

## The Conditional State of Primates in Selected Zoological Garden in Nigeria: A Survey

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### ABSTRACT

Parasitic diseases often represent a major concern in zoo animals for the high environmental contamination due to the maintenance of animals in confined areas. In wild conditions, animals have some natural resistance against parasitic diseases and there is a state of equilibrium between the parasite and the host and it seldom led to harmful infection unless stressed. The aim of the research work is on the conditional state of primates in selected zoological garden primates in selected Zoological Gardens in Nigeria. Survey method was adapted for this research 87 questionnaires was distributed among staff taking care of the zoological gardens. The findings of this work shows, that captive primates are housed according to their species. From the responses, the nutritional status of the captive primates is moderate, based on their physical appearance, and shows 34 respondents, representing (39.1%) Agreed, 29 respondents, representing (33.3%) strongly agreed that the captive primates are constantly dewormed against parasitic infections, while 20 respondents, representing (4.6%) strongly disagreed. On the accountability of the funds, 36 respondents, representing (41.4%) Agreed, 18 respondents, representing (20.7%) strongly agreed, while 24 respondents, which represents (27.6%) disagreed and 9 representing (10.3%) strongly disagreed based on the data, there is adequate accountability of the funds allocated to zoos.

**Keywords:** Parasitic disease, Nutritional status, Zoological garden.

### Introduction

Collections of wild animals have been in existence since antiquity. The history of modern zoos, however, started some 200 years ago with the creation of the first public zoos. Since that time large numbers of zoos have been established in all parts of the world, and a great diversity has arisen among these institutions, which now vary from zoos with general collections to specialized institutions such as aquaria, bird parks, primate zoos, and safari parks (Adedokun, et al., 2002).

The predecessor of the zoological garden is the menagerie, which has a long history from the ancient world to modern times. The oldest known zoological collection was revealed during excavations at Hierakonpolis, Egypt in 2009, of a ca. 3500 BCE menagerie. The exotic animals included hippopotami, hartebeest, elephants, baboons and wildcats. King Ashur-bel-kala of the Middle Assyrian Empire created zoological and botanical gardens in the 11<sup>th</sup> century BCE. In the 2<sup>nd</sup> century BCE, the Chinese Empress Tanki had a "house of deer" built, and King Wen of Zhou kept a 1,500-acre (6.1 km<sup>2</sup>) zoo called Ling-Yu, or the Garden of Intelligence. Other well-known collectors of animals included King Solomon of the Kingdom of Israel and Judah, Queen Semiramis and King Ashurbanipal of Assyria, and King Nebuchadnezzar of Babylonia. By the 4th century BCE, zoos existed in most of the Greek city states; Alexander the Great is known to have sent animals that he found on his military expeditions back to Greece. The Roman emperors kept private collections of animals for study or for use in the arena, the latter faring notoriously poorly. The 19<sup>th</sup>-century historian W. E. H. Lecky wrote of the Roman games, first held in 366 BCE (Encyclopedia, 2017).

Charlemagne had an elephant named Abul-Abbas that was given to him by the Abbasid Caliph. Henry I of England kept a collection of animals at his palace in Woodstock which reportedly included lions, leopards, and camels. (Blunt, 1976) The most prominent collection in medieval England was in the Tower of London, created as early as

1204 by King John I. Henry III received a wedding gift in 1235 of three leopards from Frederick II, Holy Roman Emperor, and in 1264, the animals were moved to the Bulwark, renamed the Lion Tower, near the main western entrance of the Tower. It was opened to the public during the reign of Elizabeth I in the 16<sup>th</sup> century. During the 18<sup>th</sup> century, the price of admission was three half-pence, or the supply of a cat or dog for feeding to the lions. Blunt, (1976)- The animals were moved to the London Zoo when it opened. Aztec emperor Moctezuma had in his capital city of Tenochtitlan a "house of animals" with a large collection of birds, mammals and reptiles in a garden tended by more than 600 employees. The garden was described by several Spanish conquerors, including Hernán Cortés in 1520. After the Aztec revolt against the Spanish rule, and during the subsequent battle for the city, Cortés reluctantly ordered the zoo to be destroyed (Blunt 1976).

