

Breastfeeding Pattern of Sumatran Elephant (*Elephas maximus sumatranus*) towards Their Calf at Tangkahan Conservation Response Unit (CRU), District of Langkat, North Sumatera

Kaniwa Berliani¹, Kansih Sri Hartini² and Hijah Musnur Majib Tanjung¹

¹Department of Biology, Faculty of Mathematics and Natural Sciences, Universitas Sumatera Utara,
Jalan Bioteknologi No. 1 Kampus USU, Medan, North Sumatera 20155, Indonesia

²Department of Forestry, Faculty of Forestry, Universitas Sumatera Utara,
Jalan Tridharma Ujung No.1 Kampus USU, Medan, North Sumatera 20155, Indonesia

Keywords: Breastfeeding, *Elephas maximus sumatranus*, North Sumatera, Sumatran Elephant, Tangkahan

Abstract: One particular behavior of Sumatran Elephant (*Elephas maximus sumatranus*) is breastfeeding. This behavior is important to keep the survivability of their calves. The aim of this research was to observe the breastfeeding pattern of a mother elephant towards her calf. Research location was at Tangkahan CRU area, Namo Sialang Village, Subdistrict of Batang Serangan, District of Langkat, North Sumatera. Research was carried out using focal animal sampling combined with continuous sampling method. Main objects of this research were 3 mother elephant (Agustin, Yuni, and Olive) and 3 baby elephant with approximately 2.5 years old (Cristopher, Albertina, and Eropa). Result showed that there is a difference in the duration and frequency of breastfeeding depending on the gender of the baby elephant. Male baby elephants spent more time breastfeeding than females, while the age of mother elephant also affect the breastfeeding behavior. An older mother elephant that had more experience in parenting was observed to have better breastfeeding pattern than other female elephants.

1 INTRODUCTION

Sumatran elephant (*Elephas maximus sumatranus*) is a highly social type of animal that prefers to live in groups. This behavior is important to protect its group members (Wilson, 1975). The relationship between a mother elephant and its calves is highly close that mother elephant will act protective towards its newborn calf. Various pattern of parenting behavior of a mother elephant can affect most of its daily activities. A mother elephant will typically teach its offspring how to socialize and to find their own food until they could survive on their own. In addition, elephant parents will also punish their calves to correct their behavior which can lead into a risk.

The pregnancy process of a female elephant could take up to 22 months and could only give birth to one baby elephant. A pregnant female elephant is usually accompanied by two to three other females until the birth process. After the baby elephant is born, it will be protected and taken care together

with other females in the group (Chelluri, 2009). The parenting behavior of a mother elephant towards its calf grows constantly (innate) through their habit to live in groups.

A newborn baby elephant will be strictly protected by its mother for about 10 to 15 years (Joshi, 2009). A mother elephant will show its parenting behavior and provides energy to take care of its calf. In addition, a baby elephant is strongly dependent to its parents to meet its daily feeding need at the beginning of its growth during the neonatal period (Poirier, 1972). The parenting behavior of a mother elephant is shown in several other behavior, one of which is breastfeeding. During this process, a mother elephant will breastfeed its calf for 3 years or more (Sukumar, 2003; Joshi, 2009).

Despite its importance in maintaining the survival of its species, the information about parenting behavior of a mother elephant, particularly breastfeeding, has not yet been well studied in Tangkahan. Thus, it is important to conduct a study

and observe the feeding pattern of a mother elephant in order to obtain a beneficial information to support the ex-situ conservation management of Sumatran elephant at Tangkahan CRU, Langkat, North Sumatera.

2 MATERIALS AND METHODS

2.1 Time and Study Site

This research was done from May to June 2018, while the survey about the elephant behavior has been previously done from March 2018. Research location was at Tangkahan Conservation Response Unit (CRU) area, NamoSialang Village, Subdistrict of Batang Serangan, District of Langkat, North Sumatera. Tangkahan itself is a buffer zone of Gunung Leuser National Park and has been utilized as ecotourism site since May 19th 2001, but only become CRU area on December 2002.

