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End-of-Life Behaviors in Pets and Their Association with Human Terminal Lucidity: An Owner-Reported Survey in Thailand

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Abstract: **Currently, Thailand has a high pet ownership rate, with the registered pet population reaching 5.8 million, excluding unregistered animals. Compared to the total human population in Thailand, this accounts for a ratio of approximately 1 in 11.4. Pet owners often form strong emotional bonds with their pets, treating them as family members or their own children. However, pets—primarily dogs and cats—have an average lifespan of only 13 years. When pets become ill or approach the end of their lives, some owners observe behavioral changes that are often interpreted as a final farewell, similar to the "terminal lucidity" phenomenon observed in humans. This research aims to examine the behavioral patterns of pets prior to their death and the relationship between owners and their pets. A survey methodology was conducted using a questionnaire administered to owners of deceased pets. The questionnaire comprised four main sections: basic pet demographic data, pet behavioral patterns prior to death, the degree of the owner-pet relationship, and the owners' perceptions regarding their pets' behaviors. The findings indicate that a majority of respondents reported a high level of owner-pet relationship (53.49%), which corresponded with a high to highest degree of observable behavioral changes in pets (39.59%–46.51%). Although 53.49% of owners did not perceive the behavioral changes specifically as a "farewell" and 60.47% did not observe a noticeable temporary improvement in their pets' condition before death, they still recognized behavioral shifts indicating the pets were attempting to communicate something. Therefore, diligent observation of pet behavior by owners may facilitate the early detection of illness or injury, enabling timely intervention before it is too late.**

Keywords: **Human-Animal Bond, Pre-Death Pet Behavior, Terminal Lucidity, End-of-Life Pet Care, Pet-Owner Communication.**

I. INTRODUCTION

Pets play a significant role in human lives, serving not only as companions kept for security or enjoyment but also as friends and valued members of the family. Dogs and cats, in particular, often share close and long-lasting relationships with their owners. These relationships foster emotional bonds that may influence how owners perceive, feel about, and remember their pets' behavior. A systematic review by Kretzler et al. (2022) found that pet ownership was associated with lower levels of social isolation in certain adult populations. Another systematic review examining attachment to pets and mental health and well-being found that these relationships may be associated with owners' psychological health and well-being, although findings varied across populations and related factors (The Relationship Between Attachment to Pets and Mental Health and Wellbeing: A Systematic Review). Together, these findings highlight that pets may hold a significance in their owners' lives that extends beyond simply sharing a household.As pets become ill, grow older, or approach the end of their lives, owners may observe behavioral changes that differ from their pets' usual patterns. These changes may include altered responses to the surrounding environment, unusual behavioral expressions, or changes in interactions with their owners. This topic may be conceptually linked to terminal lucidity, a phenomenon reported in humans in which individuals with severe cognitive impairment or neurological conditions may temporarily regain clarity of thought or communication shortly before death. However, there is currently insufficient evidence to establish that behavioral changes in pets before death

