Corvus albus*	-	-	LC	Increasing
African grey parrot	*Psittacus erithacus*	II	1	EN	Decreasing
Yellow billed kite	*Milvus aegyptius*	-	1	NT	Unknown
Short tailed hawk	*Buteo brachyurus*	II	1	LC	Increasing
African grey Hornbill	*Lophoceros nasutus*	II	2	LC	Stable

IUCN - *LC – Least Concern *EN – Endangered *NT – Near Threatened *VU – Vulnerable *CR – Critically Endangered
CITES – Appendix I, Appendix II, Appendix III
Endangered Species (Amended) Act, 2016 (NIG) - *1 – First Schedule *2 – Second Schedule

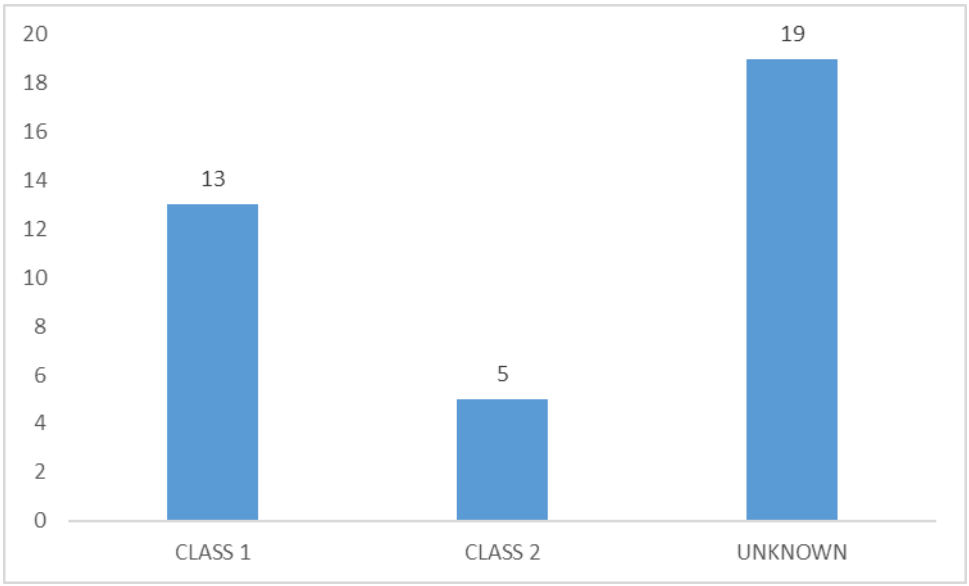

Figure 1: Clasification of wild traded fauna for TM under Endangered species Act (Amended), 2016

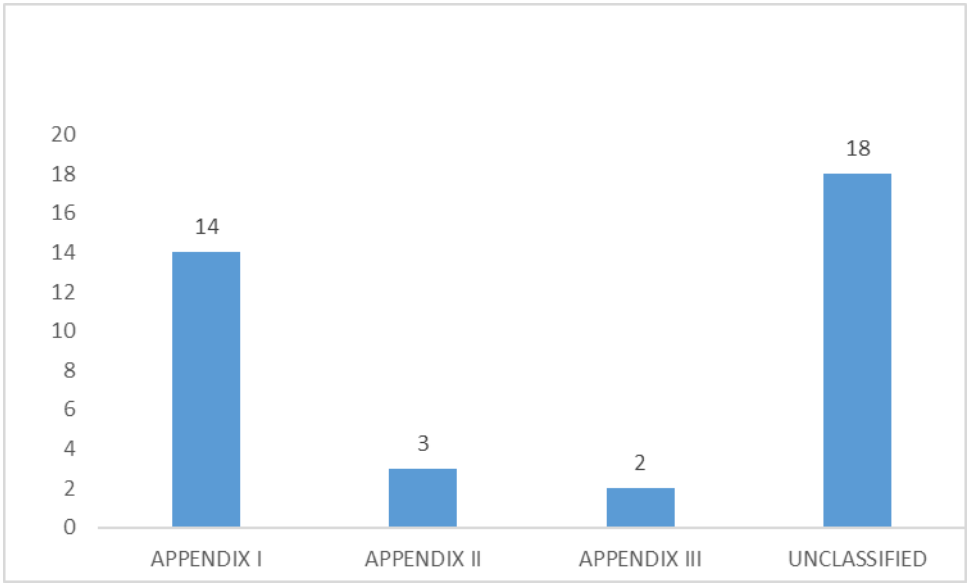

Figure 2: CITES Classificaction of wild traded fauna species for TM in Osun State

