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Pet Companionship And Stress, Anxiety, And Depression – A Cross-Sectional Study Comparing Pet Owners And Non-Pet Owners Of Bengaluru

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Abstract

This study adopted a cross-sectional design to explore the relationship between pet ownership and psychological well-being, specifically focusing on stress, anxiety, and depression. The objective was to determine whether pet companionship could be linked to lower levels of these mental health concerns when compared to individuals without pets. A representative sample of 150 residents from Bengaluru was selected, with 75 participants owning at least one pet and the other 75 being non-pet owners. To assess the levels of stress, anxiety, and depression in both groups, the Depression Anxiety and Stress Scale (DASS-21), a 21-item questionnaire, was administered. The analysis of data and t-Test scores revealed that individuals with pets exhibited significantly lower levels of depression than those who did not have pets, suggesting a potential beneficial effect of pet companionship on mental health, particularly in the context of depressive symptoms.

Keywords: psychological well-being, pet owners, pet companionship, depression, anxiety, stress

Introduction

The history of human-animal companionship spans approximately 15,000 years, representing one of the most enduring forms of interspecies cooperation. The domestication of dogs and cats as house pets marks a pivotal chapter in our shared history. As civilization advanced, so did the integration of animals into human lives, becoming a common lifestyle feature among both urban and rural dwellers (Vigne, 2011). Initially, human-animal relationships were deeply symbiotic, with early humans depending on animals for hunting assistance, protection, and companionship. Over millennia, this relationship evolved into more utilitarian roles during periods of agricultural and industrial development, where animals were primarily valued for their labor and productivity. Despite these shifts, animals have maintained a significant place in human society, adapting to meet the demands of modern urban life in highly industrialized societies (Vigne, 2011).

In contemporary times, we see that this interspecies cooperation has extended beyond the necessities of food and transport, and have transformed into a companionship of sorts. A vast majority of pet owners regard their companion animals as family members, yet the role of pets in family systems and family therapy has received little attention in research, training, and practice. A companion animal has been perceived as much more than just that, extending to the role of a family member (Walsh, 2009). The trend for the last decade has shown an increase in adoption of animal companions particularly in Indian urban environments. Since the onset of the COVID-19 pandemic and subsequent lockdowns, pet adoption has seen an annual increase of 11%. This rise in pet adoption is likely linked to the prolonged periods of social isolation experienced during the pandemic, which has piqued researchers' interest in the complex dynamics of human-animal cohabitation (Garg & Ng, 2022). Central to this study is the fundamental question: Is having a pet companion linked with improved outcomes for stress, anxiety, and depression, or is it merely a sentimental

notion without empirical backing? Through a rigorous comparison, this study seeks to illuminate the transformative power of the human-animal bond, comparing the emotional experiences of pet owners and non-pet owners alike. By highlighting the tangible benefits enjoyed by those who share their lives with animal companions, this study also aims to underscore the broader implications for mental health in the ever-evolving urban landscape of Bengaluru.

Antonacopoulos and Pychyl (2010) noted that although researchers have studied the impact of pet ownership on psychological health, they have primarily focused on specific groups like seniors. This study examined a sample of 132 Canadian adults living alone, including both pet owners and non-owners. Participants completed an online survey assessing human social support, emotional attachment to pets, loneliness, and depression. The study found that pet ownership and attachment to pets alone did not predict loneliness or depression levels. However, dog owners with high human social support were significantly less lonely than non-owners. Additionally, pet owners with low human social support and high attachment to their pets experienced higher loneliness and depression. These results suggest that the relationship between pet ownership and psychological health is complex and influenced by human social support and attachment levels to pets.

Kanat-Maymon, et al. (2016) explored how basic psychological needs—autonomy, competence, and relatedness—impact well-being within human-pet relationships, guided by self-determination theory (SDT). Utilizing a sample of 206 pet owners, the study found that pets significantly contribute to their owners' well-being through perceived need support, but do not significantly impact psychological distress levels. These effects were notable even when accounting for need support from close human relationships. The study highlights the unique role of pets in fulfilling psychological needs and enhancing well-being, supporting the "pet effect" theory that pets positively influence human health and happiness.

Mueller et al. (2021) examined how pet ownership relates to health outcomes and the sociodemographic factors that may influence these associations. By analysing data from a nationally representative sample of 1,267 U.S. adults, researchers found that pet owners differ from non-pet owners in key demographic and contextual characteristics, with variations between dog and cat owners. Pet ownership did not correlate with overall health or Body Mass Index (BMI), but dog owners reported higher physical activity levels. Pet ownership was linked to increased anxiety, moderated by gender, and higher depression odds, with employment status influencing the depression link for dog owners. The study underscores the complexity of pet ownership and calls for nuanced research to understand its health impacts fully.

Raina, et al. (1999) investigated how companion animals and attachment to them affect physical and psychological health in older adults and whether these effects are influenced by human social networks. Conducted over a year with standardized telephone interviews, the study involved 1,054 non-institutionalized adults aged 65 and older from Wellington County, Ontario, Canada. Measurements included social network activity, chronic conditions, pet ownership, and physical and psychological health, along with sociodemographic variables. Results indicated that pet owners were younger, more likely to be married or living with someone, and more physically active. Over the year, pet owners' ability to perform Activities of Daily Living (ADLs) declined less than that of non-pet owners. No direct link was found between pet ownership and changes in psychological well-being, but pet ownership significantly influenced the relationship between social support and psychological well-being. Overall, the study suggests that pet ownership helps maintain or slightly improve physical functioning in older adults, while its impact on psychological well-being is more complex and mediated by social support.

