Science World Journal Vol. 20(No 3) 2025 https://dx.doi.org/10.4314/swj.v20i3.28
www.scienceworldjournal.org
ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)
Published by Faculty of Science, Kaduna State University

Full Length Research Article

PERCEPTIONS ON TRADE OF AVIAN BODY PARTS IN MARKETS IN KADUNA METROPOLIS, NIGERIA

Agbo B.O.[1*], Bello A.[1] and Ogunleye C.O.[2]

[1]Department of Biological Sciences, College of Computing, Engineering and Sciences, Faculty of Life Sciences, Kaduna State University (KASU), P.M.B. 2339 Tafawa Balewa Way, Kaduna, Nigeria

[2]A.P. Leventis Ornithological Research Institute (APLORI), P.O. Box 13404 Laminga, Jos-East LGA, Plateau State, Department of Zoology, University of Jos, Nigeria

*Corresponding Author Email Address: boniface.agbo@kasu.edu.ng

ABSTRACT
Avian body parts are used by people for several purposes, including food, clothing, ornamentation, religious practices, sport and traditional medicine. The traded body parts include: avian heads, feathers, eye, legs, whole body, carcass, bones and beaks. Structured questionnaires designed to investigate the prevailing socioeconomic drivers of avian body parts trades were administered in four markets in Kaduna Metropolis. A total of 39 bird species, distributed amongst 30 genera, 21 families were on sale. Most abundant bird families traded were the *Psittacidae* (parrots) and *Phasianidae* (francolins and quails). The respondents were of ages 18 to 76 years, with the average (x̄) age being 32 years old. The patronage of urban dwellers ages 20 to 47 topped the trade of avian body parts. Involvement in the trade of avian body parts was highest among traders (81.5%) and lowest among farmers (13%) respectively. Amongst respondents, 19.5% personally used while 79.5% sold avian body parts. Traders and farmers are major targets of any conservation action aimed at reversing the current trend in avian body parts traded in Kaduna. Effective management strategy should focus less on enforcing regulations and dwell more on empowering local communities with livelihood options that do not depend on wildlife exploitation.

Keywords: Avian body part, traditional medicine, socio economy, biodiversity conservation, Kaduna Metropolis

INTRODUCTION

Humans utilize birds and their products for sport, clothing, ornamentation, religious practices and as pets (Donald *et al*., 2024). The trade of birds, their supplied products and other biodiversity is reckoned with, as a direct threat to the survival of many species (El Hajj & Holst, 2020; Cardoso *et al*., 2021; Morton *et al*., 2021; Andong *et al*., 2023). Wild birds trade can pose broader threats through the spread of zoonotic and other infectious wildlife diseases (Borsky *et al*., 2020; Rush *et al*., 2021, Matthew *et al*., 2025), the establishment of invasive populations (Abellán *et al*., 2016; Souviron-Priego *et al*., 2018), and the degradation of community structure and ecosystem services (Marthy & Farine, 2018).

Two hundred globally threatened bird species owe their poor conservation status partly to trade (Challender *et al*., 2023). As reported recently, amongst extant bird species, 45% are traded to some extent (Donald *et al*., 2024). Out of these 45% extant species in trade, the capture for the pet industry may be implicated for 37% of all species exchanged in trade locally or internationally (BirdLife International, 2024).

Despite Nigeria's being a party to the CITES agreements (https://cites.org/eng/disc/species.php), the information on which species are most prevalent in trade is fragmentary. The bird species population trend is not completely understood in the face of changing climate and significant animal welfare issues associated with the trade of wild species (Baker *et al*., 2013); which complicate efforts at understanding species that are potentially at greatest risk.

However, attempts are being made to understand the socio-economic factors responsible for the decline of a few species prevalent in these trades (William *et al*., 2021; Antonio *et al*., 2025). The hydra-headed trade in wild birds and avian body parts is often unregulated, illegal and poorly monitored since it is mostly done, undercover (BirdLife International, 2024; Donald *et al*., 2024). These researches revealed that, the trade of avian body parts and cage-birds remains active in Nigeria (Izah & Seiyaboh, 2018; William *et al*., 2021; Adebowale *et al*., 2025; Antonio *et al*., 2025). Kaduna metropolis seemed uninvolved in these trades as recorded in counterpart states. This study, aimed to investigate the perceptions of dwellers and traders of avian body parts and to evaluate the socio-demography of markets in Kaduna metropolis involved in avian body parts trades. The following objectives were investigated specifically: (1) to determine perceptions and socio-demography of dwellers of the study areas. (2) To record the bird species traded. (3) Take note of the avian parts or products and the specific use they are put/employed. (4) To note the supplies, suppliers and the occupations of those who patronizes avian products. (5) To understand the motives and motivations for those choosing the business of trading birds and avian products; in order to evaluate the position of Kaduna metropolis dwellers in this most significant human-related driver of avian mortality and population decline (Alves & Rosa, 2010 ; Atuo *et al*., 2015).