2.2 Objects

The main object of this research was Sumatran Elephant (*Elephas maximus Sumatranus*) i.e. 3 mother elephants (Agustin, Yuni, and Olive) and 3 baby elephants with the age of approximately 2.5 years old (Cristopher, Albertina, and Eropa) out of 9 elephant individuals in Tangkahan CRU.

2.3 Materials

Materials used in this study were stopwatch (to limit the observation interval), stationary and tally sheet (to record the data), video camera (to observe the elephant behavior), and digital camera (to take picture of the research object).

2.4 Methodology

Research method about feeding pattern of mother elephant used in this study was descriptive observational combining focal animal sampling and continuous sampling method (Martin, 1993).

2.5 Data Collection

Data collection was done using focal animal sampling method towards the chosen main research object to observe the parenting behavior but not limiting its activity. This method can collect the data of parenting behavior of mother elephant in detail. Breastfeeding activity of the elephant was recorded

on the determined time frequency. The activity and interaction of each elephant individuals were observed every five minutes for 10 hours a day for a total of 100 hours observation.

2.6 Data Analysis

Data about parental behavior of mother elephants was processed using descriptive analysis to particularly provide an overview of the parental behavior towards its calf. In addition, the frequency percentage of interaction behavior between mother and baby elephant can be determined using the formula below:

$$\% \text{ Frequency} = \frac{\text{Frequency of behavior}}{\text{Total frequency of behavior}} \times 100\%$$

Tabulation of the quantitative data is subsequently served using graphics and diagrams.

3 RESULTS AND DISCUSSION

Parenting behavior of a mother elephant towards its calf can be expressed by showing different behaviors, one of which is breastfeeding. Based on 100 hours of observation on the breastfeeding activity of 3 mother elephants towards their calves, 516 sampling spots with 32,505 seconds or 541.75 minutes has been obtained. During the sampling collection, all three of the mother and baby elephant were observed to have good health condition, as the observation did not cause any alternation towards their daily activity in the CRU area. Observation results showed that there is a difference of breastfeeding pattern on mother elephants towards their calves.

3.1 Breastfeeding Duration of Mother Elephant

The breastfeeding duration was different for each mother elephants during the observation. During the 100 hours observation, mother elephant "Olive" breastfed her calf "Eropa" for 7910 seconds or 131.83 minutes. Olive was observed to spend her time differently each day for the 10 days of observation. It can be seen on Figure 1 that the average duration for Olive to breastfed Eropa was averaged at 13.18 minutes a day. Olive spent her time at breastfeeding most on the fifth day of observation, as during that day Olive showed the

least movement for grazing or browsing. Mother elephants prefer to consume the feed given by CRU

management, to allow their calves easily reach their nipple and feed from it.

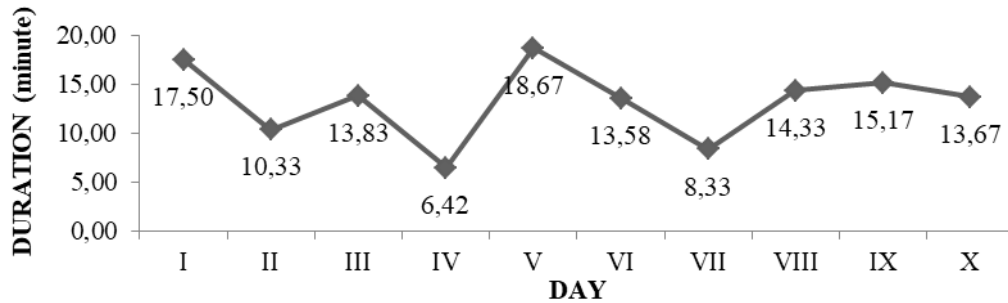


Figure 1: Duration of breastfeeding between mother elephant “Olive” towards its calf “Eropa”

