

Association between Genital Ulceration and Body Condition of Olive Baboon (*Papio Anubis*) In the Lake Manyara National Park

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Abstract

Genital ulceration disease in olive baboon (*Papio anubis*) caused by *Treponema Pallidum*, the disease causes moderate to severe genital ulceration in the population of an olive baboon. The study on the association between genital ulceration and body condition of olive baboons was conducted in the Lake Manyara National Park in Tanzania. The study investigated the body condition of affected and non-affected olive baboons across an observation of 599 and reveals the proportion of affected and non-affected in the surveyed population. A pair of binoculars (10 x 50) were used whenever the located individual was observed healthy or with a clinical sign.

QGIS version 3.1 was used to map baboon distribution in the study area. R-studio version 2.3.1 was used to test the association between body condition and affected olive baboon. Results revealed that a total number of 104 individuals, 56 males 47 females were affected. Results also indicated that there is a positive association between the body condition and the affected baboon, $R=0.23$, while there is a negative association on non-affected individuals' correlation $R=-0.45$.

The proportion shows significant variation between affected and non-affected individuals, $\chi^2=53.772$, $df=17$, $P=0.001$. On the other hand, the affected baboons revealed more emaciation, alopecia hand, rough hair signs compared to non-affected individuals. The most affected sex was female however there is no significant variation of sex in affected individuals $\chi^2=65.03$, $df=51$, $P=0.08941$. It is concluded that *Treponema pallidum* infection with genital lesion associated with body condition is common in baboons of Lake the Manyara National Park.

Keywords: Ulceration disease • *Treponema pallidum* • Immunodeficiency virus

Introduction

The severe expansion and distribution of primates' diseases draw the attention of scientists worldwide. Primates' disease diagnosis found carrying Ebola Reston, B virus (*Cercopithecine herpesvirus 1*) [1]. Monkey pox, yellow fever, simian immunodeficiency virus, tuberculosis, genital ulceration, and other diseases not yet identified [2]. Some of these diseases can also be zoonotic [3]. Among others, baboon seems to be most affected by genital ulceration that alters also their body condition [4]. Serological evidence of genital ulceration has been found in DRC, Sierra Leon, and Gombe in Tanzania [5]. The disease condition was also observed to spread in the northern Tanzania-protected areas such as Tarangire, Manyara, Serengeti National Parks, and Ngorongoro Conservation Area [6]. The genital ulceration disease in olive baboon (*Papio anubis*) is

caused by *Treponema pallidum*. The disease causes moderate to severe genital ulceration in olive baboons and may also be associated with the baboon's body condition [7]. Therefore this study aimed to show the association between genital ulceration and body condition of olive baboons by observing a total of 599 affected and non-affected individuals and, later mapping the most affected area in a national park

Materials and Methods

Lake Manyara National Park (330 km²) is located in northern Tanzania in Arusha and Manyara region and lies at an altitude of 960-1470 m a.s.l. and coordinates of 3 35'S 35 50'E [8]. The national park contains diverse wildlife habitats such as a lake, forests, shrubland, and grassland that host a variety of wild carnivores,

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herbivores, birds, primates, reptiles, and invertebrates [9]. Individual baboons' body condition was observed in the comparison between affected and non-affected body conditions. The affected individuals were identified by observing and, referring to body clinical signs such as alopecia, emaciation, gaits, rough hair coat, and wounds. The assumption was made that, individuals with genital ulceration also possess the above mentioned clinical signs. Marking of the individual baboons and troops was done by GPS and mapped by using QGIS version 3.1 to highlight the distribution pattern and severity of the baboon body conditions [10,11] (Figure 1). The association tests and comparisons were done by using R-studio version 2.3.1 to quantify the significant variation between affected and non-affected individuals [12].

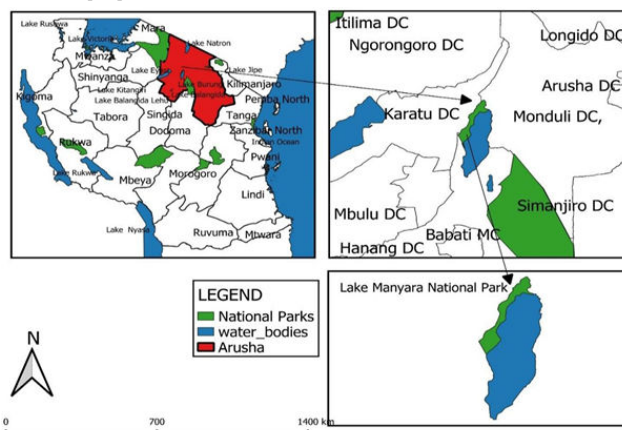


Figure 1. Study area.