Mathers et al. (2010) aimed to determine if adolescent health and well-being are influenced by having a pet or time spent caring for/playing with pets. Using cross-sectional data from the Health of Young Victorians Study in Victoria, Australia, the research analyzed predictors like pet ownership and interaction time against outcomes like quality of life, physical activity, health status, BMI, and blood pressure in 928 adolescents. The findings showed that 88.7% of adolescents had pets, but 75.1% reported no pet-related activities during the study period. The results indicated no significant association between pet ownership or time spent with pets and adolescents' health or well-being. Despite high pet ownership rates, interaction with pets was minimal and did not clearly impact health or well-being.

Bao and Schrer (2016) conducted a study which explored whether pets are associated with their owners' happiness, focusing on positive aspects of mental health. Using an online survey with 263 American adults, the results show that pet owners are more satisfied with their lives than non-owners but do not differ in other well-being measures, personality traits, emotion regulation, or need satisfaction. Dog owners, compared to cat owners, scored higher in all aspects of well-being and differed in the Big Five personality traits, emotion regulation strategies, and need satisfaction. The relationship between pet type and well-being was mediated by personality traits (extraversion, agreeableness, and neuroticism), emotion regulation, and need

satisfaction. Self-identified "dog people" exhibited similar, though often smaller and non-significant, patterns to dog owners. While differences between pet owners and non-owners are minimal, owning a dog is linked to positive outcomes. The study discusses implications and directions for future research.

Barcelos et al. (2021) Noted that cross-sectional studies often show mixed results regarding the impact of dog ownership on well-being. This study aimed to address these inconsistencies by evaluating how specific dog-related activities (e.g., dog walking, playing) affect hedonic and eudaimonic well-being, and how psychological closeness to the dog influences these outcomes. Using data from 1030 dog owners, the study found that tactile interactions and playing with dogs were significantly beneficial for hedonic well-being, while dog training and presence were linked to eudaimonic well-being. Conversely, dog health issues and behavioral problems negatively affected well-being. Higher psychological closeness to the dog was associated with greater well-being improvements from positive dog-related activities. This quantitative research supports and expands upon previous qualitative findings, suggesting the need for more detailed studies on the psychological basis of pet-related benefits and the impact of different activities on well-being. Future research should build on these findings with longitudinal studies to better understand these dynamics (Barcelos et al., 2022; Gee et al., 2023).

In a subsequent study, Barcelos et al. (2023) noted that there is no single, widely accepted theory explaining how pets impact human well-being, but several explanatory theories, such as social support, social catalyst, and biophilia, are commonly cited (Kruger et al., 2004; O'Haire, 2010; McNicholas et al., 2005; Serpell et al., 2017; Wells, 2019). These theories often justify the positive effects of pets but may contribute to confirmation bias, limiting scientific progress (Herzog, 2011). Pets are perceived as providing social support and fostering social interactions, but these theories may not fully account for the benefits of pet ownership (Beck and Katcher, 1996; Serpell, 1996; Garrity and Stallones, 1998; Kruger et al., 2004). Research should consider a broader range of mechanisms, including potential negative effects like grief and disruption caused by pet loss or care demands (McNicholas and Collis, 1995; Hewson, 2014; Britton et al., 2018; Applebaum et al., 2020; Buller and Ballantyne, 2020; Pergande et al., 2020). An alternative approach involves systematically evaluating the full range of reported impacts and potential explanations (Lawson, 2009). This study aims to apply a comprehensive framework to assess various hypotheses derived from recurring themes in qualitative studies about the effects of pet ownership on well-being. The goal is to broaden the understanding of how pets affect well-being and avoid focusing solely on a limited set of mechanisms. The study summarized and compared four frameworks (Barcelos et al., 2020, 2021a; Corrêa et al., 2021; Ravenscroft et al., 2021) to explore the impacts of pet-related activities on human well-being. The frameworks identified recurring pet-related activities and their effects on various well-being aspects, such as positive and negative affect, life satisfaction, autonomy, personal growth, and others. Recurring activities that appeared in more than one framework were used to generate and evaluate twelve hypotheses on how pet ownership affects psychological well-being. The study followed an eight-step process to develop these hypotheses, considering both established and novel explanations. Of the twelve hypotheses, nine were supported by the qualitative evidence, while three (social catalyst-repellent, caring, and routine hypotheses) had mixed support. The results highlight the importance of considering multiple mechanisms rather than focusing on a single explanation for the effects of pet ownership on well-being. The study acknowledges the role of oxytocin as a potential underlying mechanism but emphasizes that it cannot explain all the effects. It also notes the limitations of qualitative research and calls for future quantitative studies to validate the hypotheses. In conclusion, the generated hypotheses provide a broader understanding of the positive and negative effects of pet ownership on well-being and encourage researchers to consider a range of potential mechanisms in their studies. This approach aims to advance the understanding of how pets influence human health by challenging preconceived ideas and exploring diverse perspectives.

Beetz et al. (2024) conducted a review of 69 studies, through which it became clearer that having pets or using animals in therapy and education can have many positive effects on people. The reviewers found that interacting with animals can improve social interactions, mood, and reduce stress indicators like heart rate and blood pressure. It can also help with fear and anxiety, and benefit overall mental and physical health. However, evidence is less strong for benefits like better immune function, reduced aggression, or improved trust and learning. A key factor in these positive effects might be the release of oxytocin, a hormone that both humans and animals produce during positive interactions. This hormone could explain why human-animal interactions are beneficial.

