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PET ATTACHMENT AND STRESS LEVELS AMONG PRECLINICAL MEDICAL STUDENTS

Mariani Santosa[1*], Nicholas Hardi[2], Cicilia Jessica[3]
[1]Department of Physiology, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
[2]Department of Physchiatry and Behavioral Sciences, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
[3]Bachelor of Medicine Study Programme, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia
Correspondence Address: Mariani Santosa
Email: mariani@atmajaya.ac.id

ABSTRACT

Introduction: Medical students are considered an academic group highly prone to stress, with prevalence rates ranging from 28.5% to 78%. Human-Animal Interaction (HAI) has been shown in several studies to correlate positively with stress reduction. A 2021 Rakuten Insight survey across 12 Eastern and Southern Asian countries reported that 41% of respondents kept pets to alleviate sadness and stress, while 36% cited companionship. Pets are seen as valuable emotional resources and adaptive tools for managing stress. **Aims**: This cross-sectional study was conducted to assess the levels of stress experienced by preclinical medical students. The study specifically aimed to explore the relationship between the degree of attachment these students have to their pets and their reported stress levels. **Methods**: A total of 100 preclinical students took part in this study. The pet attachment scores and stress levels were assessed using standard questionnaires. Data from this study were analyzed using a one-way ANOVA test and Post Hoc analysis. **Results**: The average pet attachment score in this study was 49.73. The pet attachment scores were higher in female participants and participants who kept their pets for over nine years. Most respondents experienced moderate stress levels (81%). Significant differences were found in the pet attachment score to mild-moderate stress levels ($p = 0.001$). **Conclusion**: The results obtained from this study lend support to the hypothesis that attachment to pets has a positive impact on stress levels.

Keywords: Medical Student, Pet, Pet Attachment Scores, Stress Levels, Young Adult

INTRODUCTION

Various pressures faced in daily life can affect mental health, one of which is that it can cause stress. In Indonesia, stress levels have increased from 73% at the beginning of 2020 to 75% in 2021 (Optiarni and Coralia, 2023). This condition was made worse by the emergence of the pandemic, which caused mental health problems to increase (Hardi, Gracia, and Hananta, 2023). The study of medicine is frequently characterized as a highly stressful endeavor, largely owing to the vast scope and intricate nature of the material that students must absorb. Medical students are required to master a wide array of topics, which including everything from foundational science to clinical skills, all while engaging in continuous evaluations through exams, practical assessments, and coursework. This demanding curriculum not only challenges students academically but also places significant pressure on their mental health. Research has consistently shown that the rigorous demands of medical education contribute to heightened levels of stress, anxiety, and depressive symptoms among students (Ragab et al., 2021).

Medical students are estimated to be a population from the academic category with high-stress levels. Studying medicine involves many activities that can trigger stress. Exams are thought to be an activity with a high level of stress (Al-Shahrani et al., 2023). Academic stress has a significant positive relationship with physical symptoms, so that it can cause several health problems (Pacheco et al., 2017; Aziz and Khan, 2022). Therefore, efforts need to

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be made to prevent stress in medical students so that it does not affect their health or academic performance. Cohen's (1988) social buffering hypothesis emphasizes the crucial role that social support plays in alleviating the negative effects associated with stressful situations, particularly when certain conditions are met. This hypothesis suggests that having a strong network of friends, family, or community can provide emotional and practical assistance that enables individuals to manage stress more effectively (Khalid and Dildar, 2019).

Social support is widely recognized as a critical mechanism for coping with stress. Sources of social support typically include family, friends, and, notably, pets. When individuals face difficult situations and lack support from their immediate social circle, they often turn to non-human sources for comfort, with pets serving as a prominent option. Engaging with pets can be an effective coping strategy during stressful times, as the emotional bond established with a pet may provide significant social support (Tsania, Hidayat, and Ramdani, 2023). In recent years, pets have become increasingly recognized as integral members of many households, significantly influencing the dynamics of family life. Research shows that around 85% of individuals consider their pets as family members, reflecting a deep emotional bond that transcends mere companionship (Khalid and Dildar, 2019).

