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## OCCURRENCE OF SURGICAL AFFECTIONS IN ZOO HERBIVORES: A RETROSPECTIVE STUDY

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### ARTICLE INFO

### ABSTRACT

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The study has been directed to find out the occurrence of surgical affections in herbivorous zoo animals in National Zoological Garden, Dhaka, Bangladesh predicated on record books from 2012 to 2016. A total of 330 surgically affected animals were recorded. The overall occurrence of surgical affections was higher in Bovidae (34.85%) followed by Cervidae (25.45%), Equidae (13.94%), Cercopithecidae (10.61%), Giraffidae (4.85%), Elephantidae (4.55%) Hippopotamidae (4%), Rhinocerotidae (1.52%) and Macropodidae (0.61%). In this study, it is found a higher occurrence of surgically affected are male than female animals. The overall occurrence in male was 56.36% and those in female, it was 43.64%. In terms of different affections, the highest occurrence was wound (13.03% male, 16.67% female) and followed by lameness (14.55% in male, 11.82% in female), skin lesions (9.39% in male, 6.67% in female), myiasis (5.76% in male, 3.33% in female), Horn fracture 3.33% (Only in male), arthritis (2.42% male, 1.52% female), hoof injury (1.82% male, 1% female), abscess (1.52% male, 1.21% female), sore (0.61% male, 2.12% female), Fracture (1.21% male, 0.3% female), Paralysis (0.61% male, 0.3% female) and Corneal opacity (0.61% male, 0.3% female). This report may help to develop control strategies against major surgical affections reported in this study.

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## INTRODUCTION

A zoo (zoological park or zoological garden) is a facility in which wild creatures are limited to wall in areas, showed to people in general, and in which they may likewise be reproduced. Current zoos have an essential part to play in the preservation of biodiversity. Wild animals have been maintained in close association with humans since the dawn of human creation (Fowler, 1996). Wildlife Surgery encompasses the surgical care of all non-domestic animal species, whether they are free-ranging in the wild or in temporary care for rehabilitation and release after an injury, or those that are kept permanently in captivity for conservation and other purposes. The surgical procedures fall into three broad categories: orthopedics, soft tissue surgery and neurosurgery (Fowler, 1996).

The management practices of wild animals and geo-climatic condition of Bangladesh are favorable for the occurrence of various surgical affections. The occurrence of surgical affections fluctuates with the species, ages, sex of the animals and season of the year (Samad, 2001). For proper care and management, identification of surgical affections in wild animals is important. In many of the cases, diseases are treated with medicine only; while few cases need surgical intervention in clinical veterinary practice. The importance of wildlife surgery is to save and prolong the life of wild animals, to hasten recovery from an injury, for elimination of a disease process, for cosmetic reasons, for correcting deformities or malformations, for the replacement of a part by an artificial one, on economic reasons or to make an animal socially acceptable, to aid in diagnosis of a suspected pathological process, for investigation in research work. Veterinarians play a key role in conservation programs (Kelly et al., 2013) and may be involved in wildlife health care (Reading et al., 2013), population management (Wikler et al., 2014), immobilization, capture and translocation (Ewen et al., 2015). Although a lot of research or survey works have been carried out in domestic or pet animals to the best of our knowledge, there is no such record on the investigation of surgical affection in wild animals in Bangladesh. Therefore, the research or survey work has undertaken to investigate the occurrence of surgical affections in wild herbivores.

## MATERIAL AND METHODS

The study was carried out on the basis of record book maintained by the Veterinary hospital of Bangladesh National Zoo, from the period of 2012 to 2016. A number of 330 surgically affected wild herbivores animals were considered as sample. Data were organized in the Microsoft Excel spreadsheet and percentages of surgical affections in different species were calculated. The percentage of occurrence of surgical affections was evaluated by using following formula:

$$\text{Occurrence (\% of Surgical Affections)} = \frac{\text{Number of cases}}{\text{Number of individuals in the study}} * 100$$

## RESULT

### Occurrence of surgical affections in herbivorous zoo species

A total of 330 surgically affected wild herbivorous animals were recorded from 2012 to 2016. The highest occurrence was seen in Bovidae 34.85% followed by Cervidae 25.45%, Equidae 13.94%, Cercopithecidae 10.61%, Giraffidae 4.85%, Elephantidae 4.55% and Hippopotamidae 4% (Figure 1).

