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ARTICLE

Some Causes of Mortalities in Captive Wild Animals in Ibadan, Nigeria: A Retrospective Study

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SUMMARY

A retrospective study was conducted to determine the number of mortalities in wild animal species kept at University of Ibadan zoological garden, Agodi zoological garden, Ibadan and wild animals kept in private homes in Ibadan, South-West Nigeria between 2007 and 2012. Causes of death were determined during post mortem examination at Mokola Veterinary Hospital, Ibadan and the University of Ibadan Veterinary Teaching Hospital. A total of 127 deaths were reported during the study period. Annual increases in mortalities were reported while majority of the deaths occurred during the rainy season. There was a significant positive correlation between monthly mortalities and average monthly rainfall for Ibadan ($r=0.62$, $P<0.05$). The highest mortalities were reported in avians (29.13%), followed by reptiles (27.56%), primates (16.53%), carnivores (13.39%), rodents and ruminants (each with6.30%) and porcine (0.79%). Causes of mortalities were unknown in more than 17% of the cases. The known major causes include, injuries (23.62%), Gastroenteritis/helminthosis (14.96%), invasion by soldier ants (9.45%), transportation stress (8.66%), old age (7.87%), malnutrition (6.30%), paralysis (3.15%), drowning (2.36%) and others (6.32%). To achieve significant reduction in mortalities ofcaptive wild animals, managers of zoological gardens should adopt proper housing and feeding, routine vaccination, deworming, hygiene and sanitation and seek prompt veterinary attention when animals are sick.

KEY WORDS: Wild animals, Mortalities, Injuries, zoos.

INTRODUCTION

Wild animals are found in virtually all natural ecosystems and habitats throughout the world and in zoological gardens, animal parks and private collections and they are affected by human activities positively or negatively (Reichenbach, 2002).Sharma et al (2014) has observed that wild animals do act as reservoirs for a number of virulent pathogens which can be transmitted to man, to domestic animals and affect international trade in animals and animal products. Reports of high mortalities in zoos and free living wild animals have often causes serious concernsamong conservationists since zoos are meant to play a major role in their conservation (Russel, 2006). Fox's report of necropsies performed in more than 6,000 captive mammals and birds at the Philadelphia Zoo was said to be the first publication on causes of mortalities in zoo animals (Fox,

1923; Aguirre, 2009). Smith (2009) also identified and described 110 diseases of zoo and exotic animals. Mathision and Huw (1998) observed that mortalities in wild animals could be due to infectious agents such as parasitic, bacterial, fungal, viral and rickettsial or non-infectious causes such as injuries, poisoning, congenital abnormalities, neoplasm and malnutrition.

It has been observed that published reports of pathological conditions in wild/zoo animals is generally scanty and sporadic in developing countries (Sharma et al, 2014).Isoun et al (1972) reported the diagnosis of several diseases from carcasses of 77 dead wild animals at the Department of Veterinary Pathology, University of Ibadan between 1967 and 1971. The significance of these diseases to public health and epidemiology was also discussed.The mortalities of many wild animals at the University of Ibadan zoological gardens between 1969 and 2006 were due to parasitic diseases, pneumonia, gastroenteritis, neoplastic conditions, malnutrition, injuries and poisoning (Anga and Akpavie, 2002; Emikpe et al 2002; Emikpe et al 2007). Kumar, et al (2012) reported the death of 113 or 79.02% of 143 free range wild animals rescued from different locations in Shivalik hills of Himachal Pradesh, India between March 2004 and June 2011. A retrospective study of mortalities in zoo and wild animals in India based on necropsy study also showed various causes of mortalities in 380 animals between 1999 and 2013 (Sharma et al, 2014).

This study was conducted to determine the pattern and causes of mortalities in captive wild animals in two zoological gardens and in private collections in Ibadan between 2007 and 2012.

MATERIALS and METHODS

The Study Area

The study was conducted in Ibadan (lat.7.3907N and longitude 3.89 23E), the current capital of Oyo State in Nigeria.Ibadan with an estimated population of 1,338,659 according to the 2006 census is the third largest metropolitan city in Nigeria after Lagos and Kano (FGN, 2007). The mean maximum temperature is 26.460C minimum 21.420C and a relative humidity of 74.55. The annual mean total rainfall for Ibadan is 1,420.06mm falling in approximately 109 days and with clear raining season from March to October and a dry season from November to February.

Ibadan has two zoological gardens located at the University of Ibadan and at Agodi. A recent study by Adetunji and Ogunlami (2012) showed that UI Zoological garden and Agodi gardens have a population of 173 and 13 captive wild animals, respectively. In addition, clinical records at the Veterinary Teaching Hospital and Mokola Veterinary Hospital showed that more than 30 clients who keepsuch exotic animals as parrots, monkeys, chimpanzee, crocodiles, tortoise, antelopes, hyena as pets in their homes patronise the veterinary hospitals.

