

## Mortality pattern in non human primates in Assam, India

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### Abstract

**Aim:** The study was conducted to know the mortality pattern in non human primates in Assam.

**Materials and Methods:** A total of 27 deaths were recorded in six different species of non human primates of Assam State Zoo and Department of Forest and Environment, Government of Assam during the period from August, 2009 to December, 2009. The cause of death was determined on the basis of gross and histopathological examinations conducted at Department of Pathology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam.

**Results:** The causes of death attributed to specific diseases in non human primates were tuberculosis (22.22%), pneumonia (18.57%), enteritis (11.11%), encephalitis (11.11%), nephritis (11.11%), septicaemia (03.7%), malignant neoplasm (03.7%), zygomycotic gastritis (03.7%), traumatic injury (03.7%), poisoning (03.7%), stress (03.7%) and senility (03.7%).

**Conclusion:** The study viewed that it is important to know the causes of death of non human primates for preservation and conservation of these endangered wild species.

**Key words:** Assam, mortality, non human primate, pathological condition

### Introduction

Northeast India comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura is the richest in terms of primate diversity with 9 confirmed species records and 3 other species whose sightings need confirmation [1]. The pattern of distribution of different species and the role of rivers, both large (Brahmaputra and Dibang) and small (Sankosh, Manas and Barak) as zoogeographic barriers in dispersal is intriguing. Except for the golden langur (*Trachypithecus geei*) and phayre's langur (*Trachypithecus phayrei*), all other species have a large extent of occurrence in the region. The rhesus macaque (*Macaca mulatta*), capped langur (*Trachypithecus pileatus*) and the Assamese macaque (*Macaca assamensis*) are the most abundant species in this region [1].

Mortality patterns in non human primates are influenced both by diet and degree of environmental seasonality [2]. Emerging and reemerging infectious diseases remain a major threat to these animal colonies. Due to the close genetic relationship between non human primates and humans, disease causing organisms are easily exchanged between them. Often these animals carry and transmit diseases without any visible signs. They are more likely to contract hepatitis A, measles or poliomyelitis from humans or as part of laboratory experiment to transmit these diseases to humans. Diarrhoea and respiratory diseases were major causes of morbidity in non human primate and were associated

with high mortality in some primate colonies [3].

For conservation of these wild species, many of which are globally endangered, developing long-term strategy is of utmost importance. Although, a majority of the population is protected in the various parks and sanctuaries, the coverage is still inadequate. To reduce the mortality of wild animals, the study of their pathological condition is necessary to take preventive measures and control programmes. Keeping the above facts in view, the present study recorded the causes of death of non human primates in Assam.

### Materials and Methods

The study recorded mortality of non human primates of Assam State Zoo and Department of Forest and Environment, Government of Assam during the period from December, 2007 to November, 2009. A total of 27 deaths of six different species of non human primates were recorded. Data pertaining to history, age, sex, species, date and cause of death were examined. The cause of death was ascertained on the basis of gross and histopathological examinations conducted at Department of Pathology, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam.

### Results and Discussion

In the present study majority (22.22%) of animals died due to tuberculosis (Table-1). Tuberculosis was a common as well as a major killer disease in non human

Table-1. Showing the causes of death of non human primates

Cause of death	Rhesus macaque ( <i>Macaca mulatta</i> )	Golden langur ( <i>Trachypithecus geei</i> )	Spectacled langur ( <i>Trachypithecus obscurus</i> )	Slow loris ( <i>Nycticebus coucang</i> )	Assamese macaque ( <i>Macaca assamensis</i> )	Hoolock gibbon ( <i>Hylobates hoolock</i> )	Total (%)
Tuberculosis	5	-	-	-	1	-	6 (22.22)
Pneumonia	2	-	1	1	1	-	5 (18.51)
Enteritis	2	-	-	-	-	1	3 (11.11)
Encephalitis	2	1	-	-	-	-	3 (11.11)
Nephritis	2	-	-	1	-	-	3 (11.11)
Septicaemia	1	-	-	-	-	-	1 (03.70)
Zygomycotic gastritis	-	1	-	-	-	-	1 (03.70)
Bronchogenic carcinoma	1	-	-	-	-	-	1 (03.70)
Traumatic injury	1	-	-	-	-	-	1 (03.70)
Poisoning	-	1	-	-	-	-	1 (03.70)
Stress	-	-	-	1	-	-	1 (03.70)
Senility	1	-	-	-	-	-	1 (03.70)

primates [4]. Rajknowar *et al.* [5] made a detail study on tuberculosis of non human primates of Assam State Zoo and recorded tuberculin positive in captive and free living animals to be 25% and 15% respectively. The presence of tuberculosis infection in zoo animals is not only a potential danger to the workers and veterinarians working there, but also to the general public who visit the zoo.

The study recorded 11.11% pneumonic death. Pneumonia always plays a significant role in the mortality of captive animals as these animals always remain under stress. Enteritic disease recorded in the present study was 11.11%. Enteric diseases, specifically diarrhea, are frequently associated with morbidity and mortality in nonhuman primates in captivity. Enteropathogenic *E.coli* may be a significant pathogen for nonhuman primates to cause enteritis. In addition to the impact these bacteria may have on the health of colonies of animals held in captivity, there is also the potential risk of transmission to humans, which characterizes the zoonotic potential of these infections.

In concurrence of the present exploration, encephalitis was recorded earlier in barbary macaque (*Macaca sylvanus*) [6] and in chimpanzee (*Pan troglodytes*) [7]. In the present investigation, 3 animals (11.33%) died due to nephritis. Similar reports of nephritis in pigtailed macaque (*Macaca nemestrina*) [8] and in woolly monkey (*Lagothrix lagotricha*) [9] had been published.

Death due to septicaemia with isolation of *E. coli* had been encountered in non human primate in the present study. Zygomycotic gastritis recorded in a free living golden langur was in conformity with the findings of Torres-Urbano *et al.* [10] who reported the first case of disseminated zygomycosis in cynomolgus monkey (*Macaca fascicularis*).

The study documented bronchogenic carcinoma in a rhesus macaque. Incidences of spontaneous malignant tumors were found to be relatively low in cynomolgus and rhesus monkeys, but higher in African green monkeys [11]. Spontaneous primary squamous cell carcinoma of lung was recorded in a rhesus macaque and observed that both right and left lung lobes were consolidated and had multifocal white-tan masses at the time of necropsied [12].

Traumatic injuries were commonplace in nonhuman primate facilities [13]. In this study no any cage injury

and capture injury was recorded. Chemical immobilizations for restraint might have been another factor in decreasing the number of deaths due to capture injury. In accordance of the present findings, Pathak [14] also reported organochlorine poisoning in free living golden langurs. One slow loris died due to stress associated with capture myopathy. Stress related diseases were an important cause of death in many animals, including humans. During capture of wild animals, physical, environmental and psychological factors effect upon the animal simultaneously and the effects were accumulative. Death due to senility was recorded in a rhesus macaque in the study. Senility cause of deaths of animals was also recorded by former researchers in different zoos.

#### Conclusion

Non human primates can carry a variety of zoonotic diseases. Therefore proper care should be taken by anyone handling these animals to prevent potential exposure to zoonotic pathogen. To facilitate the detection and control of potential pathogens, all facilities that house non human primates should implement comprehensive microbial quality programs. This will help to reduce the morbidity and mortality of these wild animals.

#### Author's contribution

BGN done this study under the guidance of AC. This study is the part of MVSc thesis of BGN and AC was the major advisor. Both author read and approved the final manuscript.

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#### Competing interests

Authors declare that they have no competing interests.

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