Primates are a diverse group of animals represented by humans, monkeys, prosimians and apes. They share some common characteristics such as large brain size, keen vision, dexterous hands and a generalized skeleton for great physical agility (Pourrut et al., 2011). They also tend to have smaller litters than other animals, devoting more care and attention to the rearing of their offsprings. The unique combination of traits found in the primates distinguishes them from other animals (Lim et al., 2011). Modern contemporary scientific theories and Charles Darwin's theory of evolution suggests that millions of years ago some animals developed characteristics to be the precursors of later primates including humans (Mbaya et al., 2009). Darwin posited that humans share a common ancestor (now extinct) with living apes. They evolved along lines completely different from modern gorillas and chimpanzees. (Rana, et al., 2015)

### Section 'A' of the questionnaire

**Table 1.** Demographic Characteristics of the Respondents

Characteristics	Variable	Frequency	Percent (%)
1. Sex	Female	25	28.7
	Male	62	71.3
	<b>Total</b>	<b>87</b>	<b>100</b>
2. Age	15-20 years	8	9.2
	21-30 years	34	39.1
	31-40 years	31	35.6
	41 years and above	14	16.1
	<b>Total</b>	<b>87</b>	<b>100</b>
3. Location	Jos	30	34.5
	Kano	28	32.2
	Ibadan	29	100
	<b>Total</b>	<b>87</b>	<b>100</b>

4. Duration	5- 10 years	43	49.4
	10 – 15 years	23	26.4
	15-25 years	15	17.2
	25 years and above	6	7
	<b>Total</b>	<b>87</b>	<b>100</b>

**Source:** Field survey, July, 2021

The above analysis depicts that 62 representing (71.3%) of total respondents in the selected zoological gardens are male, while 25 representing (28.7%) respondents are female.

The above data, clearly demonstrates the analysis of age group of respondent falls between the age of 15-20 years; 8 representing (9.24%), 21-30 years, 34 representing (39.1%) of the respondents, 31 representing (35.6%) 31-40 years and 14 representing (16.1%) of the respondents are between the age of 41 years and above.

On the number of years working in the zoo, the data presentation shows 43 representing (49.4%) of the respondents working in the zoos for 5-10 years, 23 representing (26.4%) 10 – 15 years, 15 representing (17.2%) 15 - 25 years and 6 representing (7%) falls between 25 years above.

### Section 'B'

**Table 2.** Housing Condition of the Zoo

S/N	Statement	Opinion/Frequency (%)			
		A	SA	D	SD
1.	Number of Primates are more than the carrying capacity of the Zoo	21(24.1)	10(11.5)	44(50.6)	12(13.8)
2.	The rooms for each set of the captive primates are adequate	49(56.3)	26(30)	9(10.3)	3(3.4)
3.	The captive primate rooms are with adequate roof.	50(57.5)	28(32.2)	7(8.0)	2(2.3)
4.	All primates are house base on their species	38(43.7)	35(40.2)	10(11.5)	4(4.6)

**Source:** Field survey, July, 2021

**Key:** A = Agreed

SA = Strongly Agreed

D = Disagreed

SD = Strongly Disagreed

From the above statistical analysis 21 respondents which represent 24.1% agreed with the statement, 10 representing (11.5%) strongly agreed, 44 representing (50.6%) disagreed with the statement, while 12 representing (13.8%) strongly disagreed.

The observation shows that the captive primates are not more than the carrying capacity of the selected zoos.

From the above analysis on items 2, shows that 49 respondents, representing (56.3%) Agreed, 26 representing (30%) strongly agreed. 9 respondents, representing (10.3%) disagreed and 3 respondents representing (3.4%) strongly disagreed the above shows, the rooms for each set of captive primates are adequate.

Item 3 shows that, 50 respondents, representing (57.5%) Agreed with the stamen, 28 respondents representing (32.2%) strongly agreed, 7 representing (8.0%) disagreed, while 2 representing (2.3%) strongly agreed. Majority of the respondents agreed that the roof of the rooms is adequate.

Item 4, shows that 38 respondents, which represents (43.7%) agreed, 35 respondents representing (40.2%) strongly agreed, 10 respondents, representing (11.5%) disagreed and 4 respondents, which represents (4.6%) strongly disagreed. This shows, the captive primates are housed according to their species.