Pet attachment can be defined as a form of emotional bond between the owner and his pet (Optiarni and Coralia, 2023). Several studies show that humans often have strong attachments to their pets; sometimes, these attachments are stronger than family members (Lass-Hennemann et al., 2022). Some pets are classified as an "emotional support" animal. Dogs and cats are the most popular pets globally (Tsania, Hidayat, and Ramdani, 2023). Attachment behavior towards pets engenders a sense of comfort through various physiological mechanisms vital for alleviating stress (Platto et al., 2022). One of the primary reasons for the stress-reducing effects of interacting with pets is attributed to changes in oxytocin levels in individuals. Oxytocin is a hormone linked to various positive effects on the human body, including promoting relaxation, fostering closeness to others, and lowering stress. Engaging with a pet increases oxytocin levels and helps reduce heart rate (Khalid and Dildar, 2019).

Pet attachment can increase and maintain positive feelings during times of stress (Hawkins and Brodie, 2020; Janssens et al., 2021). Pet ownership has been shown to enhance both psychological and physical well-being by supporting emotional regulation and stress management (Sable, 2013). A large body of research has examined the link between pet attachment and mental health. While some studies report a positive correlation, others find a negative association between emotional attachment to pets and mental well-being (Lass-Hennemann et al., 2022). These conflicting findings highlight the need for further research, particularly among highly stressed populations like medical students, to better understand the relationship and develop effective interventions.

Medical education is widely recognized as demanding, often exerting significant psychological pressure on students during their preclinical years. Stress among medical students has been associated with a range of negative outcomes, including academic burnout, decreased empathy, and mental health challenges. In light of these concerns, various coping mechanisms have been explored to mitigate stress, including physical activity, mindfulness practices, and pet ownership. Pets, especially companion animals like cats and dogs, have been shown to offer emotional support, reduce feelings of loneliness, and enhance overall well-being. The emotional bond or attachment formed between humans and their pets may play a critical role in buffering stress responses, particularly in high-pressure environments such as

medical school. This study assessed the relationship between pet attachment scores and stress levels among 100 preclinical medical students, aiming to contribute to the growing literature on alternative coping strategies in medical education.

METHODS

This cross-sectional study was carried out in December 2023 at the School of Medicine and Health Science, Atma Jaya Catholic University of Indonesia. The research protocol received approval from the Ethics Commission (No. 16/11/KEP-FKIKUAJ/2023). Informed consent was obtained, with each participant signing the relevant documentation. A total of 100 preclinical students took part in this study. For analysis, a purposive sampling technique was used to select pet owners, specifically those who owned dogs or cats. In this study, a questionnaire was employed to gather data on participants' age, pet ownership, and the duration of pet ownership. The Pet Attachment Scale (LAPS) was utilized to evaluate the degree of attachment to pets, while the Perceived Stress Scale (PSS) was implemented to assess levels of perceived stress. Participants submitted their responses through an online questionnaire administered via Google Forms.

The Lexington Attachment to Pet Scale (LAPS) measures the level of attachment owners have with their pets. LAPS was developed based on three primary factors, with a particular emphasis on general attachment. This factor is designed to assess the strength of the bond between pet owners and their pets, reflecting the joy derived from engaging in play and shared activities. The second factor is substituting people, where the pet plays a significant role in the owner's life. The last factor focuses on the pet's status, which relates to how significant the presence of pets is in the owner's life. In this case, the welfare of the pet's life is also maintained. This last factor is called the rights and welfare of animals (De Albuquerque et al., 2023). Alphas for the total LAPS and the three factors were ≥80 (Johnson, Garrity, and Stallones, 2017). The LAPS questionnaire consists of 23 items. Each item offers multiple response options, ranging from 0 (indicating disagreement) to 3 (indicating strong agreement). A higher total score reflects greater attachment (Hielscher, Gansloßer, and Froboese, 2019).

Stress levels are measured using the Perceived Stress Scale (PSS), which was created in 1983, to help individuals understand that various situations can influence feelings and the level of stress they feel. This questionnaire contains 10 questions about the individual's feelings in the last month. Each question has response options from 0 (never) to 4 (very often). Individual scores on the Perceived Stress Scale (PSS) can range from 0 to 40, with higher scores reflecting elevatedstress levelss. Scores ranging from 0-13 would be considered low stress; from 14-26 would be considered moderate stress; and from 27-40 would be considered high perceived stress.

Data analysis was conducted utilizing the IBM SPSS Statistics 27 software. Univariate analysis of categorical (nominal) data is presented as a frequency distribution, while numerical data is summarized by the minimum, maximum, mean, and standard deviation (SD). A one-way ANOVA test was employed for bivariate analysis, accompanied by a post hoc test to identify the specific sources of any observed differences. The confidence interval for this study was established at 95%, with a margin of error of 5%. Statistical significance was assessed based on a two-tailed p-value of less than 0.05.

