Original Research Article

~~The~~ A Comparative Study of the Daily Activity Patterns of Dog Faced Baboon *(Papio anubis)* in Captivity ~~at: A Case Study of~~ the Kano University Zoo and Kano Zoological Garden

REVIEW

ABSTRACT

Aim: This study compare the daily activity patterns of dog faced baboon (*Papio anubis*) in Kano University of Science and Technology Wudil Zoo and Kano Zoological Garden.

Materials and methods: The~~is~~ study ~~of the activities of dog faced baboon (*Papio anubis*) in Kano University of Science and Technology Wudil Zoo and Kano Zoological Garden~~ was carried out daily ~~from~~ between 6:00am to 6:00pm ~~between~~ from December 2016 to January 2017. The observation in the activity patterns ~~of dog face baboon (*Papio anubis*)~~ were recorded ~~in~~ on ~~the~~ recording sheet, observation is done three times a week at 20 minutes interval in each of the cages under study.

Results: The findings on activity pattern of dog faced baboon (*Papio anubis*) in captivity shows that the day time activities decrease from morning to evening. 47.5% of the activities which include resting, movement and feeding were carried out in the morning, followed by afternoon and evening with 33.3% and 19.1% activities respectively. The results from~~of~~ the ~~activities of dog faced baboon in~~ Kano Zzoological Ggarden, indicated that 42.7% of the activities perform by dog faced baboon in captivity are resting, this is followed by movement which accounted for 34.9% of the activities, while feeding activities account for the least with 22.4%. Similarly,~~It shows that~~ about 43.2% of the recorded activities carried out by dog faced baboon in Kano University of Science and Technology Wudil, Zoo was~~is~~ r~~R~~esting, followed by ~~the~~ m~~M~~ovement which constituted~~with~~ 34.8% of the activities and ~~the~~ feeding activity which accounted for 22%.

Conclusion: Due to the fact that majority of the baboons activities usually take place

Comment [ED1]: Authors should provide more information on how the cages were selected including number of cages per zoo and number of persons involved in the observations.

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between m~~M~~orning and afternoon, it is recommended that visitors interested in baboons should plan~~pay~~ their visitation to the Zoo pen during that time. It is also recommended that f~~F~~eeding and ~~chasing~~ harassing of a~~A~~nimals by the visitors should be discouraged in order to ensure consistency in their behaviour.

Keywords: Papio a~~A~~nubis, feeding, movement, resting, Kano University of Science and Technology Wudil and Kano Zoological Garden

1. INTRODUCTION

Activity patterns have been studied in several primate taxa including hominoids [1,2] cercopithecines [3, 4, 5] and colobines~~,~~ [6]. Time is limited for most animals [7, 8]. Thus, animals are faced with the challenge of allocating the limited time to different activities. According to the optimality theory, "the amount of time that an organism spends engaged in various activities depends on the cost of the activity relative to the derived benefits in that organism's habitat" [9].

The amount of time spent on foraging activities therefore relates to the energy content of the food relative to the costs of obtaining the food plus the cost of all other activities (resting, moving or socialising). Thus, specifically, food availability and energy content are critical determinants of an animals' daily activity pattern. Therefore, factors that influence the availability of food have a strong bearing on time allocation profiles in baboons.

Due to the different costs and benefits of specific activities animals have varying time allocation profiles based on age and sex for certain activities [10]. Furthermore, since these activities cannot be performed simultaneously some individuals may allocate time between various behaviours better than others [7, 8]. The costs and benefits of these activities change with changes in the ecological and social state of the environment as well as the physiological state of the animal. This gives rise to temporal and spatial variation in individual activity budgets of the animal. Baboons allocate the greater proportion of their time to foraging activities [11, 12, 13, 14, 15]. De Hoop and Mkuzi baboon troops spent 69.8 % and 66.5 % respectively of their time foraging ~~respectively~~ [14]. In a study of Alto, Hook and Lodge baboon groups in [12] report them to spend 69.8 %, 75.2 % and 43 % of their time

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foraging, respectively. The Lodge troop spent relatively less time foraging than Alto and Hook groups.

Weather patterns have both direct and indirect influences on the activity pattern of primates. Rainfall and temperature have pervasive effects on animals [16] and so influence time allocation patterns both temporally and spatially.

This study seeks to identify different types of activities carryout by dog faced baboon *(Papio anubis)* in captivity.

2. MATERIAL AND METHODS

2.1 Study area

The study was carried out in Kano University of Science and Technology Zoo and Kano Zoological Garden. **Wudil** has a total area of 362km^2 and is located within Sudan savannah region of Nigeria. The experimental site is located between the latitude 11^0 37'N and longitude 8^0 58'E at an altitude of 403m above the sea level. The annual maximum rainfall is between 850mm-870mm with a minimum and maximum temperature of 26^{0}c - 30^{0}c. The relative humidity of the region is always low and ranges between 40% - 51%~~-~~.