Data Collection

Records of mortalities in wild animals in Ibadan covering a period of sixyears (2007-2012) were obtained from the records of the Wildlife Clinic of the Veterinary Teaching Hospital and Mokola Veterinary Hospital in Ibadan. The animals were from the Zoological gardens at Agodi and the University of Ibadan (UI) as well as from private homes. Causes of mortalities were determined from the reports of post-mortem examinations. The mean monthly rainfall data for Ibadan city were obtained from the Department of Geography, University of Ibadan.

In consideration of the disparity in the life spans of the various animal species, animals that have reached puberty were regarded as adults, those that have not

were regarded as young.

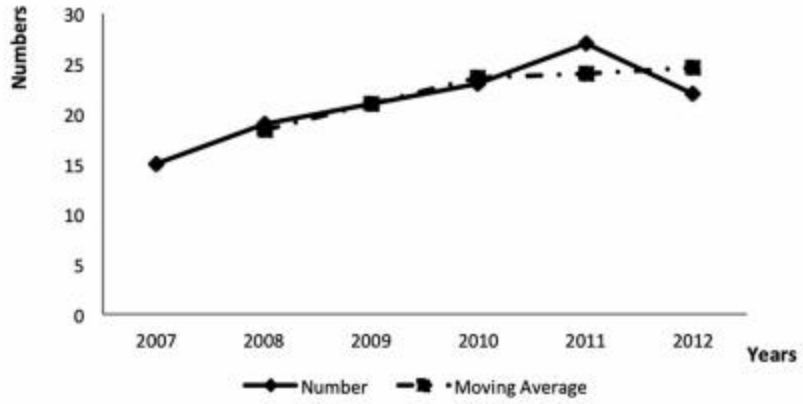
Statistical Analysis

Data collected were analysed statistically as described by Bamgboye (2008). Descriptive analysis were carried out using tables and proportions (in percentages). Chi-square (X2) was used to test for differences in mortalities based on ages, sexesand climatic seasons. Relationships between mean mortalities and mean monthly rainfall were determined using correlation coefficient. Values of $p<0.05$ were considered significant.

RESULTS

The deaths of 127 wild animal species were reported in Ibadan during the period (2007-2012) covered by the study(annual mean=21.17). Eighty-seven(68.50%) of the mortalities were from animals at the University of Ibadan Zoological garden, 30 (23.62%) from Agodi

FIGURE 1: Annual mortalities of captive wild animals reported in Ibadan (2007-2012)



zoological garden and 10 (7.87%) were from animals owned by individuals. The privately owned animals were three Red patas (Erythrocebus patas),two Mona monkeys (Cercopethicus mona), three African grey parrots (Psittacuserithacus) and two African giant tortoises (Geochelonia gigantic). Thirty-seven (29.13%) of the animals were avians, 35 (27.56% were reptiles, 21 (16.53%) were primates, 17 (13.39%) were carnivores, 8 (6.30% each) were rodents and ruminants while 1 (0.79%) was porcine (Table I). Annual mortalities were on the increase (Figure 1).

Table I: Mortalities of captive wild animals reported in Ibadan, Nigeria (2007-2012)

Year	Avians	Carnivores	Primates	Porcine	Reptiles	Rodents	Ruminants	Total
2007	6	1	3	0	3	1	1	15
2008	7	3	5	0	0	1	3	19
2009	4	3	6	0	6	1	1	21
2010	3	1	2	0	17	0	0	23
2011	6	7	2	1	5	5	1	27
2012	11	2	3	0	4	0	2	22
Total	**37**	**17**	**21**	**1**	**35**	**8**	**8**	**127**
Mean	**6.17**	**2.83**	**3.50**	**0.17**	**5.83**	**1.33**	**1.33**	**21.17**
As % of total	**29.13**	**13.39**	**16.53**	**0.79**	**27.56**	**6.30**	**6.30**	**100**

mortalities=1.57)(P<0.05)(Table II). There is significant positive correlation (r=0.64, P<0.05), between mortalities and average monthly rainfall data for Ibadan.There was no significant difference in mortalities between male and female animals but mortalities were significantly higher (P>0.05) in adults than young animals (Table III).

TABLE II: A comparison of the number of mortalities in captive wild animals in Ibadan during different seasons of the year (2007 - 2012).