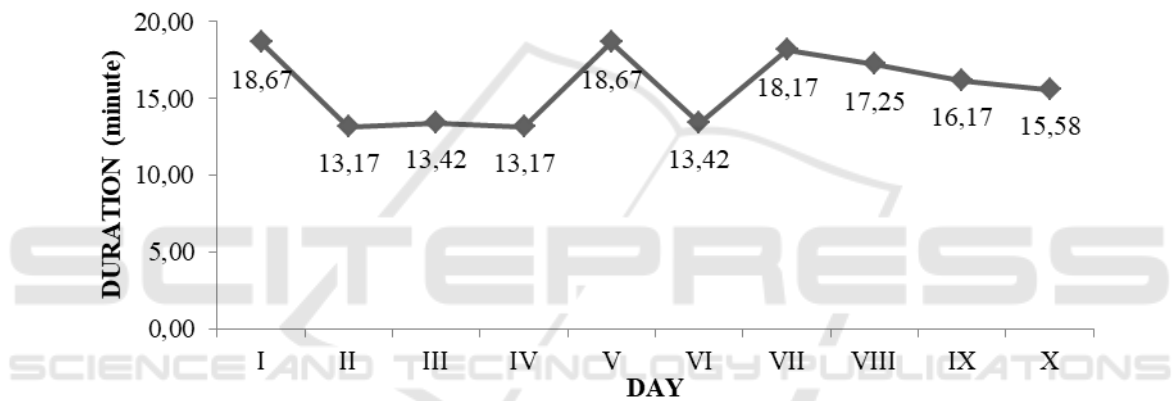


Figure 2: Duration of breastfeeding between mother elephant “Yuni” towards its calf “Albertina”

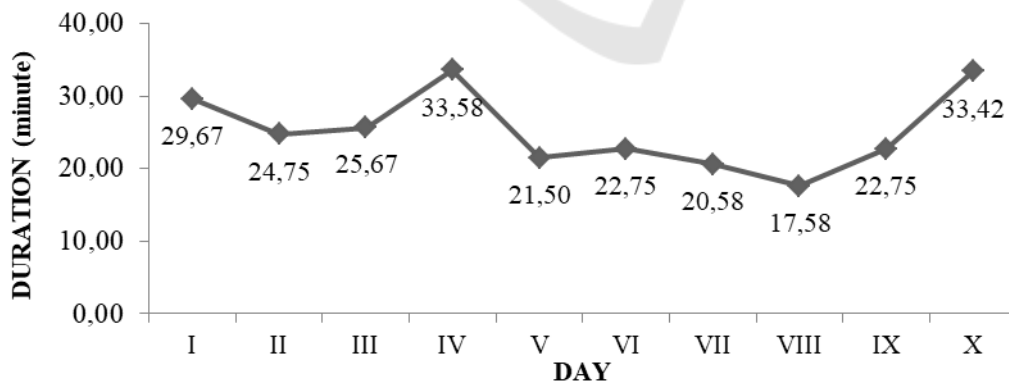


Figure 3: Duration of breastfeeding between mother elephant “Agustin” towards its calf “Cristopher”

On the other hand, the least time Olive spent for breastfeeding was at day 4 with only 6.42 minutes. During this day, Olive was observed to spend more time grazing and browsing the jungle, which consequently caused her to have less time breastfeeding. Her calf, Eropa, was also observed to imitate her feeding activity, which caused her to be satisfied by consuming the natural feed. Moss (1983) stated that baby elephant will imitate the feeding activity of their parents. During the observation time, the baby elephant spent only 6 times breastfeeding with her mother.

As the baby elephants grow, they will imitate the feeding behavior of their parents and thus improving their ability to find and consume their natural food in the wild. Sukumar (2003) reported that the ability of a baby elephant to imitate and find their own food will continuously grow until they reached 3 years old or more. This was shown by the ability of a baby elephant to revoke the grass using their trunk in the jungle, following the feeding activity of their parents (Nair, 1983). Their ability to look for food was also shown in group when baby elephants imitated and interacted with other elephants in exploration for food up to the local agricultural field, which may cause a conflict between human and elephant group (Berliani, 2016; Berliani, 2017).