METHODS

Study area

For this study, we focused on few market places and some areas where avian body parts were traded within Kaduna metropolis. These markets include; Kawo market, Unguwan Shanu market, Kasuwan Barci and Unguwan Sarki and also residents living in proximity to the areas in the State where this trading is carried out. Kaduna State is in the northwest geopolitical zone of Nigeria. The state capital is its namesake, the city of Kaduna which happened to be the 8th largest city in the country as at 2006. The state was created in 1967 as North-Central State, which also encompassed

Science World Journal Vol. 20(No 3) 2025 https://dx.doi.org/10.4314/swj.v20i3.28
www.scienceworldjournal.org
ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)
Published by Faculty of Science, Kaduna State University

the modern Katsina State. Kaduna State achieved its current borders in 1987, Kaduna State is the fourth largest and third most populous state in the country, Kaduna State is nicknamed the Centre of Learning, owing to the presence of numerous educational institutions of importance within the state such as Ahmadu Bello University. The Kaduna state is located between latitude 10°38'58" N and 10°25'36" N and to longitude 7°22'14" E and 7°32'00" E. Its northern half became Katsina state in 1987. The state is bordered by seven states: Zamfara for 117 km (73 miles) and Katsina for 161 km (100 miles) to the north, Kano to the north-east for 255 km, Bauchi and Plateau to the east, Nasarawa and Abuja Federal Capital Territory (for 45 km) to the south, and Niger to the west.

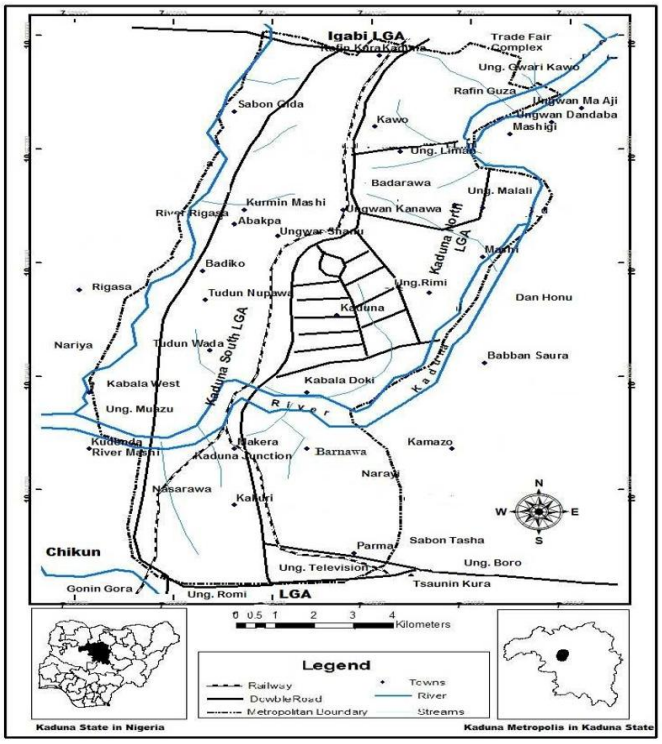


Fig.1. Kaduna metropolis map: Modified from Kaduna Environmental Protection Agency (KEPA).

Field survey

Four markets and traditional medicinal stands were surveyed to assess the prevalence and drivers of the trade in avian body parts in Kaduna metropolis. In each market, we interviewed at least 50 people across different age groups and occupations. Semi-structured questionnaires were administered to capture information on both the extent of the trade and its socio-demographic and socioeconomic drivers. Because open market sales of wildlife body parts were common in the study area, our questions were aimed at evaluating respondents' knowledge of and participation in the trade of avian body parts. We conducted face-to-face interviews using a semi-structured questionnaire that was piloted prior to the actual survey. In total, we interviewed 200 people across the surveyed markets. Each interview lasted no more than 35 minutes. We assured all interviewees of the confidentiality and anonymity of the information they provided regarding avian persecution within their localities. The questionnaire was organized around five main objectives.

The first objective focused on gathering information about respondents' knowledge of the species of birds sold in traditional medicine stores. Respondents were asked to state the types of birds sold, the most commonly requested bird species, and the types of bird species people bring to sell. The second objective focused on the various uses of the birds being sold. Respondents were asked whether they personally used avian body parts, and whether the birds were used to cure specific ailments, preferred for meat, or favored for specific fortunes, among other uses. They were also asked to list any factors that could potentially motivate them to kill a bird. These were open-ended questions, and respondents were at liberty to discuss any other factors beyond the listed options. The third objective focused on determining which parts (bones, head, feathers, etc.) were sold in the various markets. Respondents were asked to name the body parts sold, describe the methods of extraction—such as peeling or cutting—and indicate how many times they had sold or witnessed the trading of avian body parts. For instance, within the Kawo market area, all species of vultures are referred to as "angulu" (scavenger of human remains). The fourth objective was to determine the frequency of bird supplies in the markets. Respondents were asked to identify both the most frequently supplied bird species and the least frequently supplied bird species. The final objective focused on determining the motivations for the trade in avian body parts. Respondents were asked to share the reasons that led them into such trade and whether they encountered any challenges as a result. The questions were both closed- and open-ended. For example, a closed-ended question could be, "Have you sold any bird body parts?" with answers grouped as Yes or No. Conversely, an open-ended question could be, "What cultural practices require the use of avian body parts in your community?" Here, respondents were free to discuss any practices or ceremonies that involve the use of avian body parts. Interviewees were also presented with detailed descriptions of avian morphology using photos from field guides, recordings of bird calls, and were often encouraged to mimic the calls of targeted species.