Hardie et al. (2023) explored the impact of pets on social support and well-being among cat and dog owners, with a focus on the quality of the pet-owner relationship. The study hypothesized that pets would enhance well-being beyond human support and that the quality of the pet-owner relationship would influence this effect. The study involved 238 participants (aged 19–83 years, $M = 51.30$, $SD = 15.40$), primarily females

(n = 205) with a smaller number of males (n = 33). Participants completed an online survey assessing demographics, pet ownership details, and the impact of COVID-19. Various scales were used, including the Brief Psychological Wellbeing Scale (Ryff & Keyes, 1995), the Satisfaction with Life Scale (Diener et al., 1985), and the Multidimensional Scale of Perceived Support (Zimet et al., 1988), along with an adapted pet support subscale and the Cat/Dog–Owner Relationship Scale (Howell et al., 2017).

Key findings showed that pets were found to significantly boost psychological well-being, complementing human support. Pet numbers were a significant predictor of psychological well-being, and perceived pet support significantly predicted life satisfaction. Emotional closeness to pets was found to weaken the positive relationship between perceived pet support and life satisfaction ($t(3, 235) = -2.178$, $p < 0.05$). This suggests that higher emotional closeness may reduce the benefits of pet support for life satisfaction. Other relationship quality factors (pet–owner interactions and perceived costs) did not significantly moderate these relationships. The study highlights the importance of both pet numbers and perceived pet support in enhancing well-being but suggests that the effects of high emotional closeness might be complex and possibly counterproductive for life satisfaction.

The study calls for further research to address limitations, such as the need for longitudinal designs and exploration of these dynamics across different demographics and contexts.

Watt and Pachana (2007) noted that Australia is anticipating a rise in the population of individuals aged over 65, which is likely to increase the mental health needs of this demographic. Sub-clinical levels of depression, anxiety, and loneliness are prevalent among older adults, who are also more prone to living alone. Research has shown that older adults living independently often regard companion animals as significant sources of social support. A study involving 32 community-dwelling older adults (ages 60 to 75+) investigated attachment to pets among this group. Participants were required to have previous or current pet ownership to avoid bias from non-pet owners. The study supported the psychometric properties of a new attachment scale for older adults but found limited evidence linking pet attachment to quality of life. The findings have implications for clinical practice with older adults and suggest areas for further research.

Bussolari et al., (2021) explored the impact of Covid-19 restrictions on dog owners' relationships with their pets. Conducted through an online survey of 4,105 adults between March 31 and April 19, 2020, the research used directed content analysis to identify themes. Findings revealed that during the pandemic, dog ownership significantly alleviated feelings of isolation and loneliness, while also supporting participants' mental and physical health. The strong human-animal bond formed with dogs during this period was found to be a key factor in mitigating the negative psychological effects of social distancing and isolation.

Rationale of the Study

Although numerous studies have highlighted the positive impact of pet companionship on psychological health and well-being, there is a noticeable gap in research examining this connection among working adults. Most existing studies tend to focus on general populations or specific groups such as children, the elderly, or individuals with chronic illnesses, leaving a significant underrepresentation of working adults in the literature. This study specifically addresses that gap by focusing on individuals between the ages of 18 and 60, a demographic that comprises a significant portion of the working population in India. Moreover, the majority of previous research has been conducted in Western contexts, with limited studies exploring the influence of pet ownership on mental health within Indian cities, particularly in a rapidly urbanizing metropolis like Bengaluru. Given the unique stressors and lifestyle challenges faced by the working population in this region, the present study offers a fresh perspective by investigating how pet companionship might influence mental well-being within this specific cultural and occupational context. As such, this research represents a novel approach, shedding light on an understudied aspect of human-animal interaction among the residents of Bengaluru.

Research question: Is pet companionship linked to reduced stress, anxiety, and depression?

Research Hypotheses

Null Hypotheses (H0):
H0 (Anxiety): There is no significant difference in anxiety levels between pet owners and non-pet owners in Bengaluru.
H0 (Stress): There is no significant difference in stress levels between pet owners and non-pet owners in Bengaluru.
H0 (Depression): There is no significant difference in depression levels between pet owners and non-pet owners in Bengaluru.

Alternative Hypotheses (H1):
H1 (Anxiety): There is a significant difference in anxiety levels between pet owners and non-pet owners in Bengaluru.
H1 (Stress): There is a significant difference in stress levels between pet owners and non-pet owners in Bengaluru.
H1 (Depression): There is a significant difference in depression levels between pet owners and non-pet owners in Bengaluru.

Objectives

1. To assess stress, anxiety, and depression using DASS-21 among the residents of Bengaluru.
2. To compare the scores of pet owners and non-pet owners and determine if pet companionship is linked to lower stress, anxiety, and depression.

Methodology

Research Design: This study employed a cross-sectional design, with the primary objective to examine the relationship between pet ownership and psychological well-being, focusing on stress, anxiety, and depression. The cross-sectional approach allowed for the comparison of mental health indicators between individuals who owned pets and those who did not. The use of a cross-sectional design was particularly advantageous in this context, as it facilitated a snapshot comparison between these two groups, helping to identify any potential association between pet ownership and reduced levels of mental health concerns. The study was conducted using a quantitative method to collect data on psychological well-being, with the key variables of interest being stress, anxiety, and depression

Participants: The participants in the study were a representative sample of 150 individuals residing in Bengaluru, India. The selection criteria included adults aged between 18 and 60 years, reflecting a broad spectrum of the working-age population in the region. Out of the total sample, 75 participants were pet owners, each having at least one pet companion (such as a dog, cat, or other domestic animal), while the remaining 75 participants did not own any pets. The demographic distribution was carefully considered with the help of simple random sampling to ensure that the sample was reflective of the broader population in Bengaluru in terms of age, gender, and socioeconomic background. This representative sampling approach was chosen to enhance the generalizability of the findings, particularly in relation to how pet companionship may affect mental health within an urban Indian context. The equal division between pet owners and non-pet owners facilitated a clear comparison between these two groups.