RESULT

This cross-sectional study involved 100 participants. Of these, 30% were aged between 19 and 20 years, and 75% were female. Furthermore, 32% of the participants had owned their pets for a

duration of 1 to 3 years, with dogs representing the predominant type of pet, comprising 84% of the total. Notably, the primary stress level identified among the participants was moderate stress, affecting 81% of individuals in the sample. Detailed participant characteristics can be seen in Table 1 and Figure 1-5.

The mean pet attachment score of female participants was greater than that of male participants. Participants who had kept pets for more than nine years and kept cats had the highest mean pet attachment scores. The results of the bivariate test using one-way ANOVA showed a significant relationship between pet attachment score and stress levels (Table 2).

Post hoc analysis was carried out to find out which groups had differences. There is a significant difference in pet attachment scores at low vs moderate stress levels (Table 3).

Table 1. Characteristics of study participants

Characteristics		n (%)
Age (Years)	18	7 (7%)
	19	30 (30%)
	20	30 (30%)
	21	29 (29%)
	22	4 (4%)
Gender	Male	25 (25%)
	Female	75 (75%)
Duration of having pet (Years)	1-3	32 (32%)
	4-6	21 (21%)
	7-9	24 (24%)
	>9	23 (23%)
Type of pet	Dog	84 (84%)
	Cat	16 (16%)
Stress levels	Low	14 (14%)
	Moderate	81 (81%)
	High perceived	5 (5%)