2.2 MATERIALS

Field notebooks, stop clock, r~~R~~ecording sheet, Biro and ~~D~~igital camera

2.3 DATA COLLECTION

Sampling method was used to study the activities of dog faced baboon *(Papio anubis)* in Kano University of Science and Technology Wudil Zoo and Kano Zoological Garden from 6:00am to 6:00pm between December to January 2016. The observations ~~in the activity patterns of dog face baboon (*Papio anubis*) are~~ were recorded in standard data ~~the recording~~ sheets. ~~observation is done three times a week~~ at 20 minutes intervals in each of the cages under study. Note: this research is limited to period when the temperature is extremely low (Hammattan period). The activity parameters recorded include: Feeding, Moving, and Resting and are described as follows:

Feeding: the feeding began when the animal first made contact with any part of food or other food substances, feeding bout terminated when the either moved more than one full stride, even if it was carrying some food material on its hand and mouth or stopped looking at the food material, by this definition, a switch to a new food type in the absence of either of these condition was not for bout to be consider terminated, thus a single feed bout could include more than one food type [17, 9].

Comment [ED4]: Authors should provide a basis for conducting the study. As it stands, there is no clear justification for the study.

Comment [ED5]: What is this? Place this in the context of the previous sentence.

Comment [ED6]: Wrong statement of GPS position. Both the latitude and longitude should be stated in a range to depict the area. As it stands, it looks like a point.

Comment [ED7]: In addition, authors should use a standardized data collection sheet for consistency.

Comment [ED8]: What is this?

Comment [ED9]: Authors should provide more information on the sampling methods including sampling sizes, for example, basis for selection of cages, number of cages per zoo, number of animals per cage, sex, ages, number of persons involved in the observations, zoo feeding regimes, etc. Just stating "sampling method" is not appropriate.

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Resting: this includes behavior during which an animal was neither feeding, moving or engaged in other social behavior that include sleeping auto-grooming, looking around etc [9, 10].

Moving: this includes all locomotion activities like walking, running, climbing, jumping and leaping but excluding short movements during feeding and locomotion during social behavior e.g when primates chased one another [9, 10].

Other activities: other social behavior including all other activities which an animal's attention and behavior where clearly directed toward another individual. These include allo-grooming, mounting, mating, chasing, playing, aggressive or agnostic behaviours [9, 10].

All the activities are carried out in the **morning, afternoon and evening**.

Comment [ED10]: Please specify what activities?

2.4 DATA ANALYSIS

The data collected ~~are~~ was subjected to descriptive statistics which includes frequency distribution and percentage. The analysis of variance was~~ill be~~ used to ~~study~~ determine the degree of variation among the activities and also between two different animals.

3. RESULTS AND DISCUSSION

Comment [ED11]: Tests of ANOVA to determine the degree of variation among the activities and between baboons have not been documented in the results or interpreted in the discussion. There is no reference to these tests in the main body. Authors should strive to include more of these tests on differences between zoos and individuals to make discussion and conclusions more relevant.

The result of the day time activities of dog faced baboon (*Papio anubis*) in captivity is presented in Table 1. The result shows that the day time activities decrease from morning to evening. 47.5% of the activities which include resting, movement and feeding were carried out in the morning, followed by afternoon and evening with 33.3% and 19.1% activities respectively.

Comment [ED12]: Please reconsider starting sentence with figures.

Table 1 Variation in day time activities of dog faced baboon (Papio anubis) in captivity.

DAY TIME	FREQUENCY (ACTIVITIES)	PERCENTAGE
Morning	67	47.5
Afternoon	47	33.3
Evening	27	19.1
Total	141	100

Comment [ED13]: Frequency per what? Is it per day or for the entire period. If it is per day, then insert it but if it is for the whole study period then change it to Total Number of Activities.

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The result of the activities of dog faced baboon in Kano Z~~z~~oological G~~g~~arden shown~~ed~~ in Tables 2 and 3, indicated that 42.7% of the activities perform by dog faced baboon in captivity are resting~~.~~, T~~t~~his was~~is~~ followed by movement which accounted for 34.9% of the activities, while feeding activities account for the least with 22.4%. The result of this study is

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in variance with the finding of [9] who reported 50.00% for feeding and 8.50% for resting for the Kkwano Ffforest baboons. In his study, Kkwano Ffforest baboons spent relatively higher proportion of time feeding and lesser proportion of time resting and movingement, this is probably due to the level of availability and distribution of food resources at the site compare to captive environment.

Table 2: Variation in the activities of dog faced baboon (*Papio anubis*) in Kano Zoological garden/day.