Instrument Used: The instrument used to measure psychological well-being was the Depression Anxiety and Stress Scale (DASS-21) by Lovibond and Lovibond (1995). The DASS-21 is a widely validated and reliable self-report questionnaire designed to assess the severity of three negative emotional states: depression, anxiety, and stress. It consists of 21 items, divided equally into three subscales, with each subscale containing 7 items that measure specific symptoms related to depression, anxiety, and stress.

- Depression subscale: This measures the absence of positive affect, feelings of worthlessness, and hopelessness.
- Anxiety subscale: This evaluates autonomic arousal, skeletal muscle effects, and situational anxiety.
- Stress subscale: This assesses persistent tension, nervousness, and a difficulty in relaxing.

Participants were asked to rate each of the 21 items based on their experiences over the past week using a 4-point Likert scale ranging from 0 ("Did not apply to me at all") to 3 ("Applied to me very much, or most of the time"). The scores from each subscale were totaled to generate a composite score for each variable (depression, anxiety, and stress).

The DASS-21 was chosen for this study due to its brevity, ease of administration, and its proven effectiveness in measuring psychological well-being across diverse populations. The scale's structure allowed the researcher to capture distinct aspects of mental health while maintaining efficiency in data collection. Furthermore, the DASS-21 has been validated for use in both clinical and non-clinical settings, making it suitable for assessing the mental health of the general population, such as the participants in this study. The Depression Anxiety and Stress Scale (DASS-21) is a widely used psychological assessment tool designed to measure the levels of depression, anxiety, and stress in individuals. It has undergone extensive validation and reliability testing across various populations and settings, establishing its utility as a robust tool for mental health evaluation.

Key Values for DASS-21 Validity and Reliability

- Construct Validity: Factor analysis consistently supports a three-factor model (depression, anxiety, stress).
- Concurrent Validity: High correlations with established measures like BDI (r = 0.70-0.80) and STAI (r = 0.60-0.80).
- Discriminant Validity: Ability to distinguish between related constructs of depression, anxiety, and stress.
- Internal Consistency: Cronbach's alpha values for the subscales are generally between 0.82 and 0.94, indicating excellent reliability.
- Test-Retest Reliability: Correlation coefficients between 0.71 and 0.81, showing stability over time.

Data collection: For this study, data collection was carried out using a combination of Google Forms and personally administered questionnaires. Each method was chosen for its ability to effectively reach and engage the target population, as well as for its logistical convenience in a contemporary, technology-driven world.

Google Forms was utilized in this study for several reasons, including ease of use, wide accessibility, and cost-effectiveness. The questionnaire, based on the DASS-21, was designed on Google Forms. The form included clear instructions, demographic questions, and the 21 items of the Depression Anxiety and Stress Scale (DASS-21). The form was structured to be simple, with a mix of multiple-choice questions and Likert scale ratings to assess the three psychological variables (depression, anxiety, stress). A link to the form was shared via email, messaging platforms (e.g., WhatsApp), and social media platforms such as Facebook and LinkedIn. Participants were asked to complete the survey at their convenience. Responses were automatically compiled in a Google Sheet, providing real-time data collection. The online format enabled easy access to the data, and the responses were stored securely within the platform, ensuring privacy and confidentiality. While Google Forms provided benefits such as accessibility, cost-effectiveness, and automated data storage, it presented challenges to obtain data from those who did not have internet access or literacy.

To address these challenges, personally administered paper questionnaires were also used, particularly for participants who preferred face-to-face interaction or were not comfortable with online surveys. This method ensured that a more diverse population, including older individuals or those with limited internet access, could be included in the study. A printed version of the DASS-21 questionnaire was created. It included the same items as the Google Form version, ensuring consistency in data collection. The primary investigator visited various locations in Bengaluru (such as community centers, workplaces, and cafes) to administer the questionnaire. Participants were provided with a brief introduction to the study, ensuring they understood the purpose and confidentiality of their responses before completing the questionnaire. In some cases, participants were guided through the process, ensuring they understood each item and could ask for clarification if needed. This personalized approach helped ensure high-quality, engaged responses. After completion, the paper forms were collected and stored securely. Responses were manually entered into a digital database for analysis.

Instructional Strategy: The instructional strategy for this study was meticulously crafted to guide participants through the data collection process and ensure they had the information needed to complete the questionnaires accurately and thoughtfully. Participants were briefed on the study's objectives, the nature of the questions, and the estimated time required to complete the questionnaire. This information was communicated through written instructions on the questionnaires and verbal explanations during face-to-face interactions. The Google Forms questionnaire was designed for simplicity and ease of use, with clear instructions for each section to minimize confusion. For the personally administered questionnaires, participants received a brief overview of the DASS-21 scale, including an explanation of the Likert scale used for responses. During in-person administration, the primary researcher was available to answer any questions and provide clarifications as needed, ensuring that participants understood each item and could respond accurately. For those taking the survey online, a contact email was provided to assist with any difficulties encountered. Participants were encouraged to give honest and thoughtful responses. To foster engagement and participation, they were informed about the study's significance and its potential impact on understanding the effects of pet companionship on mental health.