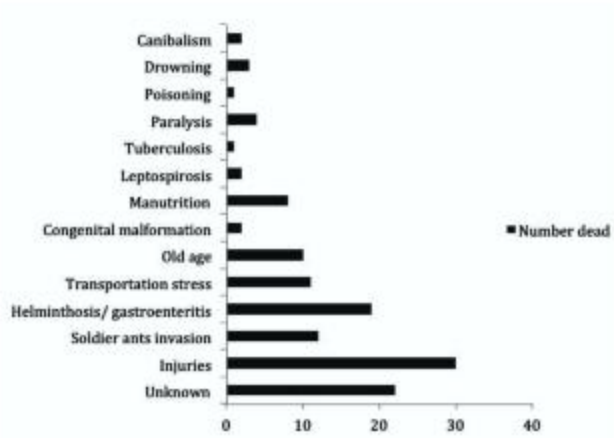
Class of animals	Rainy Season (April-October)		Dry Season (November - March)		Total
	No.	%	No.	%	No.
Avians	27	72.97	10	27.03	37
Carnivores	12	70.59	5	29.41	17
Porcine	1	100	0	0	1
Primates	12	57.14	9	42.86	21
Reptiles	20	57.14	15	42.86	35
Rodents	4	50.00	4	50.00	8
Ruminants	4	50.00	4	50.00	8
Total	**80**	**62.99**	**47**	**37.01**	**127**
Mean monthly	**1.90**		**1.57**		**1.76**

Table III: Incidence of mortalities in relation to sex and age group of captive wild animals

Kind of animal	Sex	Total Dead	No.Dead	
			Youngs	Adults
Avians	Male	12	5	7
	Female	25	7	18
	Sub-total	37	12 (32.43)	25 (67.57)
Carnivores	Male	6	2	4
	Female	11	3	8
	Sub-total	17	5 (23.81)	12 (76.19)
Porcine	Male	0	0	0
	Female	1	0	1
	Sub-total	1	0 (0)	1 (100)
Primates	Male	7	2	5
	Female	14	3	11
	Sub-total	21	5 (16.67)	16 (76.19)
Reptiles	Male	9	3	6
	Female	26	7	19
	Sub-total	35	10 (28.57)	25 (71.43)
Rodents	Male	4	1	3
	Female	4	0	4
	Sub-total	8	1 (12.50)	7 (87.50)
Ruminants	Male	4	1	3
	Female	4	0	4
	Sub-total	8	1 (12.50)	7 (87.50)
Total		**127**	**34 (26.77)**	**93 (73.23)**

The causes of mortalities were not known in 22 (17.32%) of the cases. The known causes include, traumatic injuries (23.62%), gastroenteritis/helminthosis (14.96%), invasion by soldier ants (9.45%), transportation stress (8.66%), old age (7.87%), malnutrition (6.30%), paralysis (3.15%), drowning (2.36%), cannibalism, leptospirosis and congenital malformation (with 1.58% each), tuberculosis and poisoning(with 0.79% each) (Figure 2).

FIGURE 2: Causes of mortalities ofcaptive wild animals in Ibadan, Nigeria (2007-2012)



DISCUSSION

Although the exact population of wild animals in Ibadan city is not known due to theunknown numbers that are being kept as pets in private homes, the annual mean mortalities of 21.17 reported in this study isconsidered to be high when compared to the mean annual mortalities of 10.4 reported by Angar and Akpavie (2002)in one of zoosunder study.

The causes of a high proportion of the mortalities (17.32%) were not known mainly because the carcasses were either not submitted for post-mortem examinations or were submitted late and in state of advanced autolysis. This is an indication of the low importance attached to post-mortem examinations for animals. Previous study also showed similar poor and declining acceptance of autopsy in human cadaverin Ibadan due to aesthetic, religious and local cultural believes and practices (Oluwasola, et al, 2009).

The highest cause of mortalities was traumatic injuries which accounted for 23.62% of the mortalities. A similar observation was made by Sharmar et al (2012) at an Indian zoo. Adetunji (2010) has observed that such injuries often result from poor housing design, leading to discomfort and boredom and thereby causing the animals to exhibit such vices as cage fighting and self-inflicted injuries.Such causes of mortalities as drowning, malnutrition, transportation stress and invasion by soldier ants are easily preventable. Even infectious causes such as helminthosis, tuberculosis and leptospirosis are largely preventable with chemo or immuno prophylaxis and application of biosecurity measures.

To achieve significant reduction in mortalities in wild animals,managers of zoological gardens should properly house, feed their animals and adopt appropriate biosecurity measures. They should invite veterinarians to carry out routine vaccinations, deworming and prompt treatment of sick animals. Government should provide appropriate legislation to regulate keeping of wild animals in private homes since such animals could injure people and transmit zoonotic diseases.

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