represent the same phenomenon. Such changes may arise from various factors, including physical conditions, illness, stress, and environmental influences. Therefore, behavior alone cannot establish whether a pet is aware of its impending death or intends to communicate a particular message to its owner.Animal behavior in situations involving death has also received attention in academic research. Dickinson and Hoffmann (2016) examined veterinarians' observations of animals that were present near another animal undergoing euthanasia. The study found that some veterinarians reported behavioral changes in nearby animals, including sudden quietness, restlessness, and barking. Several possible explanations were proposed, including responses to scent, changes in the physical condition of the other animal, and reactions to human emotions. However, the study focused on animals present near another animal undergoing euthanasia rather than on pets approaching the end of their own lives. Consequently, its findings cannot directly establish behavioral patterns in pets before their own deaths.Furthermore, the emotional bond between owners and their pets may play an important role in how behavioral changes near the end of a pet's life are perceived and interpreted. Owners who have lived with their pets for many years may become familiar with their pets' personalities and typical behavioral patterns. As a result, changes observed shortly before death may carry different meanings for different owners. Some may attribute these changes to illness, while others may interpret them as expressions of attachment or as a final farewell. Such interpretations reflect owners' personal experiences and perceptions and should be distinguished from scientific conclusions about animals' ability to recognize or anticipate death. Similarly, discussions of terminal lucidity in humans require supporting evidence, and observed behavioral changes alone should not be taken as confirmation of this phenomenon in animals.A review of the relevant literature suggests that further research is needed to understand the behavioral patterns of pets before death, particularly those reported by owners based on their direct experiences, as well as the relationship between owners' levels of attachment and their perceptions and interpretations of these behaviors. Accordingly, this study aims to investigate behavioral changes in pets before death as observed by their owners. Data will be collected through questionnaires administered to individuals who have previously experienced the loss of a pet. The questionnaires will examine three main areas: observed behavioral changes before death, the strength of the emotional bond between owners and their pets, and owners' perceptions and interpretations of these behaviors. The study will also explore whether some reported behaviors are perceived as resembling a brief return of clarity or responsiveness near the end of life, which may be discussed in conceptual relation to terminal lucidity in humans. The findings are expected to provide a clearer understanding of the behavioral changes reported by owners and the factors associated with their interpretations, while offering a foundation for further research into the human–animal relationship at the end of life. The study will not assume that these behaviors constitute a deliberate farewell or demonstrate intentional communication by the pet.

II. HYPOTHESIS

1.The duration of care is directly proportional to behavioral divergence; the longer the duration of care, the greater the deviation from normal behavior.

2.The level of attachment is associated with behavioral alterations.

3.Owners who detect behavioral shifts do not necessarily require high-intensity behavioral changes to perceive them; even slight modifications can be recognized by the owner.

III. METHODOLOGY

This study collected data via a questionnaire distributed through social media platforms, animal lover groups, schools, and local communities, targeting pet owners residing in Thailand with a total of 43 respondents. The data were analyzed using both quantitative and qualitative methods. The questionnaire consisted of four main sections, comprising basic animal information including age, gender, species, and duration of ownership (4 items), the level of attachment between the owner and the pet measured on a 5-point Likert scale ranging from 1 for none to 5 for the highest degree or frequency (10 items), the level of behavioral changes exhibited by the pet also measured on a 5-point Likert scale, and the owner's feelings toward the pet's behavior. All data were analyzed quantitatively and qualitatively, encompassing the percentage of owners reporting behavioral changes in their pets, the levels of owner-pet attachment, the severity of the pets' behavioral changes, and the analysis of events and owners' feelings, after which the findings were synthesized and categorized into thematic topics to evaluate the pets' behavior prior to death.

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IV. RESULT

Pet Ownership (n = 43) characteristics as Table 1-11

TABLE 1: Type of Pets

Type of Pets	Number of people	Percentage
Dog	26	60.47
Cat	17	39.53

TABLE 2: Sex

Sex	Number of people	Percentage
Male	28	65.12
Female	15	34.88

TABLE 3: Age

Age range of Pets	Number of people	Percentage
≤ 1 year	9	20.93
1.1 – 3 year	7	16.28
3.1 – 5 year	3	6.98
5.1 – 9 year	9	20.93
≥ 9.1 year	14	32.56
Not data available	1	2.33

TABLE 4: Duration of Pets ownership

Duration of pets ownership	Number of people	Percentage
≤ 1 year	10	23.26
1.1 – 3 year	6	13.95
3.1 – 5 yea	3	6.98
5.1 – 9 year	9	20.93
≥ 9.1 yea	14	32.56
Not data availabl	1	2.33

TABLE 5: Cause of Deeath

Causes of Death	Number of people	Percentage
Accident	8	18.60
Old age	13	30.23
Infectious disease	6	13.95
Inherited condition	1	2.33
Cancer	2	4.65
Intentional harm	1	2.33
Intentional poisoning	3	6.98
Underlying disease	7	16.28
Undetermined	2	4.65

TABLE 6: Husbandry System

Husbandry System	Number of people	Percentage
Open Housing System	11	25.58
Closed Housing System	13	30.23
Semi-Open System	19	44.19

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TABLE 7: Pet-Owner Relationship