Ethical Concerns: The study followed ethical guidelines to protect participants' rights and well-being throughout the research process. Before participating, individuals received comprehensive information about the study's goals, methods, and potential risks. Informed consent was secured through an initial consent form provided in the Google Forms survey and via a verbal explanation for personally administered questionnaires. Participants were made aware that their involvement was voluntary and that they could withdraw at any time without facing any penalties. To maintain anonymity, the study ensured that no personally identifiable information was collected. Responses were anonymized and stored in a way that prevented the identification of individual participants. Both the Google Forms and paper questionnaires were designed to keep responses confidential. Participants were clearly informed that participation was not obligatory and that they could choose to refuse or discontinue their involvement at any time. This right was reiterated in the consent forms and during the administration of the questionnaires. For online surveys, a statement on the form reassured participants of their right to withdraw. Ethical permission was obtained from the Head of the Institution to ensure that the study adhered to all required ethical standards throughout its duration.

Data Analysis and Findings:

Stress levels: The data was analysed according to the scoring key of DASS 21 and further the descriptive statistics and the z-test of the means of both the samples were computed using Microsoft Excel.

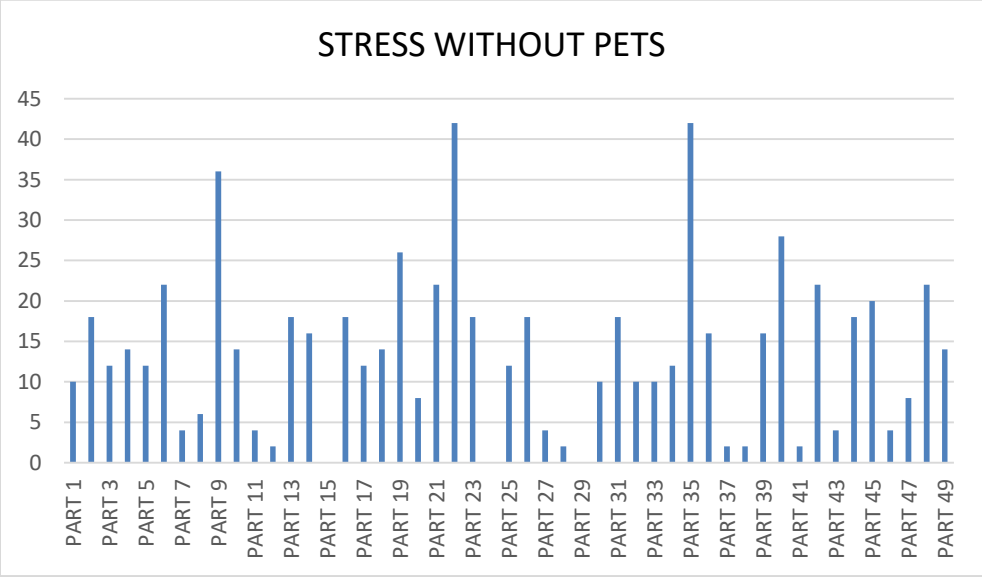

Figure 1: Stress Levels of participants without pet companionship

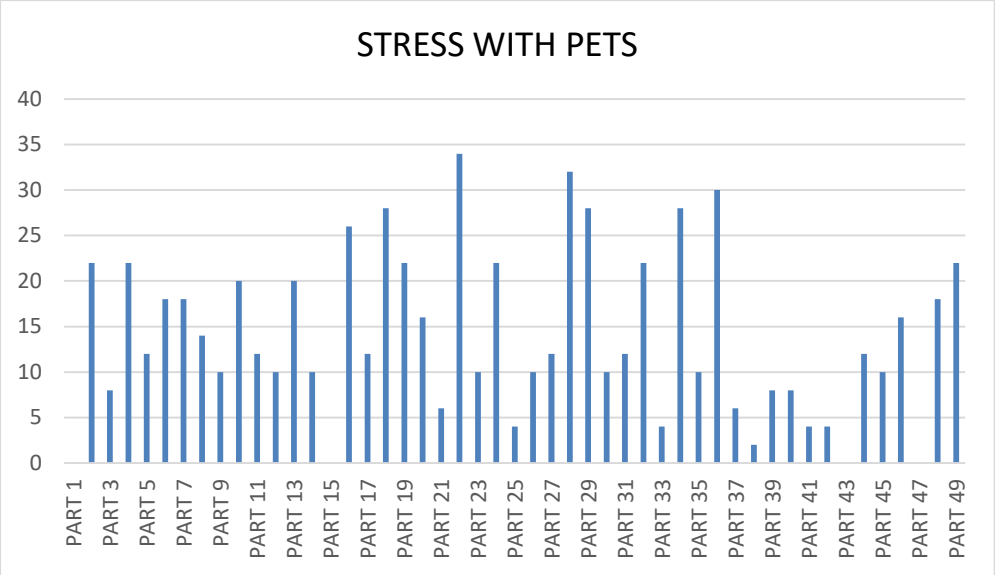

Figure 2: Stress Levels of participants with pet companionship

The findings reflected in Figure 1 and 2 show that the mean score of the stress level of people without pet companionship is 13.55 (Normal) and those with pet companionship have a mean score of 13.95(Normal). Table 1 shows the descriptive statistics where the difference in the mean scores is minimal. This difference is not significant as determined by z-test comparing the means in Table 2.

