

PRELIMINARY STUDIES OF GROOMING BEHAVIOR OF DOMESTIC AMERICAN GUINEA PIG (CAVIAPORCELLUS)

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ABSTRACT: *The present study was carried out to elucidate the grooming behavior under clean and dust environmental condition in domestic American guinea pig (Caviaporcellus). The domestic guinea pig was allowed to provide all necessary food items and water prior to the initiation of experiment in order to minimize physiological stress and the present study was carried out in residential place at Homagama during the period of December 2015 to January 2016. The guinea pig was placed for 1 hour in the clean environment and allowed another 1 hour in dust environment. Wood shavings were applied to the cage in order to make cage as dust environment. Then number of grooming and time taken for each grooming in seconds in each environment were recorded. As this manner recordings were taken for 10 days. Data were analyzed statistically using Microsoft Excel 2013 for Chi-Square test. Results revealed that the Grooming behaviour of Guinea pig was significantly high in dust environment in comparing with the clean environment (χ^2 test; $p < 0.001$).*

keywords: Grooming behavior, American Guinea pig, dust environment

INTRODUCTION

The guinea pig is oldest domestic rodent occupy in South America (Mares and Ojeda 1982; Redford and Eisenberg 1992). It was domesticated about 3000–6000 years ago (Hüchtinghaus 1961; Künzli and Sachser 1999; Stahnke and Hendrichs 1988; Weir 1974). It had been commonly used as laboratory animals in biological and biomedical research for a long time (Avery 1925; Kaiser et al. 2003; Sachser 1986, 1998; Young 1937, 1969). Guinea pigs are popular pets worldwide for many decades (Müller-Haye, 1981). They are most active at dawn and dusk mean crepuscular, feeding on grasses, seeds, fruits and roots (Terrill, 1998). Surprisingly, until today it was reported a few on behavior of the cavy. They are highly good group of animals for investigating social evolution because most basic types of mammalian social and mating systems occur in this group (Stahnke and Hendrichs 1988), and the social organization of different species seems to be very responsive to ecological conditions (Ebensperger and Cofre 2001; Lacher 1981).

Grooming behavior increases the chance of survival in a guinea pig. Guinea pigs are usually self-groomers (Vanderlip, 2003) though involving in social grooming. They clean their body by licking fur. Grooming is highly ubiquitous in Guinea pigs, and can serve various function. The most important is maintain health by removing detritus and disease causing parasites (spruijt, 1992); attract mates, avoidance of predation via removal of odors, thermoregulation and chemo communication (moon fanelli, 1999); tactile communication (Walker, 1998); and temperature regulator, a sense organ, a protective device and a moisture balance; and showing companionship and ranking order among the

animals (Wagner, 1995). Main objective of this study was to elucidate the grooming behavior under clean and dust environmental condition in domestic American guinea pig.

METHODOLOGY

The present study was carried out in Homagama (6.8433° N, 80.0032° E) during the period of December of 2015 and January 2016. Guinea pig was acclimatized for 2 hours prior to experiment. Male American domestic Guinea pig of weight 700grams and four months old was chosen as experimental organism. The Guinea pig was allowed to provide all necessary food and water prior to initiation of an experiment in order to minimize physiological stress.

The Guinea pig cage dimension of (130cm×75cm×45cm) was cleaned properly without any dust in order to provide clean environment and the guinea pig was allowed for 1 hour in that clean environment and the number of grooming and time taken for each grooming in seconds was recorded. Then wood shavings were applied to the cage in order to make cage as dust environment and guinea pig was allowed another 1 hour in dust environment and the number of grooming and time taken for each grooming in seconds were counted using Xperia S_e290 digital stop watch. As this manner recordings were taken for 10 days. Behavioural patterns of Guinea pigs were recorded using Apple I phone 5c, 8.0 mega pixel camera. The statistical analysis was done using Microsoft Excel 2013 for Chi-Square test.



Figure1. Experimental cage

Steps in the typical grooming activity:

Ethogram of grooming behaviour of guinea pig contains following steps

Licking its front feet

Wiping its face

Sitting on its haunches

Wiping its nose

Bring both front feet over the head from behind the ears all the way to the tip of its nose

The body is cleaned with teeth and tongue back and forth

Shake all over as it to remove loose hairs and fur that's still on its body

DISCUSSIONS AND RESULTS

Table 1 and Table 2 describe total number of grooming and time taken for each grooming in clean and dust environment respectively.