Data analysis

We summarized variables related to participation in the trade of avian body parts using standard descriptive statistics. We grouped the number of respondents by market and calculated the percentage of respondents actively involved in the trade. We also identified the species reported in the trade across four protected areas in the Kaduna metropolis, including their IUCN threat categories and population trends.

RESULTS

Demography of the sampled area and Socio-economic profile of avian body part sellers

The demography (Table 1) of the study area revealed that, of the sampled inhabitants of Kaduna metropolis, 98.5% were male, while 1.5% were female in the microcosm. The majority (56.5%) of the inhabitants were between the ages of 21 and 30. About 81.5% of the respondents were traders, with an income range of ₦40,000–69,000. Most respondents were traders (n=163); others included hunters (n=11), government workers (n=0), and farmers (n=26). Involvement in the trade of avian body parts was highest among traders and lowest among hunters (Fig. 3).

Science World Journal Vol. 20(No 3) 2025 https://dx.doi.org/10.4314/swj.v20i3.28
www.scienceworldjournal.org
ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)
Published by Faculty of Science, Kaduna State University

Table 1: Demographics of the avian body part sellers

Variables	Number	Percentage (%)
GENDER		
Male	197	98.5
Female	3	1.5
AGE		
11-20	9	4.5
21-30	113	56.5
31-40	45	22.5
41-50	23	11.5
51-60	5	2.5
61-70	3	1.5
71-80	2	1
OCCUPATION		
Trader	163	81.5
Farmer	26	13
Hunter	11	5.5
INCOME (NAIRA)		
15000-39000	74	37
40000-69000	104	52
70000-99000	13	6.5
>100000	9	4.5
TOTAL	**200**	**100**

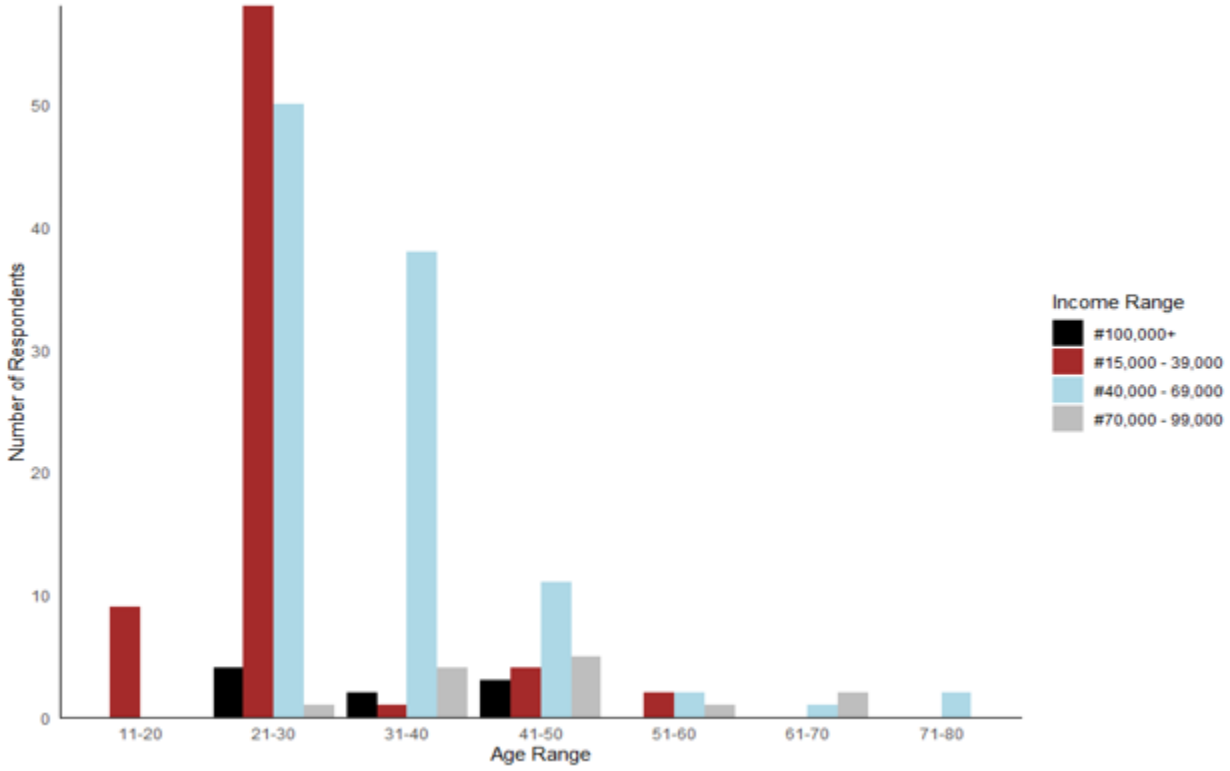


Fig. 2. Average monthly income gained by the respondents during the trade based on age range