### Various surgical affections and their occurrence in herbivorous zoo species

Recorded surgical affections in herbivorous family is presented in Figure 2. Among 330 cases the most frequently occurred surgical affection was wound (29.7%) and followed by lameness (26.36%), skin injury (16.06%), myiasis (9.09%), arthritis (3.94%), horn fracture (3.33%), hoof injury, abscess and sore (2.73%), others (2.34%).

### Occurrence of surgical affections in different sex of herbivorous zoo species

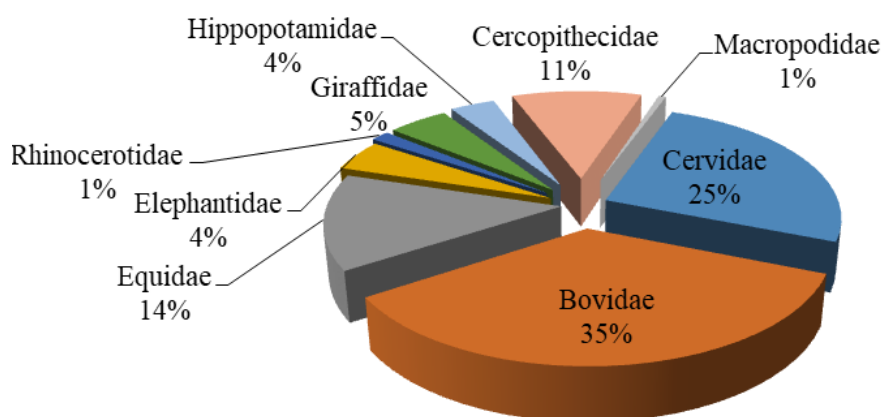
In this study, the overall occurrence of surgical affections was higher in male than female i.e. 56.36% and 43.64% respectively (Table -1).

### Various surgical affections and their distribution in male and female of herbivorous zoo animals

In this family, wound was recorded as the top most encountered affection i.e. 13.03% and 16.67% in male and female respectively, this was followed by lameness (14.55% in male and 11.82% in female), skin injury (9.39% in male and 6.67% in female), myiasis (5.76% in male and 3.33% in female), horn fracture (3.33% in male, arthritis 2.42% male and 1.52% female), hoof injury (1.82% male and 1% female), abscess (1.52% male and 1.21% female), sore (0.61% male and 2.12% female), fracture (1.21% male and 0.3% female), paralysis (0.61% male and 0.3% female), corneal opacity (0.61% male and 0.3% female) (Figure 3).

**Table 1.** Occurrence of surgical affections in different sex of herbivores zoo species

Sex	Total no. of affections recorded	Number of specific affections	Percentage (%) of affection
Male	330	186	56.36
Female		144	43.64



**Figure 1:** Occurrence of surgical affections in herbivorous zoo species

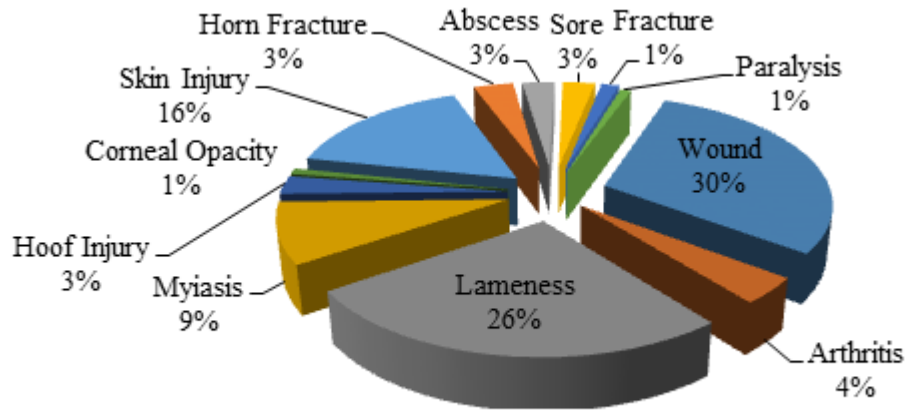


Figure 2. Surgical affections and their percentage of occurrence in herbivorous family

