

# **A Study on Behavioral and Welfare Analysis of Tiger in captivity at Chattogram Zoo**



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## **Statement of Author**

I, Nayeem-Been-Zaman, certify unequivocally that I have performed all the tasks detailed in this report. The data was gathered from books, national and international periodicals, and other sources. All citations have been properly acknowledged. Consequently, I am solely responsible for collecting, manipulating, preserving, and publishing all data compiled in this report.

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**The Author**

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## Abstract

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The truth is that dangers from hunting, poaching, habitat degradation, and other manmade factors have forced tigers to live in captivity in zoo. The only way to keep the species alive has been in captivity. Due to their cramped living conditions and constant exposure to humans, captive tigers frequently exhibit strange behavior. Over the course of three days, a study of several behavioral features and a welfare analysis of sixteen Royal Bengal tigers (*Panthera tigris*) in Chattogram Zoo were conducted. The behaviors of individual or a group were recorded continually over 6 hours from 9:00 AM to 3:00 PM. They are unable to move, swim, climb trees, hunt, and other activities that they generally undertake in the wild because they are enclosed and confined to a small area. In general, tigers kept in captivity have little to no control over the amount of time they are exposed to certain types of light, noises, smells, visits, or temperatures. These elements have an impact on tiger behavior or activity in captivity. But the authority of Chattogram Zoo have been working from the beginning to provide a comfortable environment and welfare of tigers.

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**Keywords:** Royal Bengal Tiger, Behaviour, Welfare, Captivity.

# Chapter 1: Introduction

Big cats have traditionally been kept in zoos. However, it can be difficult to exhibit these species in a way that safeguards their welfare. In addition to the high cost of management in captivity, big cats frequently exhibit frequent stereotyped locomotor behaviors (Mohapatra et al., 2010). In the wild, tigers have a vast region to roam (Singh, 1999). They might not have the chance or need to exhibit the variety of behaviors required to thrive in their native habitat in a captivity setting (McPhee, 2002). Animals react in diverse ways to situations where the environment is not ideal. Since behavior is believed to reflect an animal's initial attempts to deal with stress, it may point to a scenario where welfare is in danger before any recognized measure of physiology or pathology (Dawkins, 1998).

Animal welfare evaluations in zoos may benefit from behavioral studies. The prevalence of anomalous behaviors, stereotypical behaviors, and similarities to the behavior of conspecifics in the wild have been the main points of attention (Robinson, 1998). Activity levels, posture and movement patterns, aggression, sleep patterns, and consumption are helpful behaviors for welfare assessment (Squires, 2003). The primary and most prevalent form of stereotypy that big cats exhibit while housed in zoos is pacing (Clubb and Mason, 2007). Research has been devoted to determining the causes because animals that typically occupy large home ranges in the wild tend to fare worse in captivity and are significantly more vulnerable to welfare issues (Clubb and Mason, 2007, Szokalski et al., 2012). Traditionally, researchers have compared animal behavior under various situations to determine how certain housing systems affect an animal's welfare. In this study, 16 captive tigers' general behaviors, food habits, reproductive patterns, and frequency of stereotypical behavior were evaluated.

## **Objectives of the study:**

- i. To observe the behavioral condition of tigers in captivity.
- ii. To find out the response of tigers with visitors in activity.
- iii. To assess the welfare condition of tigers in captivity.

## Chapter 2: Material and Methods

### 2.1. Study site

The study was carried out at Chattogram Zoo (22°21'58.5"N and 91°47'47.3"E), which is located about three kilometers north-west of the city, alongside the entrance of Foy's Lake, opposite the foothills of the mountains of USTC Medical College, and covers an area of 10.2 acres. The park is roughly 7.7 kilometers away from Chattogram Railway Station. The distance to Chattogram's Shah Amanat International Airport is 29.5 kilometres. On February 28, 1989, this zoo was opened to the public.

### 2.2. Study subject

Over the course of three days, sixteen Royal Bengal Tigers (*Panthera tigris tigris* Linn.) were observed for the study. The study subjects were solely watched during their normal husbandry operations and visit hours, and no experiments were carried out.

### 2.3. Methodology

Behavioral observation and welfare analysis was done to determine the present condition of captive tigers in zoo. The duration of the study was documented for a predetermined time period. Instantaneous or continuous recording are common techniques for observing behavior. The study involves continuously monitoring the actions of one selected individual or a group (adult male, adult female) for 6 hours.