Bird Species recorded amongst caged and dried samples in markets around Kaduna Metropolis

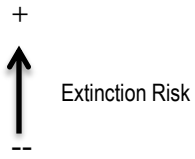
Thirty 39 bird species (Table 2) spread across 33 genera and 20 families were identified as being traded in the study area. Most avian species on sold in alive in caged are of the families Psittacidae and Phasianidae; each having seven different species (n=7). Of these species, 53.8% are experiencing population declines. The Yellow-fronted canary (*Crithagra mozambica*) was the most prevalent among the single species reportedly traded caged bird.

Table 2: Population trend and IUCN categorization of bird species traded in Kaduna metropolitan markets

S/No.	Common name	Scientific name	Order	Family	IUCN	Pop. Trend
1	African hawk Eagle	*Hieraaetus spilogater*	Accipitriformes	Accipitridae	LC	Decreasing
2	Yellow-billed Kite	*Milvus aegyptius*	Accipitriformes	Accipitridae	LC	Decreasing
3	Hooded Vulture	*Necrosyrtes monachus*	Accipitriformes	Accipitridae	CR	Decreasing
4	Common Bulbul	*Pycnonotus barbatus*	Passeriformes	Pycnonotidae	LC	Increasing
5	White-faced whistling Duck	*Dendrocygna viduata*	Anseriformes	Anatidae	LC	Decreasing
6	Domestic Duck	*Anas platyrhynchos*	Anseriformes	Anatidae	LC	Increasing
7	Spur-winged Goose	*Pectropterus gambensis*	Anseriformes	Anatidae	LC	Stable
8	Little Swift	*Apus*	Apodifrom	Apodidae	LC	Stable
9	Cattle Egret	*Bubulcus ibis*	Pelecaniformes	Areidae	LC	Increasing
10	African grey Hornbill	*Lophoceros nasutus*	Bucerotiformes	Bucerotidae	LC	Decreasing
11	Yellow-billed oxpecker	*Buphagus africanus*	Passeriformes	Buphagidae	LC	Decreasing
12	Abdim's Stork	*Ciconia abdimii*	Ciconiformes	Ciconiidae	LC	Decreasing
13	Rock Dove	*Columba livia*	Columbiformes	Columbidae	LC	Decreasing
14	Black-billed Wood Dove	*Turtur abyssinicus*	Columbiformes	Columbidae	LC	Decreasing
15	Speckled pigeon	*Columba guinea*	Columbiformes	Columbidae	LC	Stable
16	Pied Crow	*Corvus albus*	Passeriformes	Corvidae	LC	Increasing
17	Senegal Coucal	*Centropus senegalensis*	Cuculiformes	Cuculidae	LC	Stable
18	Red-billed fire Finch	*Lagonosticta senegala*	Passeriformes	Estrildidae	LC	Stable
19	Yellow-fronted Canary	*Crithagra mozambica*	Passeriformes	Fringillidae	LC	Decreasing
20	Helmeted Guineafowl	*Numida meleagris*	Galliformes	Numididae	LC	Stable
21	Common Quail	*Coturnis communi*	Galliformes	Phasianidae	LC	Unknown
22	Red Junglefowl	*Gallus*	Galliformes	Phasianidae	LC	Decreasing
23	White Silky	*Gallus euclieforme*	Galliformes	Phasianidae	LC	Stable
24	Sultan Chicken	*Gallus domesticus*	Galliformes	Phasianidae	CR	Decreasing
25	Wild Turkey	*Meleagris gallopavo*	Galliformes	Phasianidae	LC	Increasing
26	Ocellated Turkey	*Meleagris ocellata*	Galliformes	Phasianidae	NT	Decreasing
27	Sri Lanka Junglefowl	*Gallus lafayettii*	Galliformes	Phasianidae	LC	Stable
28	Red-billed Quelea	*Quelea*	Passeriformes	Ploceidae	LC	Decreasing
29	Buffalo Weaver	*Bubalornis niger*	Passeriformes	Ploceidae	LC	Stable
30	Grey Parrot	*Psittacus erithacus*	Psittaciformes	Psittacidae	EN	Decreasing
31	Rose-ringed Parakeet	*Psittacula krameria*	Psittaciformes	Psittacidae	LC	Increasing
32	Senegal Parrot	*Poicephalus senegalus*	Psittaciformes	Psittacidae	LC	Decreasing
33	Green Parakeet	*Psittacara holochlorus*	Psittaciformes	Psittacidae	LC	Decreasing
34	Red-headed Lovebird	*Agapornis pullarius*	Psittaciformes	Psittacidae	LC	Decreasing
35	Budgerigar	*Melopsittacini undulates*	Psittaciformes	Psittacidae	LC	Increasing
36	Long-tailed Parakeet	*Psittacula longicauda*	Psittaciformes	Psittacidae	VU	Decreasing
37	Ostrich	*Struthio camelus*	Stuthioniformes	Struthionidae	DD	Unknown
38	Barn Owl	*Tyto alba*	Strigiformes	Tytonidae	LC	Stable
39	Hoopoe	*Upupa epops*	Bucerotiformes	Upupidae	LC	Decreasing

