

Demographic and health status of captive elephants around Chitwan National Park, Nepal

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Abstract. Gautum S, Koju NP. 2022. Demographic and health status of captive elephants around Chitwan National Park, Nepal. *Biodiversitas* 23: 1621-1627. Elephants have been captive from ancient times. As a keystone species, it requires proper care and management to sustain its viable population in the wild as well as a captive. However, there is a lack of study on captive elephants in Nepal. This study aimed to explore the status of captive elephants in Sauraha, Chitwan National Park, the top tourist destination of Nepal. Field survey, Key-Informant Interview (KII), and questionnaire survey were carried out for the primary source of data collection. During which, 78 mahouts were interviewed. The study revealed 97 (16 males and 81 females) captive elephants in Sauraha during the study period. Among them, 17 were born by captive mothers. The distance traveled by an elephant has recorded 16 km for minimum and 84 km in maximum per day and carries the average weight of 450 kg. Captive elephants belonging to the private company (N=60) were used only in tourism, while captive elephants from National Trust for Nature Conservation (NTNC) and Governments were used in patrolling and transportation. The most common disease in captive elephants is tuberculosis (27%). Similarly, parasitic infections, diseases like foot problems, and colic were also recorded. An effective policy and plan are urgently required to conserve this endangered umbrella species in captivity.

Keywords: Conservation, elephant, endangered, foot disease, tourism, tuberculosis

INTRODUCTION

Elephants are one of the keystone species that helps maintain the ecosystem's functions, also known as habitat engineers. The Asian elephant is considered a primary biological species in Asia's tropical forests, which is listed as endangered on the IUCN Red List. It is predominantly a consequence of habitat destruction and degradation, confrontation with humans, habitat fragmentation, population growth, illegal poaching for ivory, etc. (WWF 2020; Sukmantoro et al. 2021; Wibowo et al. 2021). Elephants have interconnection with humans for over centuries. Until a long time, domesticated Asian elephants were synonymous with religious values and rituals, and in the past, the elephant was a prestigious emblem of a rich proprietor. Taming of the elephants has been documented during the civilization of Indus Valley about 2,000 BC. They were used for different kinds of cultural activities, war, circuses, elephant polo, etc. Elephants are used in tourism and conservation area protection in south-east Asia. Elephants are used in circuses in some countries because of their capacity to learn and act with incredible body size (Gautam and Rajan 2014).

Currently, private captive elephants are widely used for tourism purposes, for instance, woodland excursions in parks and reserves. While, government captive elephants are used for patrolling, wildlife research, breeding, wildlife monitoring, important ceremonies, etc. (Yakubu et al. 2016; WWF 2020). Captive elephants suffer from different

kinds of infectious as well as non-infectious diseases. The diseases in captive elephants include parasitic diseases caused due to roundworms, ticks, and lice. Other diseases include T.B, anthrax, tetanus, elephant pox, blackleg, EEHV, rabies, foot diseases, wounds and abscess, skin diseases, malnutrition, etc. (Mikota et al. 2001; Stremme et al. 2007; Alex 2009; Angkawanish et al. 2009; Chakraborty 2009; Chandrasekharan et al. 2009; Sarma 2009; Mikota and Maslow 2011). According to Stremme et al. (2007) and Angkawanish et al. (2009), the main causes for these diseases in elephants are due to the use of unethical controlling tools and poor hygiene of shelter. It is estimated that there are 40,000 to 50,000 wild Asiatic Elephants around the world. Wild Asian elephants are presently found in 13 countries, mostly South and South-East Asia. About 25% of total Asian elephants are in captivity, i.e., 15,000 to 20,000 captive elephants throughout the world and Nepal has 210 captive Elephants (NTNC 2020). These captive elephants have been a subject of critical scientific interest for wildlife scientists, park/reserve administrators, and field researchers. But there is not any research on the captive elephant of Nepal to date.

Therefore, the research aimed to explore captive elephants' current status (demographic status, health status, tourism). Hence, this research can be used as a foundational analysis incorporating the welfare of elephants.