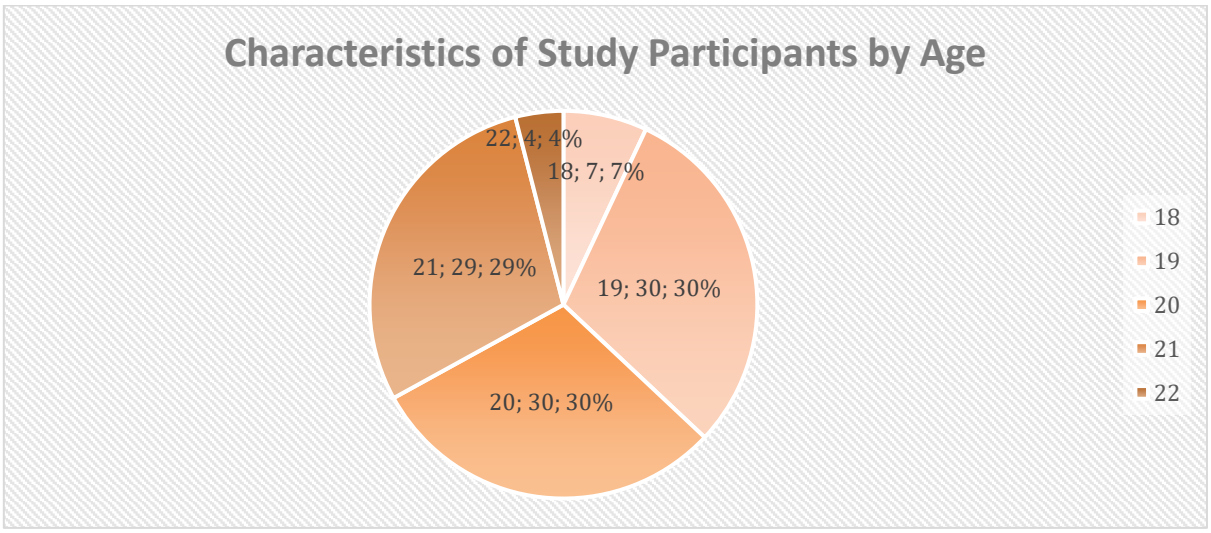

Figure 1. Characteristics of study participants by Age

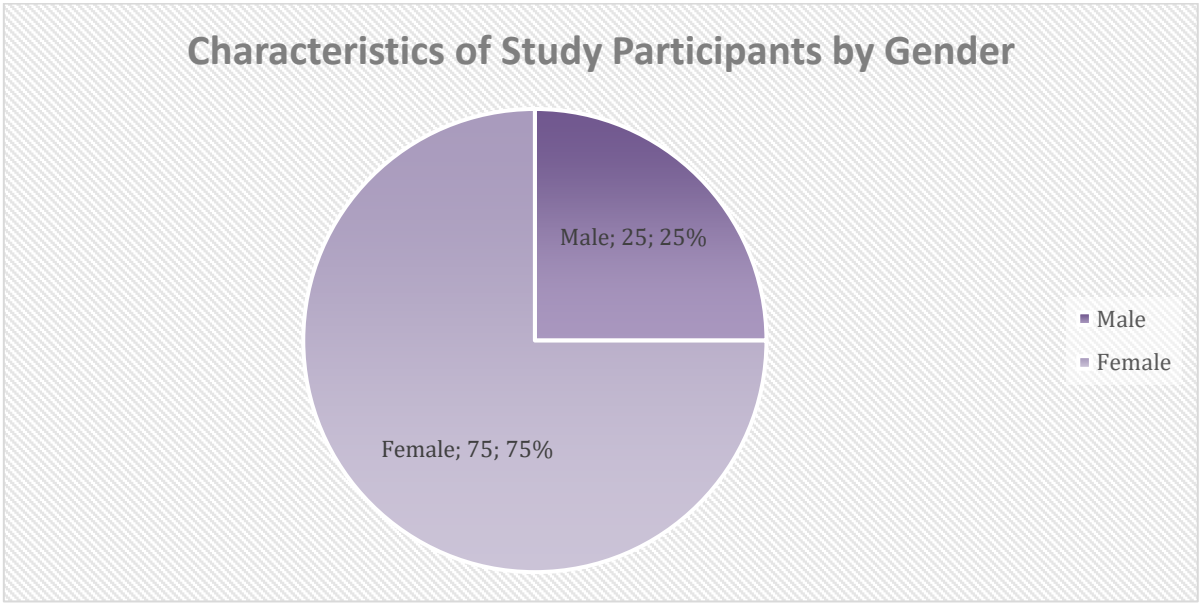

Figure 2. Characteristics of study participants by gender

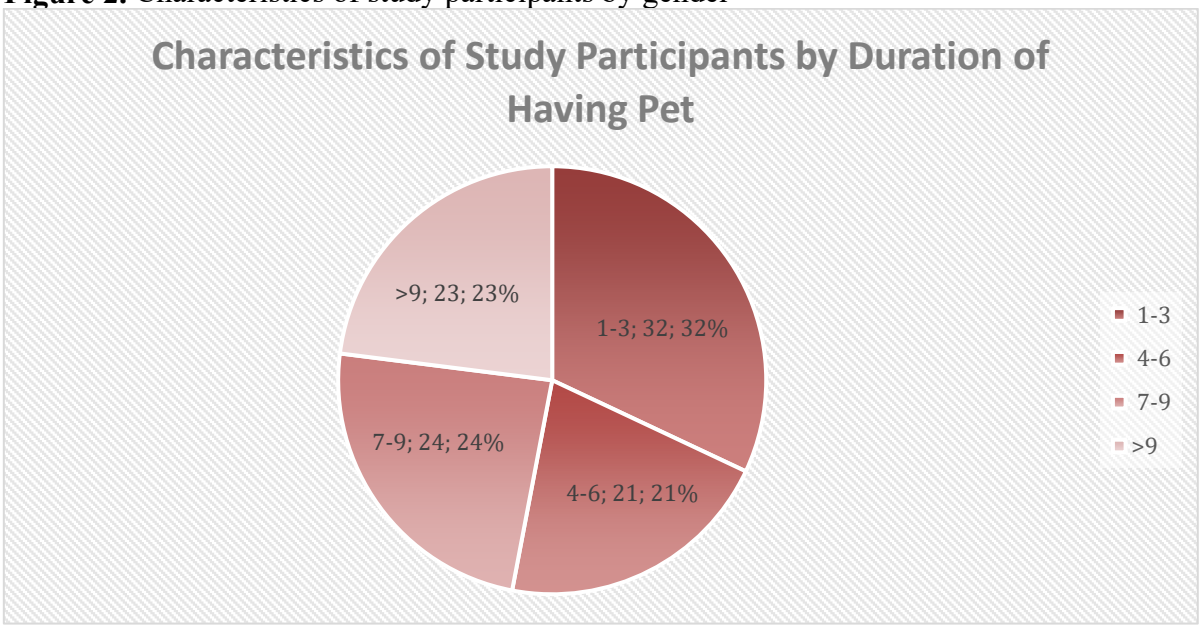

Figure 3. Characteristics of study participants by Duration of Having Pet

DISCUSSION

The findings of our study indicate that the average pet attachment score was 49.73. It was observed that female participants and those who had kept their pets for more than nine years exhibited higher pet attachment scores. Furthermore, a significant majority of respondents, specifically 81%, reported experiencing moderate levels of stress. The analysis revealed significant differences in pet attachment scores among participants with mild to moderate stress levels, with a p-value of 0.001.