Table 1: Comparison of Stress level scores of individuals with pet companionship and without pet companionship

STRESS WITHOUT PETS		STRESS WITH PETS	
Mean	13.5510204	Mean	13.9591837
Standard Error	1.43245342	Standard Error	1.2942702
Median	12	Median	12
Mode	18	Mode	10
Standard Deviation	10.027174	Standard Deviation	9.05989143
Sample Variance	100.544218	Sample Variance	82.0816327
Kurtosis	1.22663812	Kurtosis	-0.65588
Skewness	0.97276343	Skewness	0.38396907
Range	42	Range	34
Minimum	0	Minimum	0
Maximum	42	Maximum	34
Sum	664	Sum	684
Count	49	Count	49

Table 2: The z-test scores of the mean score of the stress level of people without pet companionship and those with pet companionship

	STRESS WITHOUT PETS	STRESS WITH PETS

Mean	13.5510204	13.9591837
Known Variance	100.544	82.081
Observations	49	49
Hypothesized Mean Difference	0	
z	-0.2114228	
P(Z<=z) one-tail	0.41627868	
z Critical one-tail	1.64485363	
P(Z<=z) two-tail	0.83255736	
z Critical two-tail	1.95996398	

The z-test score as reflected in Table 2 is -0.211. The negative sign indicates that the value is 0.211 standard deviations below the mean. This absolute value of the z-score 0.211, is quite close to 0 and this suggests that the data point is very close to the mean.

Significance: In the context of hypothesis testing, in this case the null hypothesis that pet companionship has no effect on the stress levels of an individual is accepted as the z-score of -0.211 shows that there is no significant difference between the means of both the samples. Typically, for a z-score to be considered statistically significant (assuming a two-tailed test with a common significance level of 0.05), it needs to be further from 0 (i.e., greater than ±1.96 for a 95% confidence level). Therefore since there is no significant difference in the standard deviations, it can be concluded that pet companionship has no significant effect on the stress levels of an individual. This indicates that any observed difference is likely due to random variation rather than a significant effect.

Anxiety levels

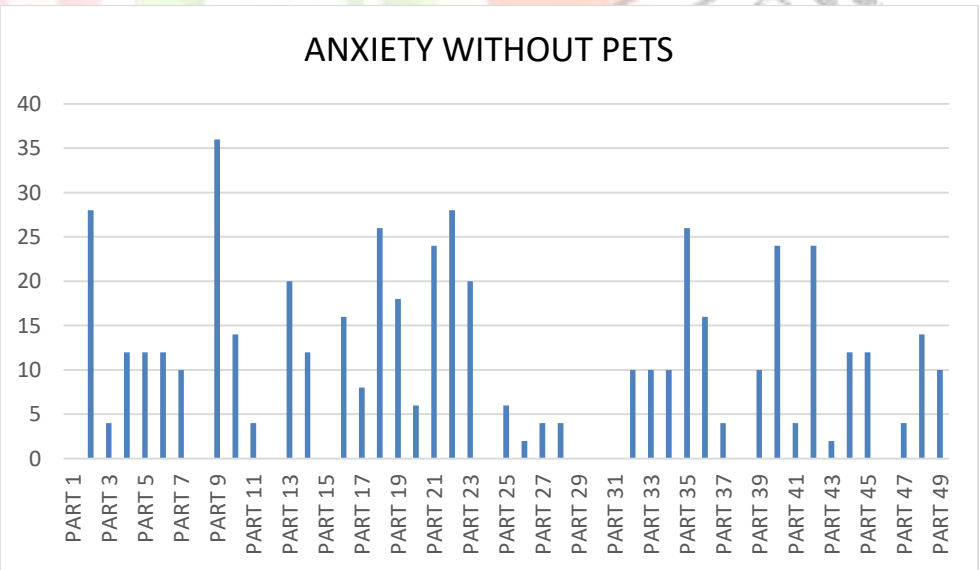

Figure 3: Anxiety Levels of participants without pet companionship

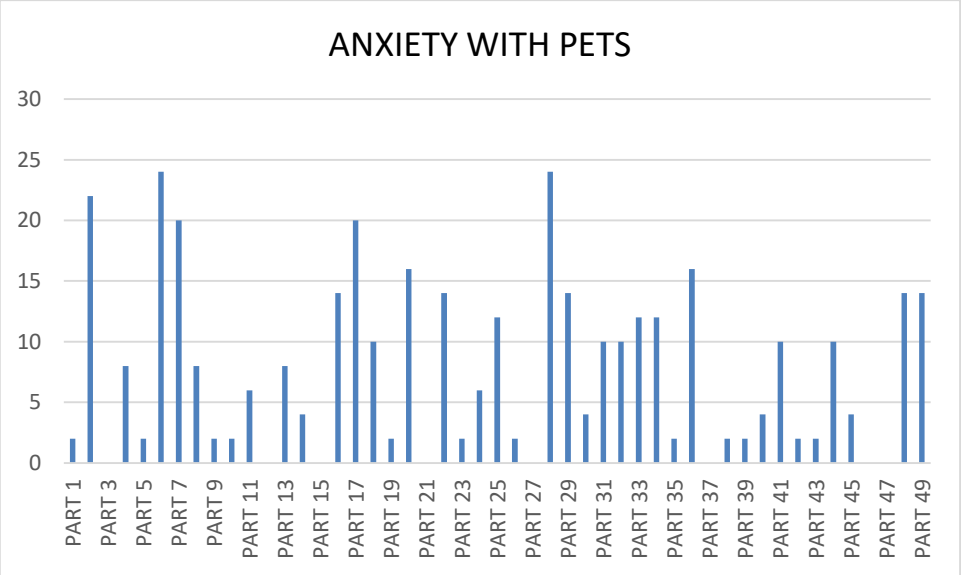

Figure 4: Anxiety Levels of participants with pet companionship

The findings reflected in Figure 3 and 4 show that the mean score of the anxiety level of people without pet companionship is 10.57 (Moderate anxiety) and those with pet companionship have a mean score of 8.44.(Mild anxiety). Table 3 shows the descriptive statistics where the difference in the mean scores is minimal There is a difference but statistically the difference is not significant as determined by z-test comparing the means in Table 4.