MATERIALS AND METHODS

Study area

This research was carried out in Sauraha, which lies in the Ratnanagar municipality of Chitwan District, Nepal (Figure 1). Sauraha lies in the buffer zone of Chitwan National Park (CNP). CNP was established in 1973 and covered 952.63km² of land. The Sauraha is situated in the east part of CNP and is the park's key gateway (Figure 1). Sauraha formerly was a tiny village of Tharu but now has developed to be one of the desirable tourist destinations. The CNP is situated on the southern portion of the Chitwan District sharing the southern frontier with Balmiki Tiger Reserve of India and the eastern boundary with Parsa National Park (NTNC 2020).

CNP is situated in the country's lowland with Siwalik Hills surrounding the entire valley. The park falls within the bio-climatic sub-tropical monsoonal climate, and the mean annual rainfall is 2,100 mm (Murphy et al. 2013). It lies at the elevation of 140-800 masl. The park is home to 68 species of mammals, 55 species of amphibians and reptiles, 546 species of birds, and 120 species of fish. Chitwan mainly consists of tropical and subtropical forests with mostly Sal forest. Since 1984, the park has been designated as UNESCO World Heritage Site and is a regional biodiversity hotspot within a complex (NTNC 2020).

In Nepal, there is a total of 210 captive Elephants. Out of which 94 are asserted by Protected Areas (government), 8 by the National Trust for Nature Conservation (NTNC),

and 106 are possessed by individuals or private companies (Mandal and Khadka 2014). Out of 210 captive elephants in Nepal, 96 are in Chitwan (NTNC 2020). Sauraha is Nepal's number one tourist attraction for wildlife safari. It is situated in the eastern region of the Chitwan District and lies in the buffer zone of CNP. It is renowned for watching different wildlife and birds. Elephant rides are the major attraction for tourists to visit Sauraha. Elephants are widely used for safari in Sauraha (Sigdel 2013). Sauraha is the main tourist attraction within the CNP buffer zone with facilities for elephant riding. The growing tourism industry with private elephant riding facilities has generated different sorts of job opportunities for residents and hotel owners (Mandal and Khadka 2014).

Methods

Direct observation, questionnaire survey, and KII were carried out for data collection. Direct observation of elephant use was done to observe activities of captive elephants while the elephants were on duty. Mahouts (N=78) and tourists (N=40) were interviewed and KII was carried out with Gudhan Chaudhary, chief of Elephants Breeding Centre- Khorsor, NTNC- Sauraha, Chairman of Elephant's owner co-operative and, Dr. Amir Sadaula, chief Veterinarian at NTNC, Sauraha. Two trips of each elephant were observed to record the workload, distance travel, and tourism. All data were collected from October 16, 2019, to October 26, 2019, and from December 28, 2019, to January 7, 2020.