Table 1. Number of grooming in clean environment

Number of trials	Time spending for each grooming in seconds(S)					Number of grooming in each trial	Total time
1	18.9	19.7	18.9			3	57.5
2	15.1	19.6	20.1	18.6	18.9	5	92.3
3	15.5	17.8	16.3	13.3		4	62.9
4	20.1	18.9	19.6	17.5		4	76.1
5	18.6	19.7	20.3	15.6	13.3	5	87.5
6	19.6	17.8	20.2	15.4		4	73
7	16.4	15.6	20.1	18.2		4	70.3
8	17.8	20.2	18.9	15.6		4	72.5
9	19.7	18.9	15.1	17.8	20.1	5	91.6
10	20.1	17.8	18.3	15.6		4	71.8

Table 2. Number of grooming in dust environment

Number of trials	Time spending for each grooming in seconds (S)							Number of grooming in each trial	Total time
1	23.2	20.1	20.5	19.8				6	83.6
2	19.4	20.3	20.1	21.8	19.6	20.5	19.8	7	141.5
3	20.1	18.3	19.6	20.8	21.6	20.3	21.1	7	141.8
4	18.9	19.7	18.9	15.1	20.1	13.2	15.6	7	121.5
5	19	20.7	18.8	13.1	21.2			5	92.8
6	17.6	20.7	22.1	23.4	19.8	20.1	20.3	7	144
7	14.5	17.8	19.6	15.3	18.9	15.7		6	101.8
8	20.3	19.4	21.5	18.6	15.2	17.3	18.4	7	130.7

9	15.1	18.6	19.2	16.8	20.8	21.3	18.3	7	130.1
10	19.6	21.2	18.6	17.5	18.8			5	95.7

Fig. 2 and Fig. 3 graphically expressed total time taken for grooming in clean and dust environment respectively.