It can be seen from the Figure 2 that mother elephant "Yuni" breastfed her female calf "Albertina" for up to 9,460 seconds or 156.67 minutes. In general, it can be concluded that mother elephant "Yuni" spent more time breastfeeding compared to "Olive". The average time of Yuni breastfed Albertina was approximately 15.77 minutes a day. This could be due to the age difference between Yuni and Olive, which affects the parenting behavior towards their calves. Yuni is known to be older than Olive, and thus had more experience of parenting and taking care of her calf. Based on our observation, Yuni regularly breastfed Albertina, even during the movement of grazing and browsing activity. When Albertina tried to reach Yuni's nipple, she will stop and let Albertina feed from it.

Mother elephant Agustin and Yuni had approximately similar age, which made them both to give similar parenting behavior. Unlike the other elephants in this study, mother elephant "Agustin" breastfed her baby male elephant "Cristopher". During the 100 hours of observation, Agustin was recorded to breastfed Cristopher for 15,135 seconds or 252.25 minutes. It can be seen on Figure 3 that the average duration of Cristopher to breastfeed was at 25.22 minutes each day. Cristopher was observed

to be breastfed during the fourth and tenth day of observation at 33.58 and 33.42 minutes respectively. Cristopher was also observed to be more active compared to other baby elephants. His activity needed more energy, which caused him to get breastfed more in order to fulfil his daily feed requirement. Sukumar [5] stated that mother elephants did not only provide nutritional intake for their calves, but also maintain their average growth, physical condition, and reproduction ability.

Subsequently, the behavior of these mother elephants are expected to care for their calves and thus succeeded their reproduction.

3.2 Breastfeeding Frequency of Mother Elephant

Observation on this research revealed that mother elephant expressed their breastfeeding behavior continuously every day. The repetition of this feeding behavior was observed for 100 hours between mother and baby elephants. This interaction revealed the frequency of daily feeding process, and thus any changes in the breastfeeding behavior and frequency can be observed. Figure 4 showed the frequency percentage of breastfeeding behavior of mother elephant "Agustin" was higher compared to Yuni and Olive. The highest frequency percentage of Agustin was at day 4 and 10. This data showed that Agustin used 14.54% of observation period to breastfeed on both day 4 and 10 during the 100 hours observation. On the other hand, mother elephant "Olive" used 14.50% of observation period to breastfeed on day 5 while Yuni used only 12.34% of observation period to breastfeed on day 1 and 3.

During observation, the frequency percentage of breastfeeding behavior of each mother elephant showed differences each day. It can be observed that the higher frequency percentage of breastfeeding one mother elephant used, the longer the duration will be on the same day, and vice versa. Thus, it can be concluded that the frequency percentage of breastfeeding behavior on a mother elephant was directly proportional with the duration spent. In general, Agustin and her calf Cristopher had the highest frequency percentage of breastfeeding compared to other mother and baby elephants. This could be due to the sex difference of baby elephant causing different amount of energy intake to their body. In addition, mother elephant was also observed to give better care for male calf. Lee and Moss (1995) recorded that baby elephants showed different breastfeeding behavior from 0 to 54 months. Furthermore, Lee and Moss (1986)

explained that breastfeeding frequency and duration of male baby elephant was higher than females. This

pattern is consistent until the baby elephant reached 3 years old.