Stress Levels

The study demonstrated that 81% of preclinical medical students suffered from moderate levels of stress. This result aligns with findings by Ebrahim et al. (Ebrahim et al., 2024), who stated that most medical students suffer from moderate to high-stress levels. These results are also consistent with

a systematic review of the effects of academic stress on the mental health status of medical students, which concluded that academic stress is the leading cause of the high incidence of stress, anxiety, depression, and emotional exhaustion in medical students (Ruzhenkova et al., 2018).

Previous research by Ragab et al. has identified gender and academic year as independent risk factors associated with stress among medical students. Notably, elevated stress levels experienced during the first year of medical school can persist throughout the subsequent years of study (Ragab et al., 2021). Furthermore, findings indicate that female medical students are more significantly impacted by stress compared to their male peers. It is also important to recognize that academic pressure constitutes a considerable potential stressor in this population (Ragab et al., 2021).

Pet Attachment Scores

More female participants had a significant difference in the pet attachment score than male participants (P = 0.040). These results align with the findings of Mueller et al., which stated that gender would significantly determine pet ownership, where female participants are more likely to own pets than male participants (Mueller et al., 2021).

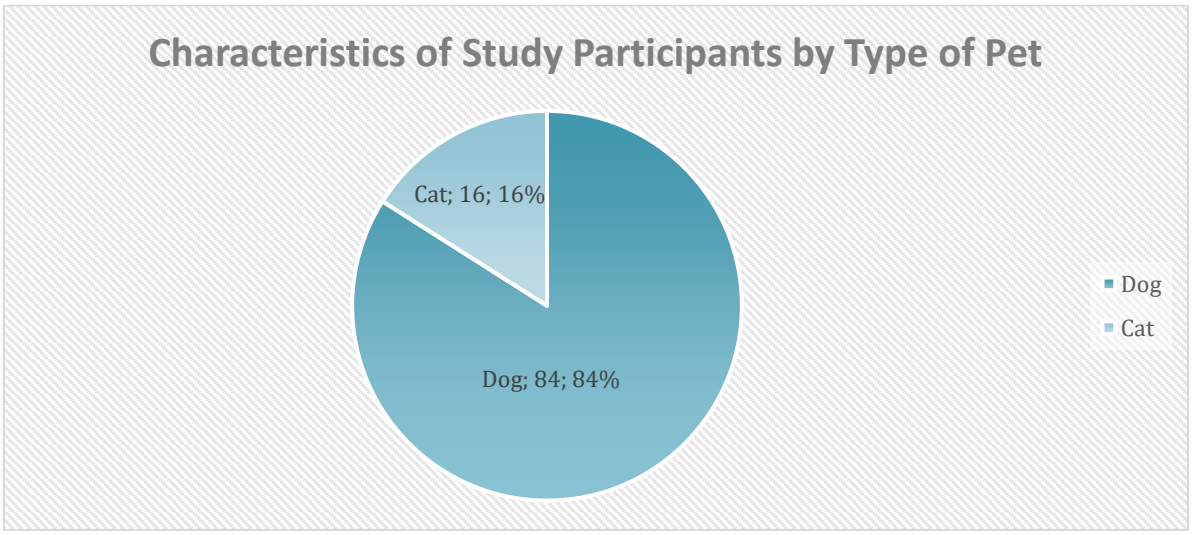

Figure 4. Characteristics of study participants by Type of Pet