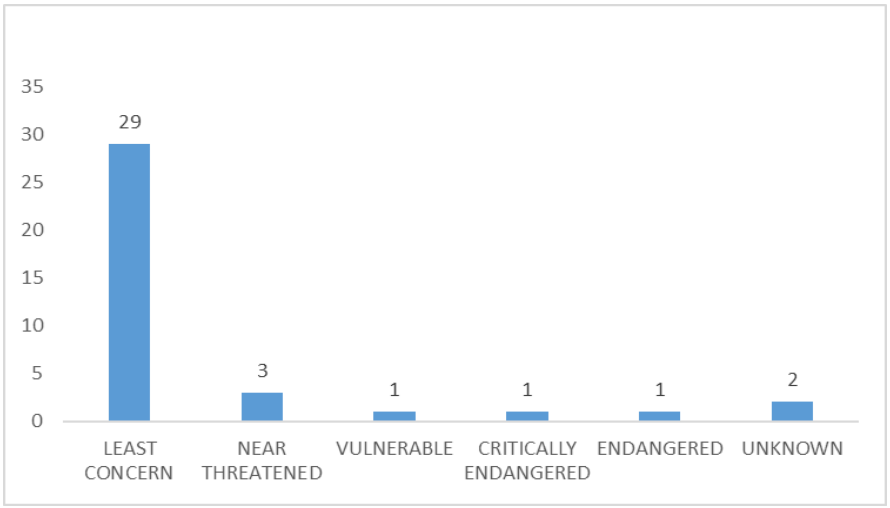

Figure 3: IUCN conservation status of wild traded faina for TM in Osun State

Plate A and D shows animal skin displayed at a stall at Ede and Oja Oba, Osogbo.
Plate B shows the matchbox size drawn on the animal skin
Plate C shows the head of tree hyrax displayed at stall

DISCUSSION

The provoking increase associated with wildlife hunting and its utilization towards sustaining livelihood, is a setback to achieving conservation goals. In the African tradition, hunting is regarded as a social event (rite of passage), enabling men prove their strength and manhood (FAO, 2015). The earliest humans had men engaged in hunting with bows and guns, while the females engage more in feeding the household (FAO, 2015), including snail collection, trapping of small rodents, sales of resource, food vendors or traditional medicine ingredients sellers which agrees with the gender distribution of the respondents where 56% were females. There is a long tradition which portrays the role of wild fauna in zootherapy, other early written historical sources attest to the medical use of animal's parts, and their products (Lev, 2003). Soewu *et al.,* (2012), reported that the prevailing situation in the society also influence the trend in the demand for traditional medicine.

Poverty is seen as a driver of biodiversity loss (Palmer and Di Falco, 2012), according to United States Agency for International Development (USAID, 2006), three in four people living in rural areas are dependent on natural resources for their livelihoods and maintaining a good livelihood requires a sound health is important. Illegal hunters are believed to be poor and uneducated (Knapp, 2017), however respondents involved in traditional medicine ingredients are educated having obtained primary and secondary education. Over seventy-eight percent of the respondents had spent over 21 years or more trading wild fauna as traditional medicine ingredients, providing a better advantage in identifying traded species. The variety of fauna species traded agrees with previous studies by several authors (Adeola, 1992; Nguyen and Nguyen, 2008; Soewu *et al*., 2012). However, the numbers of species documented during the survey differ from most of the previous researches. Thirty-eight (38) species of vertebrates were recorded during the present survey while Sodeinde and Soewu (1999) documented 45 species for southwestern Nigeria, Soewu *et al*., (2012) recorded 30 species in Ogun State Nigeria, Ngunye and Ngunye (2008) recorded thirty (30) and sixty-eight (68) animal species in North and Southern Viet Nam respectively for traditional medicine.