Science World Journal Vol. 20(No 3) 2025 https://dx.doi.org/10.4314/swj.v20i3.28
www.scienceworldjournal.org
ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)
Published by Faculty of Science, Kaduna State University

Keys:
IUCN - International Union for the Conservation of Nature;
Pop.- population;
CR - Critically Endangered
EN - Endangered
VU - Vulnerable
NT - Near Threatened
LC - Least Concern
DD - Data Deficient



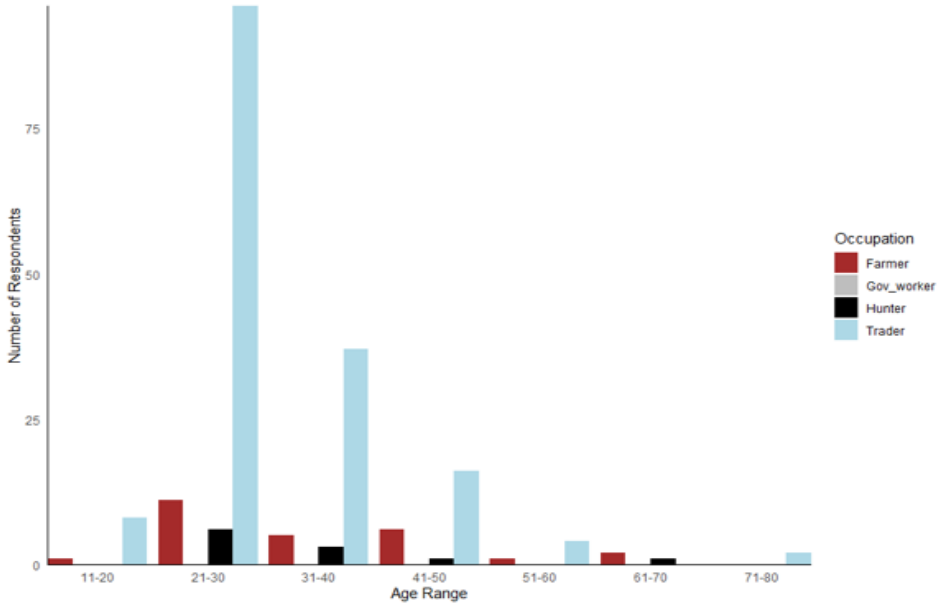


Fig. 3. Number of respondents within four major occupational grouping with active involvement in avian body parts trade based on age range.

Traded avian body parts and utilization

The avian body parts traded include the head, bone, feather, fat, stool, eye, intestine, blood, whole body, dead body, beak, and leg (Table 3). Among these, feathers were the most commonly traded body part, followed by the whole body. Of all respondents, 79.5% (n=159) reported having sold avian body parts, while 19.5% of traders admitted to personally using them. About 14.5% of the traded parts were used to cure specific ailments, and 72% were intended to bring specific fortunes. The most common methods of extracting these body parts were cutting or peeling.

Table 3: Frequencies of Avian body parts encountered in the ethnozoological survey of markets in Kaduna Metropolis.

Body Part	Frequency
Head	63
Feather	111
Fat	21
Whole body	106
Bone	4
Eye	10
Leg	8
Intestine	1
Dead body	14
Blood	1
Beak	2
Stool	16

Science World Journal Vol. 20(No 3) 2025 https://dx.doi.org/10.4314/swj.v20i3.28
www.scienceworldjournal.org
ISSN: 1597-6343 (Online), ISSN: 2756-391X (Print)
Published by Faculty of Science, Kaduna State University

Fig 4. A mixed feathers of some birds ready for market and a preserved body of a common bulbul. Photos by Asiya Bello (2023)