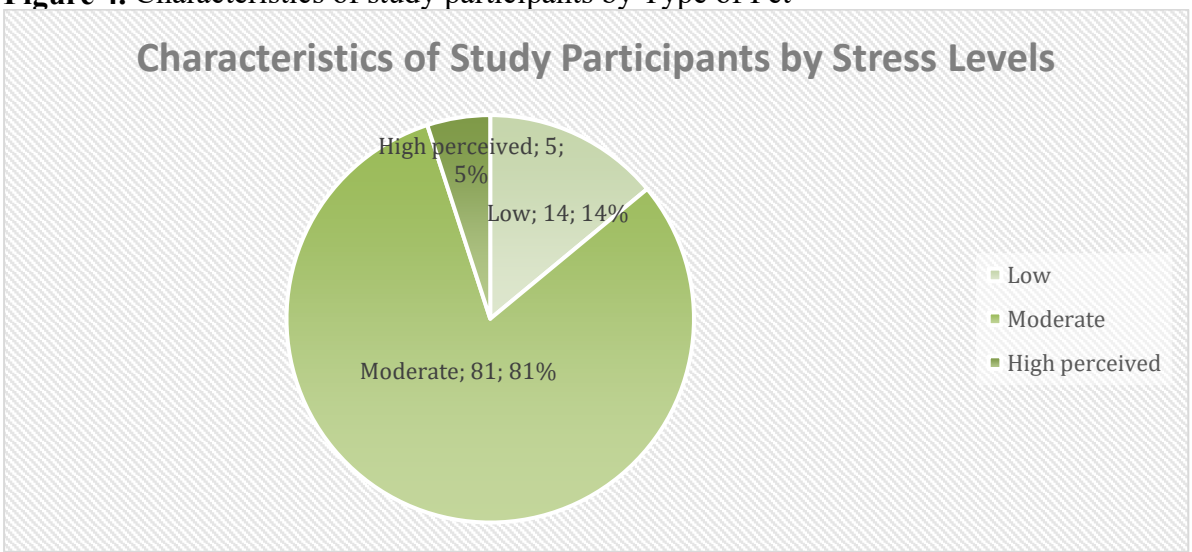

Figure 5. Characteristics of study participants by Stress Levels

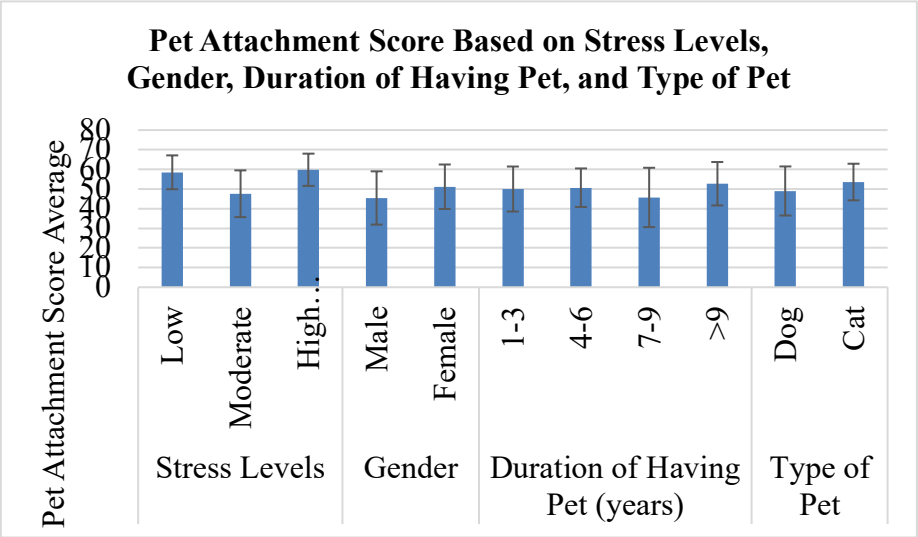

Figure 6. Bar charts represent the mean and standard deviation (SD) of the pet attachment score in different stress levels, gender, duration of having pet, and type of pet groups (Mean ± SD)

Table 2. Differences in pet attachment scores based on participant characteristics

		n	Pet attachment score (Mean ± SD)	p
Stress levels	Low	14	58.50 ± 8.63	0.001*
	Moderate	81	47.59 ± 11.90	
	High perceived	5	59.80 ± 8.20	
Gender				0.040*
	Male	25	45.44 ± 13.57	
	Female	75	51.16 ± 11.32	
Duration of Having Pet				0.246
	1-3	32	50.00 ± 11.45	
	4-6	21	50.67 ± 9.80	
	7-9	24	45.71 ± 15.10	
	>9	23	52.70 ± 11.04	
Type of Pet				0.168
	Dog	84	49.00 ± 12.49	
	Cat	16	53.56 ± 9.32	

Female participants will be more attached to pets because they tend to see them as part of the family with the same role as children who can provide comfort and companionship (Temesi, Bunford and Miklósi, 2020) Females are depicted as more active in pursuit of connectedness, as in being more attached to their parents and more likely to attract support from other sources, and females are also more likely to utilize various sources of support, such as friendships or social groups (Tsania, Hidayat, and Ramdani, 2023). This is contrary to the study conducted by Muldoon et al.,which stated that there was no difference in pet attachment scores between men and women (Muldoon, Williams, and Currie, 2019). The different results may be attributed to population differences and the instruments used to

measure the level of attachment between owners and their pets.