Table 3: Comparison of Anxiety level scores of individuals with pet companionship and without pet companionship

ANXIETY LEVEL WITHOUT PETS		ANXIETY LEVEL WITH PETS	
Mean	10.5714286	Mean	8.44897959
Standard Error	1.33884914	Standard Error	1.24985075
Median	10	Median	6
Mode	0	Mode	2
Standard Deviation	9.37194395	Standard Deviation	8.74895523
Sample Variance	87.8333333	Sample Variance	76.5442177
Kurtosis	-0.1855849	Kurtosis	2.22635564
Skewness	0.7618972	Skewness	1.39899338
Range	36	Range	40
Minimum	0	Minimum	0
Maximum	36	Maximum	40
Sum	518	Sum	414
Count	49	Count	49

Table 4: The z-test scores of the mean score of the anxiety level of people without pet companionship and those with pet companionship

Z-TEST: TWO SAMPLES FOR MEANS	ANXIETY WITHOUT PETS	ANXIETY WITH PETS
Mean	10.5714286	7.63265306
Known Variance	87.833	76.544
Observations	49	49
Hypothesized Mean Difference	0	
z	1.60451554	
P(Z<=z) one-tail	0.05430023	
z Critical one-tail	1.64485363	
P(Z<=z) two-tail	0.10860046	
z Critical two-tail	1.95996398	

Comparing the p-value to the significance level (α) i.e. α = 0.05 (one-tailed), a z-score of 1.60 (p-value ≈ 0.0548) is slightly higher than 0.05, so therefore the null hypothesis that pet companionship does not have any effect on the anxiety levels of individuals cannot be rejected.

Depression levels

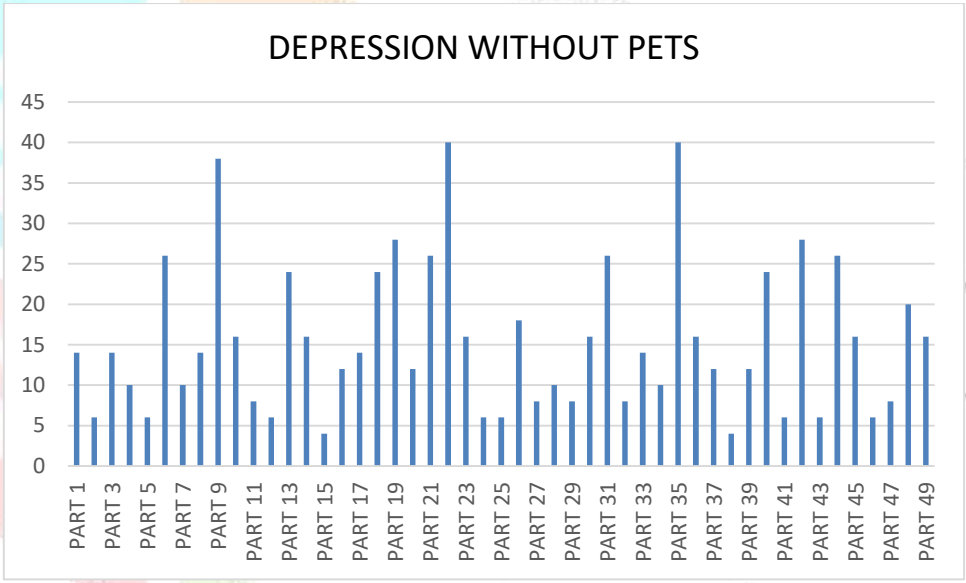

Figure 5: Depression Levels of participants without pet companionship

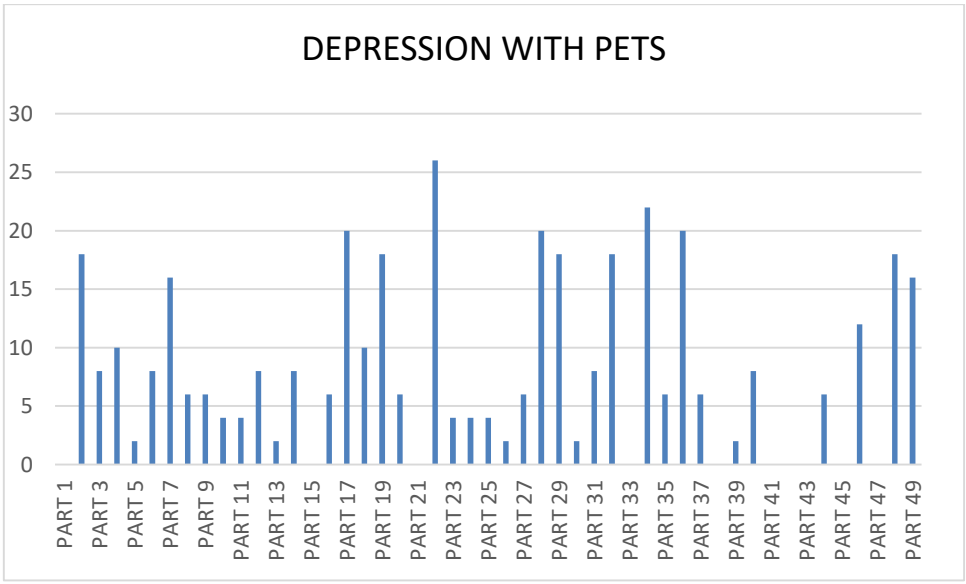

Figure 6: Depression Levels of participants with pet companionship

The findings reflected in Figures 5 and 6 show that the mean score of the depression level of people without pet companionship as 15.38 which is Moderate and those with pet companionship having a mean score of 8.69 which is Normal according to DASS-21**.** Table 5 shows the descriptive statistics where the difference in the mean scores is significant. The difference is significant as determined by z-test comparing the means in Table 6.