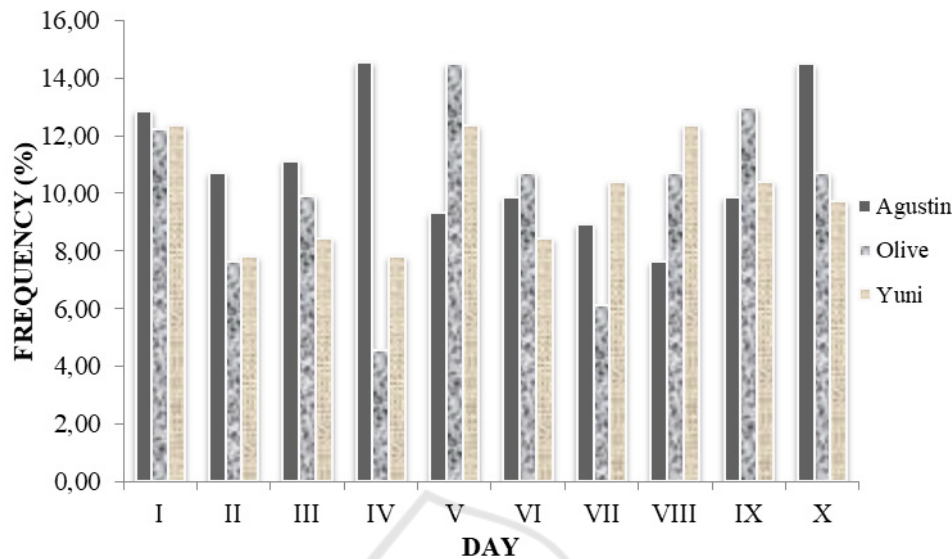


Figure 4: Frequency percentage of breastfeeding behavior of mother elephants towards their calves

Mother elephants tend to give better care for male baby elephants. Sukumar (2003) explained that mother elephants invested more time to take care of male calves for up to 2 – 5 months compared to female calves. This is associated with the demographic term on elephant population, in which the increment of parental care on male calves is expected to promote the success of reproduction. Furthermore, Trivers and Willard (1973) reported that mother elephant will spend more time breastfeeding male calves as they grow faster compared to females. Nevertheless, many factors could affect the survivability of long-living animals, including physical condition, annual climate, food availability, population density, etc

4 CONCLUSIONS

Duration and frequency percentage of each mother elephant in this study showed differences during the 100 hours observation. Higher frequency percentage of breastfeeding one mother elephant used will lead to longer duration of breastfeeding on the same day, and vice versa. The frequency percentage of breastfeeding behavior on a mother elephant was directly proportional with the duration spent. Male calves were known to spend more duration for breastfeeding compared to females. This could be due to faster growth of male calves. In addition, the age of mother elephant also affects their breastfeeding behavior. Older mother elephants will have more experience parenting and thus has better feeding pattern than other elephants which is consistence to the existing theory.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge that this research is supported by Lembaga Penelitian Universitas Sumatera Utara. The support is under research grant TALENTA USU of year 2018 Contract Number 2590/UN5.1.R/PPM/2018.

REFERENCES

- Wilson EO 1975 Sociobiology: The new synthesis. Harvard University Press. Cambridge, Mass
- Chelluri G 2009 Ontogeny of The Mother-calf Relationship in African Forest Elephants (*Loxodonta africana cyclotis*) [Thesis]. Biological Sciences Ecology and Evolutionary Biology.
- Joshi R 2009 Asian Elephant's (*Elephas maximus*) Behaviour in the Rajaji National Park , North-West India: Eight Years with Asian Elephant. *Nature and Science* 7(1): 49-77.
- Poirier FE 1972 Primate socialization. Random House. New York
- Sukumar R 2003 The Living Elephants: Evolutionary ecology, behavior and conservation. Oxford University Press, New York.
- Martin P, Bateson P 1993 *Measuring behavior: An introductory guide*. Cambridge University Press. Cambridge. England. Second Edition 222p

- Moss CJ 1983 Oestrous behaviour and female choice in the African Elephant. *Behaviour*. 86. 167-196
- Nair PV 1983 Studies on the development of behaviour in the asiatic elephant. Ph.D [Thesis]. India Institute of science, Bangalore
- Berliani K. Alikodra HS. Mas'yud B. Kusri MD 2017 Bioekologi gajah sumatera (*Elephas maximus sumatranus*) pada konflik manusia-gajah di Provinsi Aceh. Prosiding Seminar Biotik. ISBN: 978-602-60401-3-8
- Berliani K. Alikodra HS. Mas'yud B. Kusri MD. 2016. Susceptibility of cultivated plants to Sumatran elephant conflict area in Aceh Province. *JMHT*. 22(1). 65-74
- Lee PC, Moss CJ. 1995. Statural growth in know-age African elephants (*Loxodonta africana*). *Journal of Zoology* (London) 236, 29-41.
- Lee PC, Moss CJ. 1986. Early maternal investment in male and female Asiatic elephant calves, *Behavioural Ecology and Sociobiology*, 18. 353-361
- Trivers RL. Willard DE. 1973. Natural selection of parental ability to vary the sex ratio of offspring. *Science*. 179. 90-92