Dogs and cats are the majority of animals kept as pets. Dogs are the type of animal most often kept by participants in this study (84%). Based on qualitative research, dogs have an excellent capacity to facilitate social interaction and contact (Smolkovic, Fajfar, and Mlinaric, 2012). They are the type of pet most likely to go on adventures with their owners and can offer many benefits of physical activity based on the dog's needs and desires (Smolkovic, Fajfar, and Mlinaric, 2012). The presence of cats and interacting with them may have a beneficial influence and boost mood. and (Optiarni and Coralia, 2023).

The attachment relationship between humans and pets, also known as pet attachment, is based directly on Bowlby's theory of attachment to humans (Erliza and Atmasari, 2022). Research by Lass-Hennemann et al. shows that humans often have strong attachments to pets; sometimes, attachments to pets are more robust than family member. It is not yet clear what underlies the formation of emotional relationships between humans and their pets, these emotional bonds are likely used as a compensatory strategy for those unable to establish secure relationships with others during childhood (Lass-Hennemann et al., 2022). This attachment will increase as the time spent caring for the pet increases (Wu, Wong and Chu, 2018).

In the current study, participants who had cats and kept pets for more than nine years had the highest mean pet attachment scores. These findings are congruent with existing research that indicates cats can form significant emotional attachments with humans and provide emotional support to some of their owners (Ines, Ricci-Bonot, and Mills, 2021). As with any intricate social relationship, the bond between a cat and its owner is influenced by the interactions between the two parties and individual personality traits. Key factors contributing to this relationship include the sociability of the cat and the expectations held by the owner, both of which may play a critical role in shaping the dynamics of their connection (Ines, Ricci-Bonot and Mills, 2021). This is also in line with research conducted by Erliza et al., which found high pet attachment scores among cat owners, where keeping cats can provide many positive benefits for human happiness (Erliza and Atmasari, 2022). A recent study on pet attachment indicated that dog owners exhibit a greater emotional bond with their pets than cat owners. This finding may be attributed to several items on the pet attachment instrument more reflective of typical dog-related activities. When these particular items were excluded from the analysis, no significant difference in attachment scores between dog and cat owners was observed (Smolkovic, Fajfar, and Mlinaric, 2012). Nevertheless, both dog and cat owners demonstrated significantly higher attachment scores compared to individuals who own other types of pets. Furthermore, the duration of pet ownership is a critical factor influencing the level of attachment; those who have owned their pets for extended periods tend to experience a deeper emotional connection (Smolkovic, Fajfar and Mlinaric, 2012).

The Relationship between Pet Attachment Score and Stress Levels

The results showed a significant difference in the pet attachment score on stress level (P=0.001). From the post hoc test results, a significant difference in pet attachment scores was found at low vs moderate stress levels (p=0.004). It is in line with a study conducted by Rahmi et al., which indicates a significant relationship between coping strategies related to pet attachment and academic stress among college students, where someone with a pet generally has lower stress levels (Imelisa, Sarja, and Bolla, 2023). The Stress and Coping Theory provides a pertinent framework for understanding the significant influence of social support on

mental health. This theory posits that social support is integral in shaping individuals' perceptions and responses to stress. In the face of challenging circumstances, social support serves as a vital resource that can impact stress levels (Acoba, 2024).

Table 3. Post hoc analysis comparing pet attachment scores and stress levels

	Mean difference	**CI 95%**		**p**
		Minimum	**Maximum**	
High perceived vs Low	1.30	-13.15	15.75	1.000
High perceived vs Moderate	12.21	-0.57	24.99	0.066
Low vs Moderate	10.91	2.88	18.93	0.004*

*post hoc Bonferroni (p< 0,05)

When individuals perceive that they are adequately supported and equipped to manage difficulties, their experience of stress tends to decrease. Consequently, the extent of stress associated with a particular event is not solely dictated by the event itself; rather, it is significantly influenced by the perceived availability of social support. A robust support system can mitigate the overwhelming nature of certain experiences. Therefore, enhancing social support is likely to reduce perceived stress levels (Acoba, 2024).