Pet-Owner Relationship	Number of people	Percentage
Very high	23	53.49
High	17	39.53
Moderate	3	6.98
Low	0	0.00
Very low	0	0.00

TABLE 8: Level of behavioral change

Level of behavioral change	Number of people	Percentage
Very high	17	39.53
High	20	46.51
Moderate	4	9.30
Low	2	4.65
Very low	0	0.00

TABLE 9: Noticeable recovery

Noticeable recovery	Number of people	Percentage
Yes	17	39.53
No	26	60.47

TABLE 10: Perceived pet communication

Perceived pet communication	Number of people	Percentage
Perceptible	20	46.51
Imperceptible	23	53.49

TABLE 11: Holding on until the owner arrives

Holding on until the owner arrives	Number of people	Percentage
Yes	19	44.19
No	10	23.26
Not sure	14	32.56

According to the study, pets with an age and a duration of ownership of ≥ 9.1 years accounted for the highest proportion at 32.56%, followed by those with less than 1 year at 20.93%, and 23.26%. Regarding housing systems, the semi-closed/semi open system was the most prevalent at 44.19%, followed by the closed and open systems at 30.23% and 25.58%, respectively. The primary cause of pet mortality was old age (30.23%), followed by accidents (18.60%). In terms of the human-animal bond, the highest level of attachment accounted for 53.49% of all respondents, followed by high and moderate levels at 39.53% and 6.98%, respectively. Regarding behavioral changes in pets, a high level of change was reported at 46.51%, followed by the highest and moderate levels at 39.53% and 9.30%, respectively. Furthermore, 60.47% of owners did not perceive any improvement in their pets' conditions, whereas 39.53% felt there was an improvement. Regarding pre-death behaviors, 53.49% of owners felt that their pets did not bid farewell before dying, while 46.51% felt they did. Finally, 44.19% of owners felt that their pets waited for them before passing away, followed by those who were uncertain (32.56%) and those who did not feel this way (23.26%).

V. DISCUSSION

Studies indicate that the level of the bond between owners and their pets is high, which varies directly with changes in the animal's behavior. When the relationship is at a high level, even subtle behavioral symptoms can be clearly observed (Jennifer Vonk, 2023). Although most pet owners do not notice an abnormal improvement in symptoms, they perceive behavioral changes, such as the pet seeking out the owner more frequently. In pets experiencing illness, this behavior can be likened to a sign of saying goodbye. However, in pets that suffer accidents or sudden traumatic events resulting in immediate death, no behavioral changes occur; whereas if they are injured, pets will seek out their owners due to feelings of insecurity (Therese Rehn et al., 2017).

Keeping pets in an open or semi-open/closed system prevents owners from clearly observing pre-death behaviors, as some pets tend to hide when they feel ill (Isabella Merola and Daniel S Mills, 2016). Some owners reported that certain animals showed noticeable improvement before passing away, while others reported no such improvement; nevertheless,all owners noted that their pets exhibited increased proximity-seeking behavior ranging from moderate to high levels.This demonstrates that pets possess an instinctual awareness of their own illness and communicate it to their owners through behavioral changes.

The care and observation of pet behavior within the home is therefore crucial. When a pet's behavior changes, it does not happen without reason, but rather reflects a need to communicate something to the owner. If owners diligently observe their pets' behaviors, they may be able to recognize these signs and identify the causes to address issues before it is too late.

VI. CONCLUSION

This study demonstrates that animals exhibit behavioral awareness in response to physiological changes within their bodies, with such expressions becoming significantly more pronounced when a high-level bond exists with the owner.Although owners are capable of observing these behavioral shifts in their pets, they often do not perceive them as signs of a final farewell. Instead, behaviors such as increased proximity-seeking or displaying unprecedented actions serve as signals informing owners of the pet’s discomfort, injury, or illness. Therefore, owners should diligently monitor their pets' behaviors to identify potential underlying causes and address issues promptly; early detection of illness can reduce unexplained pet loss. For future research, it is recommended to study owners of other animal categories, such as exotic or wild animals, and to examine sample groups with lower levels of owner-pet relationships to determine whether animals in such contexts still manifest observable behavioral changes.

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