**Figure 1:** Geographical location of Chattogram Zoo



## Chapter 3: Results

The current study examines how normal-colored tigers and white tigers or bleached tigers behave in regard to daily activities (grooming, climbing, playing, roaring, relaxing, sleeping), feeding and presence of visitors or not. There were 16 tigers used as study subjects. The Table1 provides information about the tigers researched at the Chattogram Zoo. Through the use of a predefined questionnaire form, all the chosen observations were recorded.

**Table 1:** Information on the Tigers Studied at Chattogram Zoo

SI No	Age (years)	Gender
1	1	Male
2	1	Female
3	1	Male
4	1	Male
5	10	Female
6	8	Female
7	2	Female
8	6	Female
9	3	Female
10	3	Female
11	2.5	Female
12	8	Female
13	1	Male
14	3	Male
15	4	Male
16	4	Male

### 3.1. General Activities

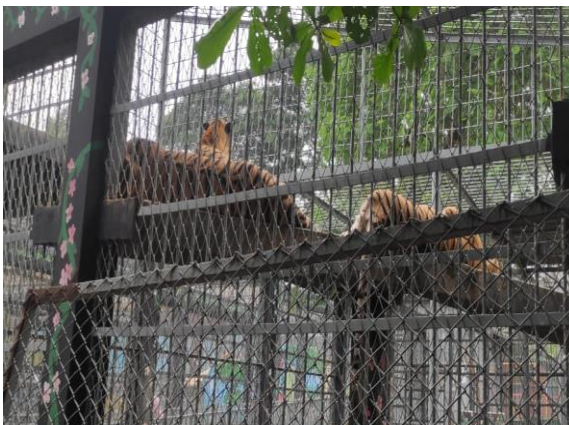
Table 2 provides information about the general behaviors and activities of each tiger. Each row corresponds to a specific behavior or activity, while each column represents the number of tigers. The cages are labeled as "Cage 1," "Cage 2," "Cage 3," and "Cage 4." The "Yes" and "No" values for each behavior and activity show whether the tigers engaged in that behavior within the specified time period (6 hours). The frequency of several actions, such as "Playing" and "Stalking Behavior," varies among the tigers. All the sixteen tigers in cage 1-4 were seen to bath in tub, grooming, response in zookeeper sound and locomotion activity during the study. But two tigers in cage 4 were not seen playing. Stalking behavior was found of 2,4,7,13,14,15 and 16 number of tigers among 4 cages when visitors were come near to cage. Hiding tendency was found from 3, 5, 6,7 and 13-16 numbers of tiger.



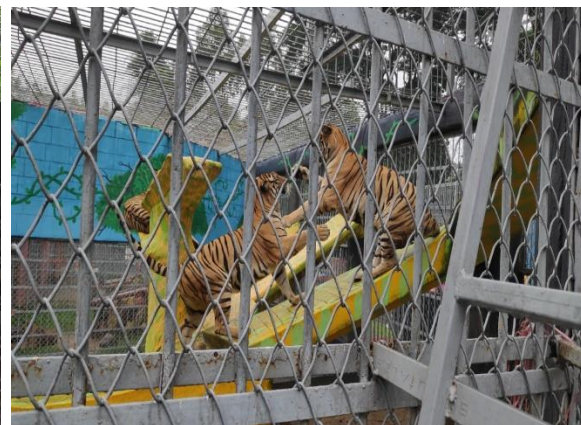
**Figure 2:** Grooming activity of tiger



**Figure 3:** Stalking behavior of tiger



**Figure 4:** Resting period.



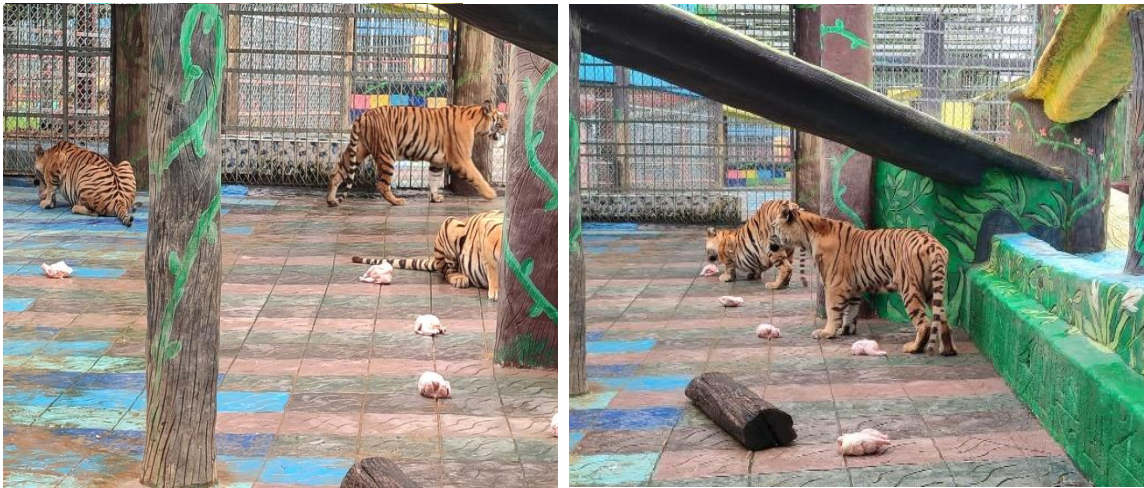
**Figure 5:** Playing with each other.