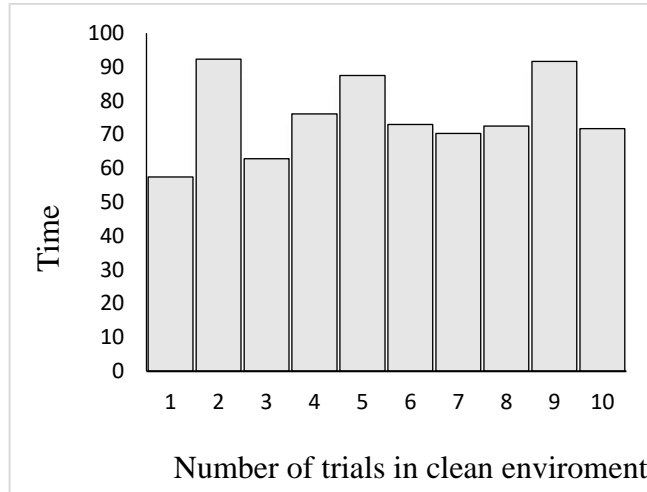


Figure 2. Total time taken for each trial in clean environment

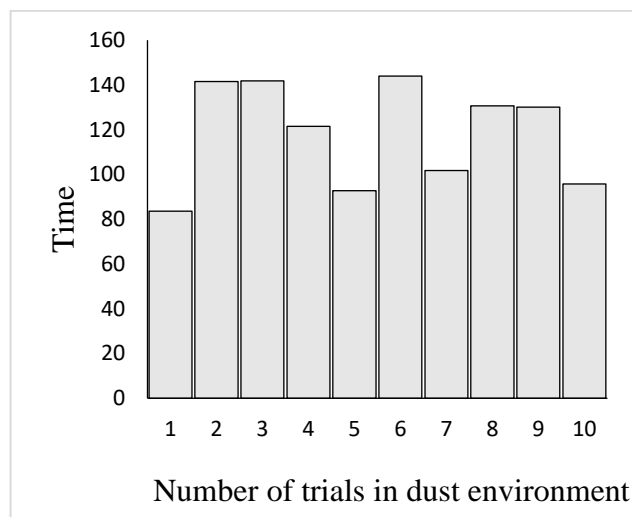


Figure3. Total time taken for each trial in dust environment

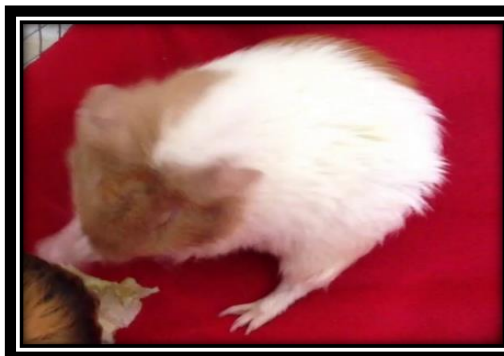


Figure 4. Licking front feet



Figure 5. Wiping face



Figure 6. Sitting on haunches

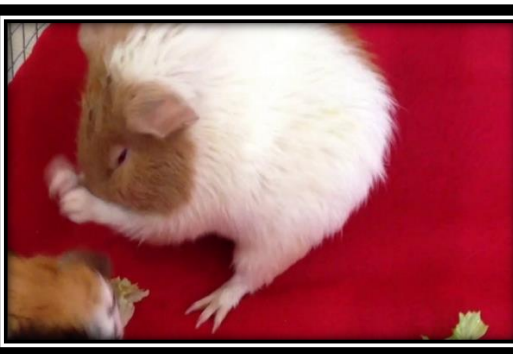


Figure 7. Wiping nose



Figure 8. Bringing front feet over the
Head from the ears



Figure 9. Bringing front feet behind
the ears to the tip of the nose

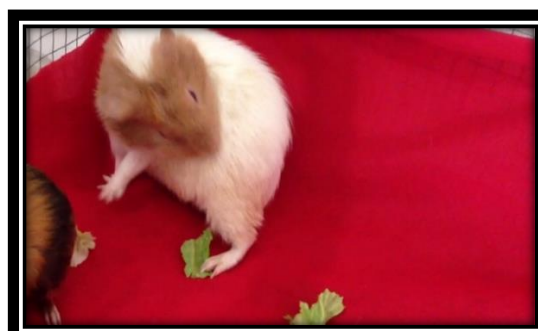


Figure 10. The body is cleaned with
tongue and teeth



Figure 11. Shaking body to remove loose fur

Figure 4 – 11. Ethogram of grooming behaviour of American domestic Guinea pig

The Grooming behaviour of Guinea pig (*Caviaporcellus*) was significantly higher in dust environment in comparing with the clean environment (χ^2 test; $p < 0.001$). It showed that grooming behaviour of guinea pig vary within the clean and dust environment. The self-grooming behaviour of guinea pig occurs more time in dust environment than in the clean environment. It had been reported the same (Carleton, 1924). Grooming can have psychological benefits remove dust particles detritus and parasites from its fur. Caring of the body surface is important because it function as a temperature regulator, a sense organ, a protective device and a moisture balance. In this experiment above mentioned facts further confirmed there is increased in number of grooming in the dust environment.

Grooming is considered as socio positive behavior (Rood 1972) and is an art of cleaning. Several studies confirmed it in various animals (for example; Langurs; (Ahamed and Dharmaretnam, 2003); Asian Elephant; (Ahamed, 2015 and Samarasinghe and Ahamed, 2016). The Guinea pigs are able to groom themselves with the use of their front teeth, tongue and back claws. It is controlled by the entire neocortex, or the cerebellum (Berridge and Whishaw, 1992). They are showing different types of grooming including self-grooming in order to keep their body free of dust and to increase the chance of survive. The Cambridge Cavy trust state that more dust can contrast guinea pig breathing problems, skin problems particularly fungal infections and itchy, small grains can get stuck in their fur and cause irritating, dust remove the oils from the skin cause dry skin, eye problems, ulcerated feet and also can lead to the premature death. With the exception specific short term experimental protocols, guinea pigs should always be kept on solid floor without dust free bedding (National research council, 1996).

Self-grooming is a complex innate behaviour with an evolutionary conserved sequence pattern and is one of the most frequently performed behavioural activity in guinea pigs (Berridge, 1990). Grooming behaviour is an example of fixed action pattern. These are highly stereotyped and extremely similar between individuals. They may be elicited by outside stimulation but continue even after the stimuli is removed. They may even start spontaneously without external stimuli (Gardner, 1988). Grooming syntax emerges in ontogeny simultaneous with striatal maturation (Colonnese, 1996).

Some are using wood shavings as bedding for guinea pigs. But there is much research now on the risk of using wood shavings with any rodent species, because wood shavings contain lot of dust. Dusty wood shavings was used in this experiment in order to create dust environment as many researchers use wood shavings for their researches. In this experiment it was noted that Guinea pig highly sneeze in the dust environment and, during the grooming activity in dust environment it took more time to wipe its nose. It had been reported that some even say that a milky substance is secreted from their eyes and rubbed into the hair during the grooming process (Richardson, 2000). Apart from the all reason mentioned, diseases and ectoparasites such as lice can cause the grooming. Ectoparasites are controlled by grooming.

5.CONCLUSION

It could be said that clean and dust free environment is essential to provide the social environment to guarantee their behavioral health, safeguard their physiological and psychological well-being to Guinea pig.

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