International Union of Conservation and Nature (IUCN) draft guideline (Glowka *et al*., 1994) documented that the exploitation of given species is likely to be sustainable if it does not reduce the future use potential of the target population or impair its long–term visibility as well as it being compatible with maintenance of long-term viability of supporting and dependent ecosystem. Live animals were

recorded to be sold at high rates than dead animal, however, the utilization of live animals as ingredients for traditional medicine results to devastating consequences, and in some cases becomes the primary reason an animal faces risk of extinction. Evident to this, Jani Actman on National Geographic magazine titled "Traditional Chinese medicine and wildlife" stated that pangolins and rhinos which is believed to hold healing power in some parts of their body and are now classified as endangered species with a decreasing population trend. Seasonal changes, species utilization and availability are common factors documented that influences prices and demand as observed in most reptiles and large mammals. There is need to consider alternatives as most of the people due to their economic and social background depend mainly on harvesting, processing and trading in wildlife as their only means of making a living (Soewu, 2008). However, Xie in Chaudhury and Rafei (2001), stated that traditional remedies were simple, convenient and affordable with fewer side-effects compared to modern medicine that results to complications influences the local people dependence on traditional medicine resulting to continuing exploitation of wild fauna to meet their health needs. The links between traditional medicine and biodiversity therefore are imperative, particularly when considering the importance of former as a source of primary health care to 80% of the world's population. TRAFFIC (2000) reported that the economic importance of the bushmeat trade in all countries is highlighted, and the importance of bushmeat as a source of protein for rural poor confirmed. Also, there is clear evidence that with diminishing alternative resources, taboos are being ignored and commercial trade is becoming a more significant element with local traditional medicines utilized as curatives either in their consumptive or non – consumptive form, most times involve the use of animal parts as major ingredients. This study documents species diversity hunted and traded for traditional medicine purposes within Osun state, the unit price for parts and whole body size for each species and indicate the species diversity as well as their status under IUCN/CITES/Endangered Species (Amended) Act, 2016 Nigeria to understand the resulting effect of this practice to the population trend of the resources. The variety of fauna species recorded during this survey agrees with results reported by Soewu *et al*., (2012) on wild mammalian species for traditional medicine in Ogun State.

CONCLUSION

In the global community, the main motivation behind conservation efforts is biodiversity loss. The fundamental causes for biodiversity loss are rooted in social, institutional and economic factors and will be more prone to depletion when the direct value of the goods in question are not realized. The wide range of

species recorded, reptiles, mammals and birds are appreciated for their medicinal applications and are included in lists of threatened or endangered species under IUCN, CITES and Endangered Species (Amended) Act, 2016 Nigeria. A continuing use of wild fauna species for traditional medicine will result to a decrease in their population thereby leading to potential extinction. The interdependence that exist between sustainability of the environment through preservation and protection of its resources and the sustainability of the human wellbeing thereby suggest the development of new public health practices, which can translate into policies and actions by creating an effective awareness to the people specifically to person involve in direct extraction of wild species. There is gap of knowledge resulting from the perception that wild fauna are gifts from God and should be exploited for human survival. This may have attributed to the lack of conservation consciousness in utilization of these resources.

RECOMMENDATION

Given the ecological and economic complexities of the utilization of wild fauna for trado -medicinal purpose, it suggests that a variety of solutions is needed. First is the substitution of wild fauna resource in local medicine. These substitutes will have potential benefits of reducing the pressure on wild populations as well as mitigating potential of possible extinction. However, replacement of ingredients in remedies should be done with caution, because recipes using different species may not have the same efficacy. Secondly, successful integration of traditional medicine into public health framework and modern science should be considered under license and developed platform. Such measures will provide a win – win situation to conservation of the species hunted and traded as well as the wellbeing of the locals who rely on traditional medicine. Attention should be given in monitoring traditional medicine recipes obtained from farmed wild animals or obtained legally through units for domestication to check for wildlife laundering. Conservation programmes as well as enforcement of laws regulating trade, illegal exploitation and utilization of wild fauna should be a priority to help promote conservation.

ACKNOWLEDGEMENT

The authors are grateful to all respondents who willingly participated and contributed in local identification of traded wild fauna stock in their stalls during the course of this study.

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