**Table 2:** Observation of general activities of sixteen tiger at Chattogram Zoo

General Activities	Cage 1					Cage 2		Cage 3					Cage 4			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Bath in water tub	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grooming Activity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Playing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Response in Zoo keeper sound	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stalking Behavior	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
Locomotion Activity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hiding activity	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes

### 3.2. Feeding Behavior

Carnivorous animals include tigers will eat the flesh of any living thing in any condition. Six days a week, raw cow and chicken meat was provided to the tigers at the Chattogram Zoo between the hours of 9:00 a.m. and 10:00 p.m. Tigers were observed to be restless and wander around in their enclosure at feeding time. All of the tigers became active and their restlessness increased when they saw the keeper bringing the food cart. The tigers moved along with the food trolley as the keeper moved around the enclosure. Tigers were seen pacing restlessly near the food source, then they stood on their hind legs and slapped the wire mesh with their front paws. The table 3 provides information of tiger's behavior during feeding. As dead animals' meat was provided separately to them so they did not show any hunting behavior, fighting with each other and roaring during feeding. They all had tendency to take away the feed in a blank spot from visitor's eye except 6,7,14 and 16 number of tigers. 3,4,5,8,9,11 and 12 number tigers have taken the feed from others when they finished the own diet.



**Figure 6:** Feeding of tiger.

**Table 3:** Observation of feeding behavior of sixteen tiger at Chattogram Zoo

Feeding Behavior	Cage 1					Cage 2		Cage 3					Cage 4			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Tiger Fight While Eating	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Show hunting behavior	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Take away food in blank spot	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Roar during Feeding	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Take away food from other tigers	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No



### 3.3. Behavior in the Presence of Visitors

The behavior of tigers in various cages when visitors are present are detailed in Table 4. The Table 4 provides information on the numerous ways that animals react to human presence, including alterations in general activity, interactions with humans, territorial behaviors, and locomotor activities. It implies that visitors' behavior may have an impact on how animals behave in various cages. All the cages of tiger were tried to make in harmony with natural environment. As the tigers were born in these cages or stayed long time there, they are adapted with the environment. No pacing behavior was increased in the presence of visitors. Besides, except one tiger all of them had shown the general activities perfectly. Three tigers from cage 3 and 4 have tendency to hide in blank spot from visitor's eye. Their locomotion activity and others like playing, hissing, roaring had no effect in the presence of visitor's. Three tigers from cage 1 and 2 showed stalking behavior when visitors come near to these cages.



**Figure 7:** Resting in the presence of visitor

**Table 4:** Observation of behavior in the presence of sixteen tiger at Chattogram Zoo

Behavior Presents with Visitors	Cage 1					Cage 2		Cage 3					Cage 4			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Increasing Pacing Behavior	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Decreasing General Activity	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
Hide in blank spot from visitor's eye	No	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	No	No
Eat less in presents of Visitor	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Playing, Hiding, Roaring in presence of Visitor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locomotion Activity presents of visitor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stalking against Visitor	Yes	No	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No

### 3.4. Welfare Analysis

Table 5 gives a quick overview of the wellbeing circumstances for animals housed in various cages during a specified period of time. It draws attention to areas where the animals' demands for feeding, medical attention, and social contact are being satisfied as well as those where changes might be made, like providing proper housing and resting locations. The analysis ensures that the animals are treated well and that their wellbeing is given first priority. All of the tigers were provided proper nutritional diet and fresh water according to their age and body weight. All the cages have enough space for tigers to move around. But in cage 3 there was no hiding place for tigers. As a result, they cannot hide from visitor's eye. Zoo has own veterinary doctors who always provided treatment to tigers when they required. Anesthesia would maintain properly in that case. Tigers were being provided partner as company in all cages.