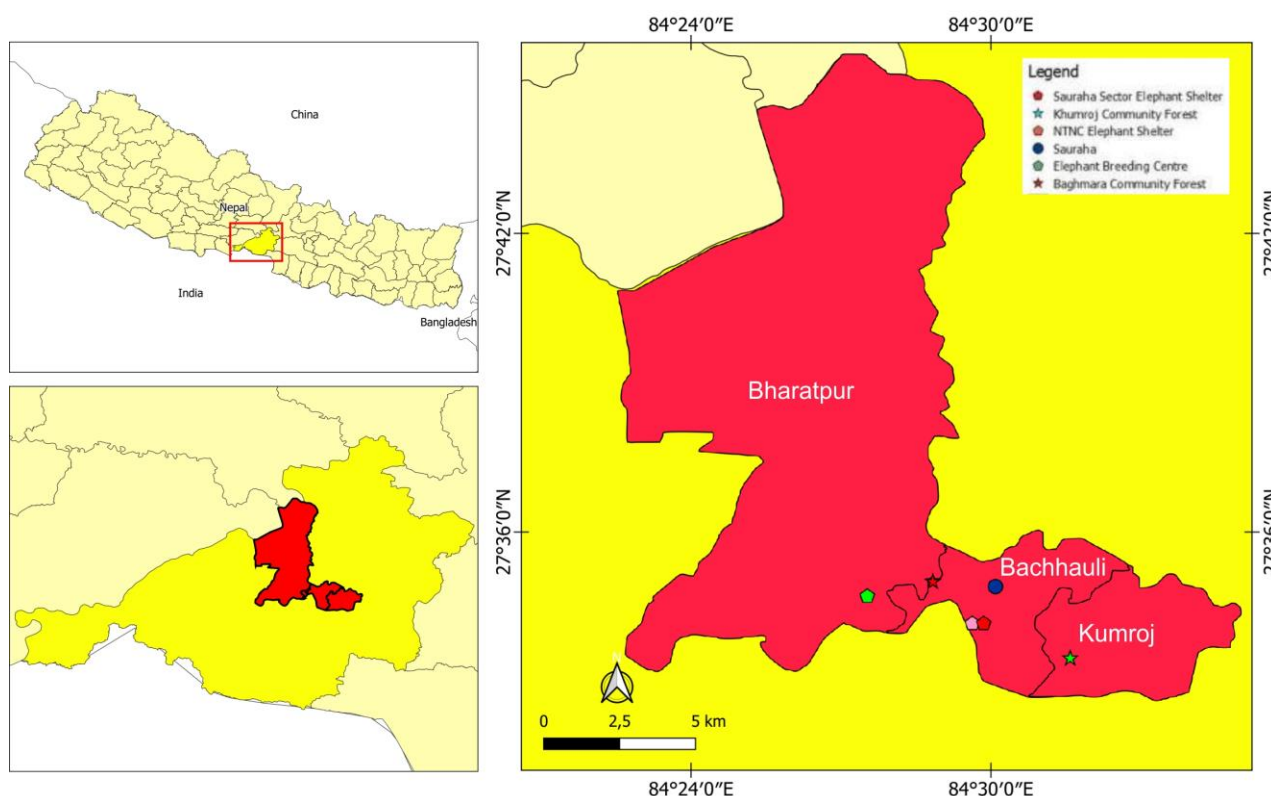


Figure 1. Map of the study area Sauraha in Chitwan District of Nepal

RESULTS AND DISCUSSION

Demographic status of elephants

In total, 97 captive elephants were recorded in Sauraha Chitwan (Figure 2). The private companies, the government, and NTNC owned 60 (2 males and 58 females), 31 (13 males and 18 females), and 6 (1 male and 5 females) captive elephants, respectively. Among 31 elephants owned by the government, 22 elephants belonged to Elephant Breeding Center (EBC), Khorsor, and the remaining 9 elephants belonged to the Sauraha elephant shelter. The minimum age of a working elephant was recorded as 15 years and the oldest elephant observed working was 60 years.

Out of 97 elephants, 78 were observed and monitored during the study period. Among them, only 8% of elephants were kept free (without chains) while the remaining 92% of elephants were in a chain in their shelter. Only five elephants owned by Sapana Village Lodge (Swiss Project) and one sick elephant at Sauraha were not in the chain. The owners and company of Sapana Village Lodge supposed that keeping elephants free will reduce conflict and keep elephants healthy.

In the study area, we recorded that, altogether 17 calves (9 males and 8 females) were born at Sauraha, inside the captive environment between 2015-2020. Similarly, 13 captive elephants have died in 5 years. All of them died due to infection of tuberculosis (TB) (Figure 3).

In Sauraha, 18 (2 private domesticated, 1 owned by NTNC and 15 government-owned) out of 78 elephants

were less than 10 years old, 12 (5 private domesticated, 1 owned by NTNC and 6 government-owned) were between 10 to 20 years old, 9 (6 private domesticated and 3 government-owned) were between 21 to 30 years old, 16 (14 private domesticated and 2 government-owned) were between 31 to 40 years old, 28 (8 private domesticated, 3 owned by NTNC and 3 government-owned) were between 41 to 50 years old and 14 were more than 50 years old (Figure 4).

Health check-up and diseases of elephants

The captive elephants from the government and NTNC had regular check-ups and monitoring than private captive elephants. They had regular health check at intervals of three months and when they get sick. Most of the private elephants (48 out of 60) were taken for a medical check-up only during sick. The frequency of check-ups is directly linked with the welfare of elephants.