NUMBER OF DAYS	FREQUENCY (ACTIVITIES)	PERCENTAGE (%)
DAY 1		
Feeding	32	22.7
Moving	50	35.5
Resting	59	41.8
DAY 2		
Feeding	32	23.0
Moving	49	35.2
Resting	58	41.7
DAY 3		
Feeding	30	21.4
Moving	52	37.1
Resting	58	41.4
DAY 4		
Feeding	31	22.5
Moving	46	33.3
Resting	61	44.2
DAY 5		
Feeding	30	21.3
Moving	53	37.6
Resting	58	41.1
DAY 6		
Feeding	31	22.5
Moving	47	34.0
Resting	60	43.5
DAY 7		
Feeding	32	23.3
Moving	43	31.4
Resting	62	45.2
Total	**974**	**100**

Table 3: variation in the activities of dog faced baboon (*Papio anubis*) in Kano Zoological garden/week

ACTIVITIES	FREQUENCY (ACTIVITIES)	PERCENTAGE
Feeding	218	22.4

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Movement	340	34.9
Resting	416	42.7
Total	974	100

The result of the dog faced baboon activities is indicated in Table 4 and 5, it shows that about 43.2% of the activities carried out by dog faced baboon in Kano University of Science and Technology Wudil, Zoo is Resting, followed by the Movement with 34.8% of the activities and the feeding activity account for 22%. The low frequency of feeding and movement in the first and second days may be as a result that the animal is menstruating on the first and second days of my research which leads to the resultant of high resting activity in the period. This result of the dog faced baboon activities in captivity indicated in the table above ~~is~~ however, agrees with the finding of who reported highest resting period than feeding and movement period

The Dog faced Baboon activities are significantly related to day time period. The baboon were observed to be very active in the morning followed by afternoon and evening. These activities which is made up of mostly movement and feeding may be due to the presence of visitors in the morning and afternoon. This activity pattern morning, a~~A~~fternoon and evening have been commonly reported among arboreal species [17]. The daily activities of dog faced baboon (*Papio anubis)* in Kano University of Science and Technology Zoo and Kano Zoological Gerden ranged between6:00am in the morning to 6:00pm in the evening in which most of the visitors usually pay their visit. However, [17] was of the opinion that adaptive significances of diurnal variability in primate's activities budget are poorly understood. With regards to individual activities, resting which include sleeping, looking about etc. was the most frequent activity carried out by the dog faced baboon in captivity. This may be due to the confinement in which the baboons were kept. Most of the baboon's time was spent in sitting postures, standing or playing posture. In this position, the hind limb may be placed in variety of positions and the fore limbs of the baboon often at rest on the knees or between hind limb. However, despite the confinement, movement also constitute the substantial percentage of the dog faced baboon activities in Kano University of Science and Technology and Kano Zoological Garden. The movement which accounted for 34.9% in Kano Zoological Garden and 34.8 in the University Zoo include walking, running, climbing, leaping and riding. This significance percentage might be due to the fact that dog faced baboon are usually regarded as one of the most entertaining animal within the Zoo.

Meanwhile, of both the animals studied, the Baboon in the Kano Zoological Garden has the slightly higher frequency of activities. This might be also due to its ability to communicate or play with more number of visitors.

Comment [ED15]: Sentence is too long and winding. Please revise into simpler and shorter sentences.

Comment [ED16]: Please support this sentence with references. Is it an established fact that baboons feed and move less during menstruation?

Comment [ED17]: Who? Please state reference.

Comment [ED18]: Did the authors conduct any statistical tests to prove significance? Please insert statistical test.

Comment [ED19]: Inconsistency! Resting was the major activity from this study. Please revise.

Comment [ED20]: Not consistent with results. Presence of visitors in the morning and afternoons would make baboons more active but according to study, baboons were resting mainly at peak visitation periods. Please rectify.

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Table 4: Variation in the activities of dog faced baboon in Kano University of Science and Technology Wudil, Zoo/day.

NUMBER OF DAYS	FREQUENCY (ACTIVITIES)	PERCENTAGE
DAY 1		
Feeding	29	21.0
Moving	37	26.8
Resting	72	52.1
DAY 2		
Feeding	27	19.8
Moving	35	25.7
Resting	74	54.4
DAY 3		
Feeding	30	21.9
Moving	42	30.6
Resting	65	47.4
DAY 4		
Feeding	30	22.2
Moving	45	33.3
Resting	60	44.4
DAY 5		
Feeding	31	22.3
Moving	56	40.3
Resting	52	37.4
DAY 6		
Feeding	32	23.3
Moving	60	43.8
Resting	45	32.8
DAY 7		
Feeding	32	23.7
Moving	58	43.0
Resting	45	33.3
Total	**957**	**100**

Table 5: Variation in the activities of dog faced baboon (Papio anubis) in Kano University of Science and Technology Zoo/week

ACTIVITIES	FREQUENCY (ACTIVITIES)	PERCENTAGE
Feeding	211	22.0
Movement	333	34.8
Resting	413	43.2
Total	**957**	**100**

CONCLUSION

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This study was designed to gather information on the daily activity pattern of Dog faced Baboon in Kano University of Science and Technology and Kano Zoological Garden. From the study, the following conclusions can be made. The dog faced baboons are most active in the morning. Also Resting constitute the most frequent activity of dog faced baboon in captivity. Most of the baboon activities have short duration.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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