### Section 'C'

**Table 3.** Feeding/Nutritional Quality of Food for the Primates

S/N	Statement	Opinion/Frequency (%)			
		A	SA	D	SD
1.	The captive primates are adequately fed	46(52.9)	20(23)	16(18.4)	5(5.7)
2.	The nutrients of the foods are adequate	52(59.8)	21(24.1)	13(15)	1(1.1)
3.	The meals are served at the right time	50(57.5)	27(31.0)	10(11.0)	0(0)
4.	The nutritional status of the primates are moderate	37(42.5)	28(32.3)	11(12.6)	11(12.6)

**Source:** Field survey, July, 2021

**Key:** A = Agreed

SA = Strongly Agreed

D = Disagreed

SD = Strongly Disagreed

46 respondents, representing (52.9%) Agreed, 20 representing (23%) strongly agreed, 16 representing (18.4%) disagreed, while 5 representing (5.7%) strongly disagreed with the responses, it showed that, the captive primates are adequately fed. 52 representing (59.8%) agreed with the statement on item 2, 21 respondents, representing (24.1%) strongly agreed, 13 respondents representing (15%) disagreed and 1 respondents strongly disagreed. The observation shows the nutrients of the foods are adequate.

On the item 3, 50 respondents, representing (57.5%) Agreed that the meals are served at the right time, 27 respondents, which represents (31.0%) strongly agreed, 10 respondents, representing (11.5%) disagreed, while there was no responses on the strongly disagreed. The above shows the meals are served at the right time.

Responses on item 4, shows that 37 respondents, representing (42.5%) agreed, 28 respondents, which represents (32.3%) strongly agreed, 11 representing (12.6%) each disagreed and strongly disagreed. From the responses, the nutritional status of the captive primates are moderate, based on their physical appearance.

### Section 'D'

**Table 4.** Primate's health care management practices in the Zoos

S/N	Statement	Opinion/Frequency (%)			
		A	SA	D	SD
1.	The zoo has clinic and trained/certified Veterinary Doctor	39(44.8)	31(35.6)	13(15)	4(4.6)
2.	The cleaners / keepers have adequate personal protective devices e.g. boots, apron, Hand gloves.	36(41.4)	21(24.1)	21(24.1)	9(10.4)
3.	The rooms of the captive primates are cleaned daily.	36(41.4)	36(41.4)	7(8.0)	8(9.2)
4.	The captive primates are adequately treated when sick.	39(44.8)	31(35.6)	15(17.2)	2(2.4)
5.	The captive primates are constantly dewormed against parasitic infections	34(39.1)	29(33.3)	20(23)	4(4.6)

**Source:** Field survey, July, 2021

**Key:** A = Agreed

SA = Strongly Agreed

D = Disagreed

SD = Strongly Disagreed

The observation shows 39 respondents, representing (44.8%) agreed to the item 1, 31 respondents, which represents (35.6%) strongly agreed, 13 respondents, representing (15%) disagreed, 4 respondents, representing (4.6%) strongly disagreed. This shows the zoos have clinic and trained / certified veterinary doctor. On item 2, 26 respondents, representing (41.4%) Agreed with the statement, 21 which represent (24.1%) strongly agreed, while 21 respondents representing (24.1%) disagreed and 9 respondents, representing (10.4%) strongly disagreed. It shows the cleaners / keepers have adequate protective devices.

36 respondents, which represents (41.4%) agreed, 36 respondents, representing (41.4%) strongly agreed that the rooms of the captive primates are cleaned daily, while 7 respondents, representing (8%) disagreed and 8 representing (9.2%) strongly disagreed.

From the data on item 4, 39 respondents, representing (44.8%) agreed, 31 respondents representing (35.6%) strongly agreed, that captive primates are adequately treated when sick, while 15 respondents, representing (17.2%) disagreed and 2 representing (2.4%) strongly disagreed.

The observation on item 5, shows 34 respondents, representing (39.1%) Agreed, 29 respondents, representing (33.3%) strongly agreed that the captive primates are constantly dewormed against parasitic infections, while 20 respondents, representing (4.6%) strongly disagreed.