Forty-four (44) out of 78 elephants suffered from diseases: 27% (N=44) elephants were infected with tuberculosis (T.B.), 27% elephants with foot problems (physical pain due to hard work), 14% with problems of indigestion, 7% elephants suffered from Herpes causing elephant endotheliotropic herpesvirus-hemorrhagic disease (EEHV-HD), 7% gastrointestinal parasitic infections, 11% of them had physical injuries (wounds) and 7% elephants suffered from other diseases (Figure 5). T.B has been reported many times in Asian elephants reported as per the study done by Mokita et al. (2001); Dumonceaux et al. (2011).



Figure 2. Captive elephants in Sauraha, Chitwan, Nepal: A. An elephant with a deformed tail, B. Chained captive elephant, C. An elephant with the wounded foot, D. An elephant carrying tourists (Photo: Sandeepa Gautum 2019)

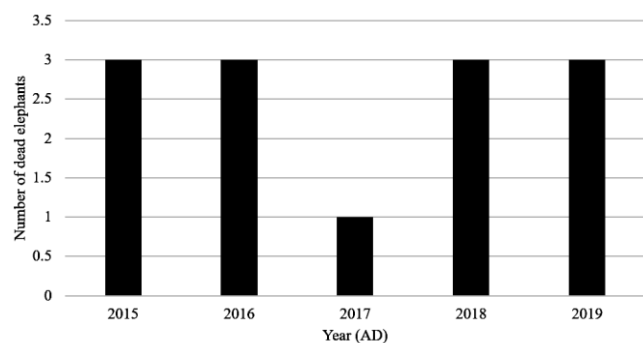


Figure 3. The number of dead captive elephants in Sauraha, Chitwan, Nepal between 2015-2019

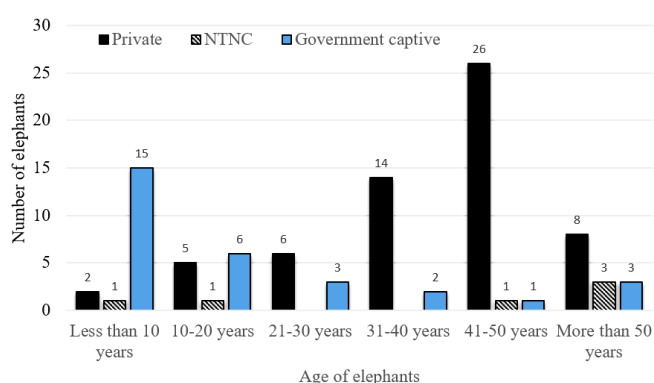


Figure 4. Number of elephants owned by different sectors and their age

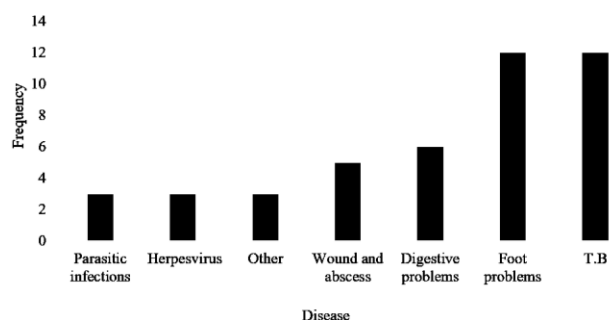


Figure 5. Number of elephants suffering from various diseases in Sauraha, Chitwan National Park, Chitwan District, Nepal

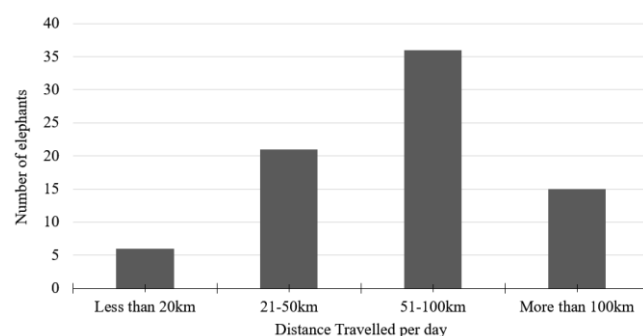


Figure 6. An average distance traveled by a captive elephant in a day in Sauraha, Chitwan National Park, Chitwan District, Nepal

Workload and tourism

During observation, we recorded that a private elephant works 7-10 hours a day (59.5 km per day) on average. Normally during high tourist flow, they have a maximum of 5-7 trips a day. One trip is equal to 1-1.5 hours. The minimum age of the elephant taking an elephant ride was 15 years and the maximum 60 years. It was observed that 11 elephants traveled less than 20 km/day (minimum 16 km), 21 elephants traveled 21-50 km per day. While, 37 elephants traveled the distance of 51-80 km per day, and 9 elephants traveled more than 80 km in a day (Figure 6).