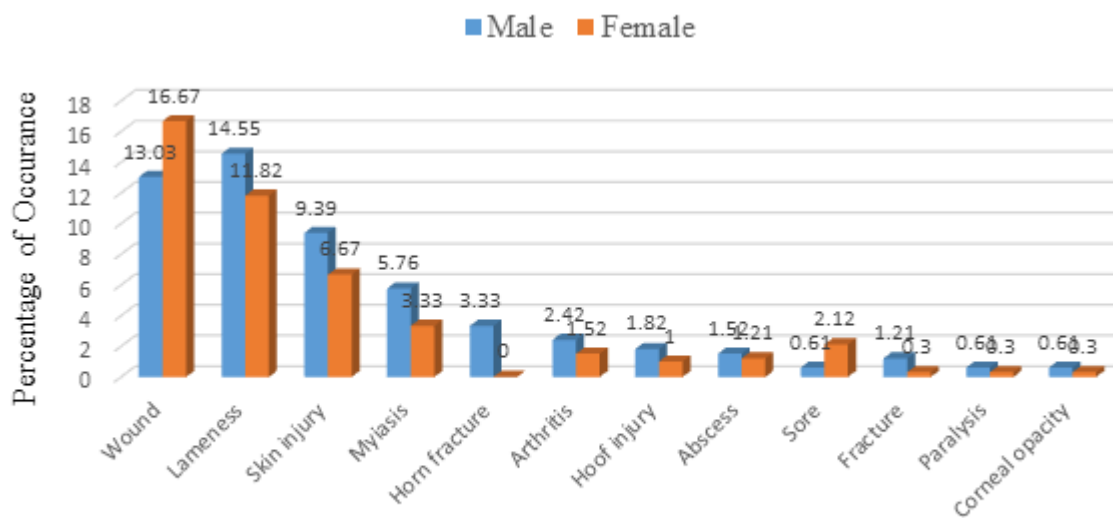


Figure 3: surgical affections and their occurrence in different sex of herbivorous family

## DISCUSSION

The overall occurrence of surgical affections in our study was higher in the family Bovidae (34.85%) and least in Macropodidae (0.61%). There is no such type of previous investigation in this line in zoo animals to compare and contrast our finding. The occurrence of surgical affections was higher in male than female. Zoo animals are usually polygamic that's mean they need above forty times mating in twenty-four hours both for male and female. But in Dhaka zoo, most of the male animals are above ten years for that reason, they can't copulate above forty times in twenty-four hours, they copulate only twelve to fifteen times a day according to the statement of zoo personnel. As a result sexual thirst of female is not fulfilled and thus female frequently attack their male counterpart and injure them. This one of the most important reason why male were more prone to physical injury than female.

The maximum occurrence of surgical affection was wound (29.7%). The traumatic wound, fracture, horn affections and arthritis were reported to be more prevalent in bathan than stall feeding system in case of domestic animals (Sarker et al., 2013). Our results thus in alignment with the features in domestic reported by Sarker et al (2013) in domestic animals as there is no such report in wild herbivores. In zoo animals, wound may be due to the abrasion with cages, trauma, during fighting, laceration due to running with sharp objects and jumping. Lameness was the second highest surgical affection in zoo animals. The percentage of occurrence of lameness was 26.37% (in male 14.55, in female 11.82). Lameness may be due to injury or fracture during fighting, running and falling.

Myiasis is resulted from the invasion of tissues by dipterous larvae which feed on the host's live or dead tissues and body fluids (Zumpt, 1965). The percentage of occurrence of Myiasis was 9.09%. Higher prevalence of myiasis had been reported in different areas for example, 14% in Saudi Arabia (Shehada, 2005), 5.08% in Turkey (Karatepe et al., 2008) and 5% in France (Boulard et al., 2008). Myiasis is not lethal to the animal if treated in time. Untreated maggot wounds may result in death of the animal, depending on the size and condition of the animal, the location of the infestation, and whether there are other complications such as infection or toxicity and impairment of the host's immune system (Otranto and Stevens, 2002).

Both leg sore and cutaneous sore were present in our study and this may occur because of an abnormal accumulation of interstitial fluid edema of the lower extremity (Guyton and Hall, 2000). The total percentage of occurrence of sore was 2.73%. The occurrence of bone fracture was 1.51% and that of horn fracture was 3.33% (only in male). Most of the fractures occurred due to massive trauma to legs and horns as well as during fighting each other. Our results are in good alignment with the report of incidence study of (Sarker, 2013) who exhibited bone and horn fracture in domestic species. Abscesses can occur nearly anywhere in the body but are often seen in the skin (Brown, 2004).

Several constraints were encountered in this study like absence of detail treatment information, anesthetic information, operation procedure, lack of follow up information and so on. But still the collected information has given us the overall scenario regarding surgical affections in captive carnivores and herbivores in confined conditions.

From the study, it was observed that herbivorous zoo species were susceptible to different surgical affections and the occurrence was higher in male than female species. Proper planning and program should be undertaken to treat and control surgical affections of wild animals.

## CONFLICT OF INTEREST

The author does not have any conflict of interest.

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