**Figure 7:** Alertness in the presence of zookeeper.



**Table 5:** Observation welfare analysis of sixteen tiger at Chattogram Zoo

Welfare Analysis	Cage 1					Cage 2		Cage 3					Cage 4			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Proper nutrition and water supply	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Suitable housing and comfortable resting area	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
Get quick treatment of disease and injury	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provide Partner as company	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

### 3.5. Reproductive Behavior

Table 6 provides information on the reproductive habits of animals housed in various cages during a specified period of time. It draws attention to the existence or absence of specific reproductive, territorial, and dominance-related behaviors. The observed behaviors can provide important insight into the interactions and social dynamics of the animals in their distinct habitats. Some reproductive data were taken from zookeeper that all the tigers can reproduce their offspring at any season. They did not show any circling movement with each other and dominating and territorial behavioral had showed during this study. Some male tigers from cage 1 and 4 showed to spray urine in an object several times in a day



**Figure 8:** Urine spray of male tiger

**Table 6:** Observation of reproductive behavior of sixteen tiger at Chattogram Zoo.

<b>Reproductive Behavior</b>	<b>Cage 1</b>					<b>Cage 2</b>		<b>Cage 3</b>					<b>Cage 4</b>			
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
Season	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Notice of Circling each other	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Urine Spray	yes	No	Yes	yes	no	no	No	no	no	no	no	no	Yes	Yes	Yes	Yes
Presents of dominating behavior	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Presents of territorial and violating behavior	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

## Chapter 4: Discussion

This study observes the behavior including activeness, abnormal behavior (stereotypic), feeding behavior and analysis of welfare of captive tigers. From an aesthetic and scientific perspective, it is clear that captivity changes behavior, which is undesirable. Animals constantly alter their behavior to suit their surroundings. The fact that all the basic needs for survival are met in captivity is a serious issue. Animal survival and reproduction are significantly impacted by the temporal arrangement of behavior (Daan and Aschoff, 1982).

The study of behavior on tigers reveals some additional characteristics. All of the tigers became alert and their restlessness increased when they saw the keeper pushing the food cart. Similar observations are reported by Mohapatra et al. (2010) and Palita (1997). When food was kept inside the feeding chamber and the shutter was opened, the tiger hurriedly either remained or fed inside or came out with a large piece of meat on the lips to the outside. The soft bones and flesh were ingested. Additionally, it was noticed that the tigers gripped bones between the pads of their forepaws and chewed on them. They were observed to be extremely peaceful while being fed (Mohapatra et al., 2020). In general, animals kept in captivity have little to no control over the amount of time they are exposed to, as well as the type of light, sound, smells, visits, or temperatures. These elements have an impact on tiger behavior or activity in captivity. Environmental enrichment in inadequate captive settings may assist minimize behavioral stress, which could contribute to enhanced health, reproduction, and lifespan. Tigers who experienced a food delay exhibited aggressive, disliking, and angry pacing behavior. As an example, tigers kept in smaller enclosures pace more often than those kept in larger enclosures (Bashaw et al., 2007). Therefore, stereotypical behaviors are frequently seen in tiger. It has been demonstrated that environmental enrichment can lessen stereotypical behavior (Young, 2003). This study comes to the conclusion that tigers need big cages with enhanced environments, a pleasant attitude from the keepers, correct nutritional

supplements, and to abide by the zoo's welfare guidelines. Big cats, like tigers, may require more social interaction and different living conditions in captivity than they do in the wild. This is crucial to keep in mind when caring for these animals.

## **Chapter 5: Conclusions**

Overall, the study indicates that, in order to reduce stereotypes and stress levels, tigers kept in captivity should be managed in larger enclosures enhanced with water tubs and hiding sheds, proper nutritional diet, a positive attitude from the zookeeper, and appropriate social conditions.

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The author is immensely grateful to the zookeepers who helped him by sharing valuable information about the zoo's management.



## **Biography of Author**

This is Nayeem-Been-Zaman, the child of DM Moniruzzaman and Sheeyesmin Khanom, doing his graduation on Doctor of Veterinary Medicine (DVM) at Chattogram Veterinary and Animal Sciences University under Faculty of Veterinary Medicine. He passed the Secondary School Certificate Examination (SSC) in 2015 from National Ideal School, Dhaka and got GPA 5.00 and then Higher Secondary Certificate Examination (HSC) in 2017 from Dhaka College, Dhaka and got GPA 5.00. Currently he is doing his yearlong internship. He has a great enthusiasm in his study area to develop day one skills and gain more practical knowledge to be prepared for the modern era of science.