Results

A total number of 104 individuals, 56 males' 47 females reveal to be affected by genital ulceration. The results indicated that there is a positive association between affected baboons with genital ulceration and body condition $R=0.23$, while there is a negative association between non-affected individuals' and the body condition $R= -0.45$.

The proportion also shows significant variation between body conditions of the affected and non-affected individuals, $\chi^2=53.772$, $df=17$, $P<0.001$ (Figure 2). On the other hand, the affected baboons revealed more emaciation, alopecia, hand, rough hair signs compared to non-affected individuals, with no significant variation between male and female individuals $\chi^2=65.03$, $df=51$, $P=0.08941$. The disease seems to spread all over the national park with few individuals in the central and southern parts of the park but more observed in the northern part of the national park.

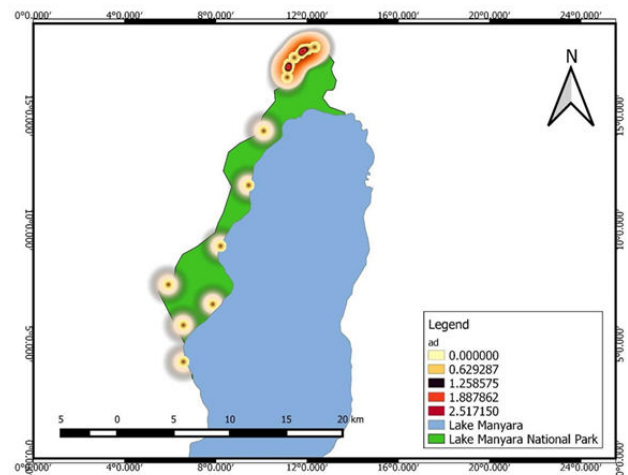


Figure 2. Distribution of olive baboon affected with genital ulceration.

Discussion

Generally, genital ulceration indicates to have been associated with baboons' clinical body signs. Although the disease is well studied in east Africa, further studies are needed to ensure mitigations and later reduce the spread of infections in a particular protected. Baboons can frequently be observed to have this severe condition in the Lake Manyara and Tarangire National Parks and further to Ngorongoro Conservation Area [13]. It is quite important to study and map the disease magnitude so that to study how severe it is. This may help in controlling the infection and suppress the pathogens' mutation [14,15]. The wildlife body condition may also despair visitor experience if not well controlled or taken care of [16]. Despite the policy explicitly excluding them from treatment [17]. Visitors may recommend negative experiences just for a minor observation of animal health (Figures 3 and 4) [18].

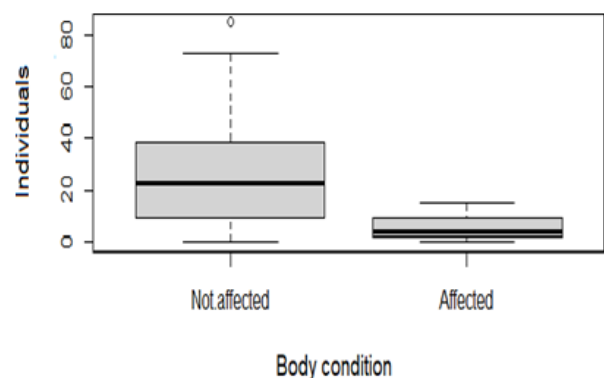


Figure 3. The proportion of affected and non-affected olive baboons.

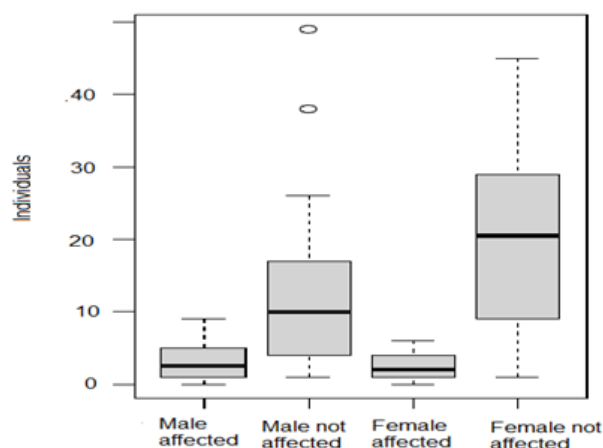


Figure 4. The physical body condition of the affected male and female olive baboon.

Conclusion

Genital ulceration disease in olive baboon (*Papio anubis*) caused by *Treponema Pallidum*, the disease causes moderate to severe genital ulceration in the population of an olive baboon. The study on the association between genital ulceration and body condition of olive baboons was conducted in the Lake Manyara National Park in Tanzania. The study investigated the –body condition of affected and non-affected olive baboons across an observation of 599 and reveals the proportion of affected and non-affected in the surveyed population.

Recommendation

The study was only to highlight the spread and association of disease clinical signs and body conditions only. Detailed diagnosis of body conditions concerning diseases is highly recommended.

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