### Section 'E'

**Table 5.** Manpower/Budgetary fund allocation for maintaining the Zoos

S/N	Statement	Opinion/Frequency (%)			
		A	SA	D	SD
1.	The Zoo has adequate skilled and unskilled staff e.g. Veterinary Doctors, Zoo keepers / Attendance	39(45)	34(39)	7(8)	7(8)
2.	Most of the Zoo staff are daily rated staff	41(47.1)	13(14.9)	26(29.9)	7(8)
3.	The Zoo generally has competent staff in terms of qualification	38(43.7)	34(39.1)	9(10.3)	6(6.9)

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4.	The staff(s) have adequate job security and satisfaction.	33(38)	20(23)	23(26.4)	11(12.6)
5.	The budget allocation for the maintenance of the zoo is adequate.	32(36.8)	12(13.8)	25(28.7)	18(20.7)
6.	The zoo has adequate funds for Health care of the captive primates and staff	37(42.5)	13(15)	26(29.9)	11(12.6)
7.	The Budgetary Allocation for feeding the captive primates and staff is adequate	36(41.4)	18(20.7)	24(27.6)	9(10.3)
8.	There is adequate accountability of the funds	36(41.4)	18(20.7)	24(27.6)	9(10.3)

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**Source:** Field survey, July, 2021

**Key:** A = Agreed

SA = Strongly Agreed

D = Disagreed

SD = Strongly Disagreed

39 respondents, representing (45%) agreed to the statement on the item 1, 34 respondents representing (39%) strongly agreed, 7 respondents representing (8%) each disagreed and strongly disagreed with the statement, it shows the zoo have adequate manpower.

Item 2, 41 respondents, representing (47.1%) agreed that most of the Zoo staff(s) are daily rated, 13 respondents, which represents (14.9%) strongly agreed, 26 respondents, representing (29.9%) disagreed with the statement and 7 representing (8%) strongly disagreed. From the data, it shows that, most of the staff(s) of the Zoos are daily rated staff(s).

Item 3, 38 respondents, representing (43.7%) agreed that the Zoos Generally have competent staff in terms of qualification, 34 respondents, representing (39.1%) strongly agreed, 9 representing 10.3% disagreed and 6 respondent representing (6.9%) strongly disagreed.

On the staff Job security and satisfaction 33 respondents, which represents (38%) agreed, 20 respondent,

representing (23%) strongly agreed, 23 respondents, representing (26.4%). Disagreed and 11 representing (12.6%) strongly disagreed. The responses showed that, the staff(s) have adequate Job security and satisfaction.

On item 5, 32 respondents, representing (36.8%) agreed that the budget allocation for the maintenance of the zoo is adequate 12 respondents strongly agreed, while 25 respondents, representing (28.7%) disagreed and 18 representing (20.7%) strongly disagreed. Based on the data, it shows the budget allocation for the maintenance of the zoos are adequate.

The responses on item 6, showed that, 37 respondents, representing (4.25%) Agreed with the statement, 13 respondents representing (15%) strongly agreed, 26 representing (29.9%) disagreed and 11 respondents, representing (12.6%) strongly disagreed. This shows, there are adequate funds for health care of the captive primates and staff(s) on the budgetary allocation, 36 respondents representing (41.4%) agreed that, it was adequate, 18 respondents, representing (20.7%) strongly agreed, while 24 respondents which represents (27.6%) disagreed and 9 representing (10.3%) strongly disagreed. It shows that the budgetary allocation for feeding the captive primates are adequate. On the accountability of the funds, 36 respondents, representing (41.4%) Agreed, 18 respondents, representing (20.7%) strongly agreed, while 24 respondents, which represents (27.6%) disagreed and 9 representing (10.3%) strongly disagreed based on the data, there is adequate accountability of the funds allocated to zoos.

## **Conclusion**

The common and prevalence of parasites in primates housed in the zoos varies according to husbandry practices, disease prophylaxis and anthelmintic treatment administered efficacious control measures have been taken by the zoos to reduce the Environmental contaminations, such as frequent dung removal. In addition, the primates are treated with anthelmintic drugs to prevent and control the parasite burdens. Many parasites are known to be transmissible between non-human primates and humans; in Zoos, there is an increased risk of parasite transmission from primates to visitors or keepers as a result of direct or indirect contact through contaminated food, water and hands. The parasite detected in this study is among those known to represent Human public Health concerns. The results shows highlight that proper precautions should be taken by the Zoological gardens with large number of animals to mitigate against parasite transmission. This includes adhering to basic hygiene standards, undertaking regular deworming of animals and ensuring cages are cleaned and disinfected daily.

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### ***Competing Interests Statement***

*The authors declare no competing financial, professional and personal interests.*

### ***Consent for publication***

*Authors declare that they consented for the publication of this research work.*

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