DISCUSSION

The involvement of more males (98.5 %) than females (1.5 %) in respondents to the investigations of the trade of avian body parts could be as a result of socio-cultural and religious belief of the dwellers of the study areas. Most respondents (males) in this study are prone to external chores on behalf of their households including shopping for food items and amongst others. The typical Kaduna metropolitan women (housewives and young maidens) are always at home away from outsiders; and may be rarely seen interacting with strangers and in places distant away from home. Again, the phobia for animals may also have contributed to why the business appeared, to be reserved for the males. This position is similar to that of observed by Antonio *et al*. (2025) in a study of socio-cultural study of the factors influencing threatened raptor species distribution in Nigeria amid human-wildlife conflicts. Antonio *et al*. (2025) recorded 86 % males' respondents against 14 % females. The sampled respondents in Antonio *et al*. (2025) were slightly higher and cut across more states than this study that is focused on a single state. Contrary to this study, was the study of Adebowale *et al*. (2025) that recorded more females (67.3%) at the forefront of the business in the south-west of Nigeria; plausibly for socio-culturally opposite reasons as was for the case with their fellow females in Kaduna metropolis. which was conducted in counterpart states around Nigeria that are not too distinct from Kaduna metropolis.

This study buttresses Nigeria's rank as foremost among the West African nations in leading the trade of avian body parts (Williams *et al*., 2014; Atuo *et al*., 2015; Buij *et al*., 2016). The involvement of respondents ranging from 18 to 76 years of age, with a mean age of 32 years in these trades, inveterate the active trends of the trade in Kaduna metropolis. Several respondents traded avian body parts within and outside the state and sometimes with other countries. This study recorded the least numbers of older aged respondents and traders of the avian body parts and products amongst comparable studies. This is likely pointing to the wide acceptance of these practices amongst the young and the middle aged respondents. It is probably worrisome for the survival of bird species and the long term conservation of biodiversity in general, as those who are supposed to be championing the course of nature are the same persons harming it.

Our record of only 39 bird species in this study, unlike higher numbers species in studies from the south-south and south-west regions of Nigeria (Atuo *et al.*, 2015; Adebowale *et al*., 2025) may be due to the secretive sales of avian body parts in Kaduna metropolis. In the other climes, avian body parts and wildlife body parts generally are sold in open markets. Buyers of avian body parts (wildlife body parts) in those study areas our move from door to door, collecting body parts from those who have them for sale. The lush vegetative nature of those regions also, may have contributed to their rich avian richness and biodiversity as a whole, necessitating higher numbers of species in display. However, it is likely that more species are persecuted, and are available for trades in Kaduna metropolis than were exposed to investigators on this research.

According to the IUCN Red List of Threatened Species (2023), twenty-one species (54%) recorded in our study area are experiencing population declines, while two species (5%) are already listed as unknown (Table 2). Several respondents reported that sourcing some species for trade has become increasingly difficult, likely reflecting these population declines. Notably, the Yellow-fronted Canary (*Crithagra mozambica*) the most frequently traded species in this study is also under threat. Although currently classified as "Least Concern" (Table 2), it is intensively hunted for decorative purposes in northern Nigeria, which may further impact its populations.

Bird species classified as "endangered" in this study were rarely displayed openly in markets; instead, they were typically kept hidden in homes or other secret locations. This practice suggests that traders are aware of the legal or social risks associated with trading endangered species, possibly due to enforcement pressure or increased public scrutiny. However, such concealment complicates monitoring and enforcement efforts, potentially allowing illegal trade to persist unchecked and further threatening already vulnerable populations.

Participation in the trade of avian body parts was found to be widespread across all communities within and surroundings of the study area. However, active involvement appears to be particularly high in communities around Unguwan Shanu, Kawo, and Unguwan Sarki, compared to those near Kasuwan Barci. Our findings also indicate that traders and farmers exhibit the highest levels of participation in this trade, whereas hunters reported less involvement, and no government workers were reported to be engaged (Fig. 3). Given this, traders and farmers likely pose the greatest threat to avian populations and should therefore be the primary focus of any conservation interventions aimed at curbing avian persecutions and the trade in avian body parts within the region (Table 1).

Respondents indicated that crows / ravens feathers are used in traditional family planning medicine, while vulture feathers are burned with certain substances during rituals. The trade in body parts of declining and threatened species may further accelerate their path toward extinction. Large-bodied birds such as vultures, eagles, hornbills, and hawks are already subject to hunting for food in many parts of Africa (Whytock *et al*., 2014; Taylor *et al*., 2015).

Both living and dried preserved birds were found near markets engaged in this trade. While some traders sold the birds without killing or consuming them, others used the birds for traditional medicine, rituals, sacrifices, or decoration (Table 3). The ongoing presence and use of both live and preserved birds in these contexts

reflect continued demand and exploitation. If left unaddressed, this clandestine trade could accelerate population declines and undermine conservation efforts for endangered species. Therefore, targeted interventions, enhanced law enforcement, and increased community engagement are essential to reduce the hidden trade and protect threatened bird populations.