The government captive elephants have the same workload throughout the year. Domesticated elephants belonging to NTNC and the government were not used for tourism but for collecting food and grass for elephants themselves and patrolling the National Park and buffer zones. They were also used in projects like tiger count and rhino count. Private elephants experience more workload when there is a high flow of tourists. The average weight carried by the elephants is 450 kg on each trip which includes “Hauda” and “Gaddi” equivalent to 100 kilograms, four people and Mahout of average 350 kg or more. We observed that the controlling tools used while controlling and the pressure of load on their back result in severe elephants' wounds. 86.52% of tourists visiting CNP from 17 July 2018 to 16 July 2019 also visited EBC, supporting that the captive elephants have a major impact on the tourism industry of Chitwan.

Not only the wild elephants but the captive elephants have also been reported causing harm to their mahouts or other people around. Though minimal, there does exist the incident of elephant harmed in the case of domesticated elephants. 31% of mahouts responded that their elephants caused harm to them or other people around. On the other hand, 69% of mahouts reported no harm caused by their elephants.

Discussion

Demographic and health status of elephants

Most of the elephants in the private sector are female (97.67%) because they can be widely used for jungle safari, but male elephants are aggressive and are not possibly used in safari (Chelliah and Sukumar 2013). The elephants born in Chitwan are mostly from EBC, Khorsor, and some of them are born by the mating of female captive elephants with a wild bull. There is a decline in the number of elephants in the year 2015, 2016, 2018, and 2019. The elephant's death may have been explicitly induced by taming (e.g., injury or accident) or may be caused indirectly due to health hazards such as parasites, wounds and abscesses, and infectious diseases. Tuberculosis and physical wound and pain are significant issues in Chitwan with captive elephants. It is reported that the 60% mortality rate of captive elephants is due to disease (Beldomenico and Begon 2010). The number of adult elephant death may also be induced by Tuberculosis (Ghodbane and Drancourt 2013). As indicated by Mahato et al. (2019), the death of the calves may also be due to EEHV.

In Sauraha, the most commonly observed diseases in captive elephants were foot problems and Tuberculosis

(T.B). In Malaysia, the most observed diseases in elephants were foot problems and Tuberculosis (Long et al. 2013). There exists a strong relationship between elephants' health and mahout's wellbeing. The United States and Europe have experienced the illness and death of captive elephants due to Tuberculosis caused by *Mycobacterium tuberculosis* and the TB can be transmitted from elephants to peoples or livestock that come in contact with them (Simpson et al. 2017). A similar case of transmission of TB from elephants to workers. Eleven dead captive elephants were tested positive for T. B from 2002-2009 in Nepal (Szydlowski 2022). One of the causes of TB is related to the food supply of an individual elephant (Backues and Wiedner 2019; Rosen et al. 2019).

Foot problems are also frequently observed disease in captive elephants. Foot problems have been observed in European and North American Zoos as well (Wendler et al. 2019). Foot problems in elephants are generally associated with the quality of the ground to which they are enclosed. If they are kept on the concrete floor with very little space, they will likely develop foot problems. Concrete grounds with feces and urine causes infection and cracking of the foot-pad, making the outside pad of the foot vulnerable to many infections (Haspeslagh et al. 2013). Foot problems are mainly observed in elephants working in a circus to entertain people. Nail cracks, abscesses, fissures are major foot-related problems (Wendler et al. 2019). Male elephants were found to be more susceptible to foot problems due to their poor resistance during the *musth* period (Sarma et al. 2012). A relatively more significant number of private captive elephants have been infected by foot diseases rather than government captive. Captive elephants are vulnerable to various health hazards, including; eye problems due to foreign body pricks, the opacity of the cornea, banging in rocks and logs due to confusion, etc. (Haspeslagh et al. 2013). Wounds in elephants may be caused due to inappropriate use of hooks by mahouts. Wounds also may be caused due to more saddle weight (Bansiddhi et al. 2019). The intake of foreign substances, sand, or rotten hay may result in colic. Colic is a kind of digestive problem that increases the internal parasitism in an elephant. Correspondingly, Elephant Endotheliotropic herpesvirus (EEHV) is harming the young calves of Asian elephants and threatening African elephants throughout the world. All these diseases are directly or indirectly related to poor hygiene (Boonprasert et al. 2019).