Keeping animals serves as an effective coping strategy for managing stress, facilitating the development of trust and intimacy through interactions with pets. Research indicates that pets provide significant stress-relief benefits for both adults and adolescents (Applebaum et al., 2020). Engaging with animals has been shown to increase oxytocin levels while regulating cortisol levels, thereby diminishing the activation of the stress response system, specifically the hypothalamic-pituitary-adrenal (HPA) axis (Applebaum et al., 2020).

Contrary to common perceptions, pet owners benefit not only from interactions with their pets but also from engaging with unfamiliar animals. Evidence indicates that such interactions can lead to significant reductions in stress levels. Notably, this decrease in stress can manifest within a matter of minutes (Khalid and Dildar, 2019). Furthermore, research demonstrates a marked increase in oxytocin levels—a hormone associated with social bonding—within one to five minutes following interaction with a pet (Khalid and Dildar, 2019). In specific contexts, pets have been shown to function as more effective sources of emotional support compared to friends and spouses, leading to diminished physiological reactivity to stress and facilitating faster recovery from stress-related symptoms (Khalid and Dildar, 2019).

Pets can play a vital role in enhancing social support through their unique ability to foster social interactions among individuals. They often serve as catalysts that encourage communication and engagement between people, creating opportunities for companionship and social bonding (Applebaum et al., 2020). Additionally, the emotional connections formed between humans and their pets can provide valuable interspecies support, contributing to improved mental well-being. This companionship helps to alleviate feelings of loneliness and isolation, as pets offer unconditional love and acceptance, thereby enriching the emotional landscape of their human counterparts (Applebaum et al., 2020).

Pets are increasingly recognized as vital social support sources, significantly

enhancing physical and psychological well-being through meaningful interactions. Research has shown that social support from both humans and pets improves well-being by fostering positive emotions, increased engagement in daily activities, stronger interpersonal relationships, and a heightened sense of purpose (Sobering and Brown, 2020). The bond between humans and pets is crucial in alleviating loneliness and promoting healthier lifestyles, such as increased physical activity. Furthermore, the companionship and unconditional love provided by pets act as a protective factor against stress and anxiety, ultimately enriching the quality of life for pet owners. (Sobering and Brown, 2020).

Research indicates that the emotional bonds formed between humans and their pets can be interpreted through the framework of human attachment theory (Platto et al., 2022). This theory posits that individuals tend to seek attachment figures for comfort and security during times of stress. In this context, pets frequently serve this purpose, offering crucial emotional support and contributing to overall well-being during challenging periods (Platto et al., 2022).

The findings provide compelling evidence that pets can offer a range of substantial emotional benefits and serve as important sources of social support. Engaging in the care of pets may act as a non-pharmacological alternative to traditional stress relief methods, functioning as an effective coping mechanism for individuals experiencing heightened stress levels.

However, it is crucial to consider that multiple factors may influence the validity and applicability of these findings. Specifically, data regarding pet attachment and its relationship with stress is frequently gathered through self-reported questionnaires. While this method can yield valuable insights, it is also susceptible to various biases and inaccuracies. Respondents may provide socially desirable answers or allow personal perceptions to cloud their responses, which can compromise the integrity of the data collected.

Furthermore, numerous confounding variables can complicate the analysis of the relationship between pet ownership and stress levels. These can include academic workload, personal life stressors, and socioeconomic factors, which may not always be thoroughly accounted for in the study methodology. Such variables can affect individuals' overall stress levels and their attachment to pets, thus warranting careful consideration in interpreting research outcomes.

CONCLUSION

This study explored the relationship between pet attachment scores and stress levels in preclinical medical students. It aimed to determine how the emotional bonds between students and their pets might influence their ability to manage stress during rigorous academic training. The findings revealed significant differences in attachment scores, particularly among students experiencing mild to moderate stress. Female students and those who had pets for over nine years tended to report stronger attachments. It is suggested that pets offer meaningful emotional support and contribute to stress relief. Caring for pets may serve as a valuable and accessible alternative method for managing stress in high-pressure academic environments.

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