Kaduna metropolis like other cities, Cross River (Atuo *et al.*, 2015), Plateau (Williams *et al*., 2021) and Ogun (Adebowale *et al*., 2025) is not behind in the trade of avian body parts for traditional practices. The perception of dwellers of the metropolis suggests the influence of dwellers in the distributions of avian species dead or alive. The perceived important roles many birds play in traditional medicine practices and fetish schemes (Antonio *et al*., 2025) has now, shaped the people's perceptions of certain species of birds. The avian body parts like herbs are used for physical or spiritual treatment of one ailment or the other through sacrifice, exorcism, incantation (Mahomoodally, 2013) and divination (Ezekwesili-Ofili & Okaka, 2019). This alternative source of remedy may be challenging to reverse, as the universal health coverage goal of the World Health Organization (2020) does not directly or indirectly negate these practices.

Conclusion

The use of avian body parts and products for aesthetic, ornamental, therapeutic and traditional medicinal purposes is not relegated to Nigeria. The cure of sicknesses or rituals that depend on the use of avian products and especially avian body parts is a practice that decline extant bird populations. For posterity sake, such practices that delight in avian persecutions should be discouraged vehemently as it has led to local extinction of some species and it is threatening global extinction of others species like the vultures. The vultures are no longer as common like they were decades gone. The earth is already losing out on the ecosystems services of consuming carcasses that spread diseases in human environment (Carucci *et al*., 2022).

Since, birds and other biodiversity are an integral part of human society; its uses, both consumptive and non-consumptive remains fundamental to cultures across the globe. In most traditional African societies; wildlife body parts performs presumed irreplaceable roles on the treatment of certain illnesses (zootherapy) and in spiritual and religious practice. This study provided new insight in to the perceptions of Kaduna metropolis dwellers and traders of avian body parts and products. The effective management of avian body parts and wildlife trade would need to go beyond enforcing regulations to empowering local communities with livelihood options that do not depend on wildlife exploitation. This will certainly reduce pressure on native species and extinction risk.

Acknowledgments

We are grateful to all respondents who provided information during interviews and to the market heads over the four markets for who received us hospitably during sampling and pacify their members to give us their maximum co-operations. We also are indebted to Asiya Bello for her invaluable assistance during data collection, Mr. Onah John and Mr. Conscience Ogunleye for their statistical thoughts contributed.

REFERENCES

Abellán, P., Carrete, M., Anadón, J.D., Cardador, L. & Tella, J.L. (2016). Nonrandom patterns and temporal trends in the transport, introduction and establishment of exotic birds in Spain and Portugal. *Diversity and Distributions*, 22: 263-273.

Adebowale, T. K., Ijose, O. A., Ibiyomi, B. B., Akintunde, O. O., Oduntan, O. O., Osunsina, I. O. O. & Shobowale, A. A. (2025). Utilization of fauna resources for therapeutic purposes as a barrier to species justice advocacy in Nigeria. *Front. Conserv. Sci*. 6:1551597. doi: 10.3389/fcosc.2025.1551597

Alves, R.R.N. & Rosa, I.L. (2010). Trade of animals used in Brazilian traditional medicine: trends and implications for conservation. *Human Ecology*. 38: 691-704.

Andong, F. A., Ossai, N. I., Echude, D., Okoye, C. O. & Igwe, E. E. (2023). Motives, other meat sources and socioeconomic status predict number of consumers with preference for two antelope species served in Enugu-Nigeria. *Global Ecology and Conservation*, *42 e02387*, https://doi.org/10.1016/j.gecco.2023.e02387

Antonio, B., Iniunam, A. I., Tende, T. and Chaskda, A. A. (2025). Threatened Raptor Species Distribution in Nigeria: Influence of Socio-Cultural Factors and Human–Wildlife Conflicts *Diversity*, 17(9), 602; https://doi.org/10.3390/d17090602

Baker, S.E., Cain, R., van Kesteren, F., Zommers, Z.A., D'Cruze, N. & Macdonald, D.W. (2013). Rough trade: Animal welfare in the global wildlife trade. Bioscience 63: 928-938.

BirdLife International (2024). Birds in trade – BirdLife scientists lead the first global overview. https://share.google/97zZvHwAA6rzXcnfl.

Borsky, S., Hennighausen, H., Leiter, A. & Williges, K. (2020). CITES and the zoonotic disease content in international wildlife trade. *Environmental and Resource Economics* 76: 001-1017.

Buij, R., Nikolaus, G., Whytock, R., Ingram, D.J. & Ogada, D. (2016). Trade of threatened vultures and other raptors for fetish and bushmeat in West and Central Africa. Oryx 50: 606-616.

Cardoso, P., Amponsah-Mensah, K., Barreiros, J.P., Bouhuys, J., Cheung, H., Davies, A., Kumschick, S., Longhorn, S.J., MartínezMuñoz, C.A., Morcatty, T.Q., Peters, G., Rippe, W.J., RiveraTéllez, E., Stringham, O.C., Toomes, A., Tricorache, P. & Fukushima, C.S. (2021). Scientists' warning to humanity on illegal or unsustainable wildlife trade. *Biological Conservation* 263: 109-341.