The health check-up of government captive elephants was infrequent and regular than that of private captive elephants. According to KII with the veterinarian, most veterinarians were appointed in government offices, making it easier to observe their nearby government captive elephants frequently. Somehow, some of the elephant owners only called veterinarian doctors after the elephant falls sick because they have to pay the charge to the doctors, unlike the government elephants, but the regular health check-ups should consider being one of the essential factors for detecting the early symptoms of diseases for elephants in captivity (Bouchard et al. 2014; Meehan et al. 2016). The veterinary medical officer

reported that TB is common in elephants globally. In addition, more prevalence of foot diseases in captive elephants of Chitwan suggested poor hygiene and concrete surface for the movement of elephants as observed.

Elephant and tourism

Since its advent in the 1960s, elephant-backed tourism has been a source of income for residents of Sauraha, Nepal (GoN 2015; Mishra 2008; Szydlowski 2021). Unlike other countries in which mahouts may own their elephants or where elephant responsibilities are shared among community members (Lainé 2019), tourism elephants in Nepal are typically owned by individuals (Szydlowski 2022). Private domesticated elephants are widely used in the tourism industry. Most of the tourists who visit CNP also visit EBC. The number of tourists visiting EBC with the main motive to observe the rearing of captive elephants. It is difficult to picture tourism in Chitwan without elephants, as they enable a close view of rhinos, tigers, mugger crocodiles, and others, attracting tourists from around the world. The elephants of Chitwan are gradually being promoted as value-adding factors for tourists in the context of annual elephant festivals and world elephant polo. The importance of elephants in tourism has been discussed in the study done by Ranaweera et al. (2015); Malikhao and Servaes (2017).

The private sector in Sauraha owned many captive elephants (61.85%). There is a high demand for elephant rides which forces the owners to emphasize quantity rather than quality. Similarly, the government captive elephants were used for patrolling, captive breeding, translocation of wild animals, tiger and rhino counting, and monitoring the wild animals in National Park (WWF 2020). Tourists ride an elephant as a recreational activity, but 38% of the tourists find elephant rides non-ethical and don't prefer to ride. This is because they consider elephant riding a form of cruelty to animals and in captivity, the natural environment for elephants is not maintained (Schmidt-Burbach et al. 2015). If the workload to an elephant is more than usual, it affects the health condition, resulting in severe wounds and abscesses. Harsh training methods and work overload are factors that contribute to unethical news of elephant rides. Elephant ride has gained much criticism as of now. As a consequence, travel companies have removed riding of the elephants from their itinerary in countries like Australia, the UK, and Canada. Moreover, 94.85% of elephants in Sauraha were kept tied with chains for more than 12 hours a day. Providing very minimal area, restricting the movement of elephants, resulting in problems in the elephant's physical health. This further reflects the poor welfare of the animal. Long chaining hours for elephants may develop stereotypic behavior in them (Varadharajan et al. 2016). Continuous chaining may also result in abrasion-induced injuries due to hobbles. Walking for captive elephants every day is significant, walking is considered very important to tackle various foot problems. Most of the elephants in Sauraha were found to travel the distance of 51-80km per day during their working hours. While the elephants traveling less than 20km were either due to illness or they were government-

captive elephants with no duty of patrolling because of pregnancy. But during the time of patrolling or important operations inside the forest, government elephants were also found to travel a greater distance than usual. Lack of exercise is one of the leading causes of foot problems in captive elephants. So, regular walking is recommended for elephants that are kept in captivity. In contrast to this, a study was done by Holdgate et al. (2016) and Miller et al. (2016) in North American Zoos found no co-relation among walking distance and foot problems. This may be due to differences in the working period of elephants, either during duty hours or foraging in nature.

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