Carucci, T., Whitehouse-Ted, K., Yarnell, R.W., Collins, A., Fitzpatrick, F., Botha, A. & Santangeli, A. (2022). Ecosystem services and disservices associated with vultures: A systematic review and evidence assessment. *ScienceDirect* 56: 101447.https//doi.org/10.1016/j.ecoser.2022.101447.

Challender, D., Cremona, P., Masch, K., Robinson, J., Pavitt, A., Scott, J., Hoffmann, R., Joolia, A., Oldfield, T., Jenkins, R., Conde, D., Hilton-Taylor, C. & Hoffmann, M. (2023). Identifying species likely threatened by international trade on the IUCN Red List can inform CITES trade measures. bioRxiv, https://doi.org/10.21203/rs.3.rs-1858556/v1.

Donald, P. F., Fernando, E., Brown, L., Busana, M., Butchart, S. H. M., Chng, S., de la Colina, A., Ferreira, J. M., Jain, A., Jones, V. R., Lapido, R., Malsch, K., McDougall, A., Muccio, C., Nguyen, D., Outhwaite, W., Petrovan, S. O., Stafford, C., Sutherland, W. J., Tallowin, O. & Safford, R. (2024). Assessing the global prevalence of wild birds in trade. *Conservation Biology*, 38(5): https://doi.org/10.1111/cobi.14350.

El Hajj, M., & Holst, L. (2020). Herbal medicine use during pregnancy: a review of the literature with a special focus on sub-Saharan Africa. *Front. Pharmacol*. 11. doi: 10.3389/fphar.2020.00866.

Ezekwesili-Ofili, J. O. & Okaka, A. N. C. (2019). *Herbal Medicine in African Traditional Medicine Book*, Chapter 10. Intech Open Access, 191-214.

IUCN (2023). The IUCN Red List of Threatened species. Version 2023-1. ‹https://www.iucnredlist.org› ISSN 2307-8235.

Izah, S. C. & Seiyaboh, E. I. (2018). "Challenges of wildlife with therapeutic properties in Nigeria; a conservation perspective," *MedCrave Group*, https://doi.org/10.15406/ijawb.2018.03.00096

Mahomoodally. M. F. (2013). Traditional Medicine in Africa: An Appraisal of Ten Potent African Medicinal Plants, *Evidence Based Complement Alternative Medicines*: 1-14. 10.1155/2013/617459.

Matthew. D. O., Karlsson, E., Izang, J. A., Isberg, L., Naslund, J., Sjodin, A., Ottosson, U., Lwande, O. W. & Waldenstrom, J. (2025). First detection of Sindbis virus in wild birds in Nigeria. *Scientific reports*, 10pp www.nature.com/scientificreports.

Marthy, W. & Farine, D.R. (2018). The potential impacts of the songbird trade on mixed-species flocking. *Biological Conservation* 222: 222-231.

Morton, O., Scheffers, B.R., Haugaasen, T. & Edwards, D.P. (2021). Impacts of wildlife trade on terrestrial biodiversity. *Nature Ecology & Evolution* 5: 540-548.

Rush, E.R., Dale, E. & Aguirre, A.A. (2021). Illegal wildlife trade and emerging infectious diseases: Pervasive impacts to species, ecosystems and human health. *Animals*, 11: 10.3390/ani11061821.

Souviron-Priego, L., Román, M.A., Olivero, J., Vargas, J.M. & Fa, J.E. (2018). The legal international wildife trade favours invasive species establishment: The monk and ring-necked parakeets in Spain. *Ardeola* 65: 233-246.

Taylor, G., Scharlemann, J., Rowcliffe, M., Kümpel, N., Harfoot, M., Fa, J., Melisch, R., Milner Gulland, E., Bhagwat, S. & Abernethy, K. (2015). Synthesising bush meat research effort in West and Central Africa a new regional data base. *Biology Conservation*. 181: 199–205.Whytock, R.C., Buij, R., Virani,

M.Z. & Morgan, B.J. (2014). Do large birds experience previously undetected levels of hunting pressure in the forests of Central and West Africa? *Oryx* 1–8.

World Health Organization (2020). What is universal health coverage? https://www.who.int/news-room.

Williams, M.M., Ottosson, U., Tende, T. & Deikumah, J.P. (2021). Traditional belief systems and trade in vulture parts are eating to the eradication of vultures in Nigeria: an ethnozoological study of north-central Nigeria. *Ostrich* 92: 194-202.

Williams, V.L., Cunningham, A.B., Bruyns, R.K & Kemp, A.C. (2012). Birds of a feather: quantitative assessments of the diversity and levels of threat to birds used in African traditional medicine. In: Alves, R.R.N. & Rosa, I.L. (Eds.), Animals in Traditional Folk. Medicine. *Springer*, pp 383–420.