Table 5: Comparison of Depression level scores of individuals with pet companionship and without pet companionship

DEPRESSION LEVELS WITHOUT PETS		DEPRESSION LEVELS WITH PETS	
Mean	15.3877551	Mean	8.69387755
Standard Error	1.32890943	Standard Error	1.19173888
Median	14	Median	6
Mode	6	Mode	0
Standard Deviation	9.30236602	Standard Deviation	8.34217218
Sample Variance	86.5340136	Sample Variance	69.5918367
Kurtosis	0.67541104	Kurtosis	-0.1096928
Skewness	1.07454743	Skewness	0.9062162
Range	36	Range	32
Minimum	4	Minimum	0
Maximum	40	Maximum	32
Sum	754	Sum	426
Count	49	Count	49

Table 6: The z-test scores of the mean score of the depression level of people without pet companionship and those with pet companionship

	DEPRESSION WITHOUT PETS	DEPRESSION WITH PETS
Mean	15.3877551	8.69387755
Known Variance	86.534	69.591
Observations	49	49
Hypothesized Mean Difference	0	
Z	3.75007176	
P(Z<=z) one-tail	8.8392E-05	
z Critical one-tail	1.64485363	
P(Z<=z) two-tail	0.00017678	
z Critical two-tail	1.95996398	

A z-test score of 3.75 indicates that the observed difference between the sample means of two variables is 3.75 standard deviations away from the null hypothesis mean difference (typically zero). Here's how to interpret this score:

Significance Level : The significance level considered is 0.05

Critical Value: For a one-tailed test at a significance level of 0.05, the critical value is approximately ±1.96.

Comparison: Since the absolute value of the z-score (3.75) is greater than the critical value for the chosen significance level, the result indicates a highly statistically significant difference between the two variables at 0.05.

Conclusion: Since 3.75 is much larger than the critical values for common significance levels, we reject the null hypothesis that pet companionship does not have any effect on the anxiety levels of individuals. There is strong evidence to suggest that there is a significant difference between the two variables and therefore the alternate hypothesis that pet companionship has a significant effect in terms of lowered depression levels in individuals.

Conclusion

The analysis of stress levels using the DASS-21 scale revealed minimal differences between individuals with and without pet companionship. The mean stress score for individuals without pets was 13.55, while those with pets had a mean score of 13.95, both falling within the Normal range. A z-test analysis produced a z-score of -0.211, indicating no significant difference between the two groups. Regarding anxiety levels, the mean score for those without pets was 10.57 (Moderate anxiety) compared to 8.44 (Mild anxiety) for those with pets. Despite this difference, the z-test yielded a z-score of 1.60 and a p-value of 0.0548 (one-tailed), which slightly exceeded the 0.05 significance threshold. Therefore, the null hypothesis—that pet companionship does not affect anxiety levels—was not rejected. In contrast, the analysis of depression levels showed a significant effect. The mean depression score for those without pets was 15.38 (Moderate), while those with pets had a significantly lower mean of 8.69 (Normal). The z-test for depression levels yielded a z-score of 3.75 with a p-value of 0.00017678 (two-tailed), exceeding the critical value of ±1.96, indicating a highly significant difference. This result strongly suggests that pet companionship reduces depression levels. These findings align with prior research. Raina et al. (1999) demonstrated that while pet ownership did not directly improve psychological well-being, it strengthened the relationship between social support and psychological health, indirectly contributing to well-being. The study suggests that pet ownership helps to maintain or slightly improve physical functioning in older adults, while its impact on psychological well-being is more complex and mediated by social support. Beetz et al. (2024) reviewed 69 studies and concluded that interacting with pets positively impacts mood, social interactions, and stress by releasing oxytocin, which supports mental health. Hardie et al. (2023) also highlighted pets' role in enhancing social support and psychological well-being. Additionally, Bussolari et al. (2021) found that dog ownership reduced feelings of isolation during the COVID-19 pandemic, helping mitigate the negative psychological effects of social distancing. These studies underscore the positive impact of pet companionship on mental health, particularly in reducing depression, through mechanisms like enhanced social support and mood improvement. Bao and Schrer (2016) noted that pet owners are more satisfied with their lives than non-owners were more satisfied with their lives in general. Dog owners scored higher than cat owners in all aspects of well-being, as opposed to cat owners. While differences between pet owners and non-owners are minimal, owning a dog is linked to positive outcomes. The study discusses implications and directions for future research. On the contrary, Mueller et al. (2021) found that pet ownership was linked to increased anxiety irrespective of gender, with higher depression odds while employment status influenced the depression link for dog owners.

Recommendations

Based on the findings that pet companionship significantly reduces depression levels but has minimal impact on stress and anxiety levels, several recommendations can be made:

1. Promote Pet Companionship for Depression Reduction: Since pet companionship has a significant positive effect on lowering depression levels, individuals experiencing depression could benefit from owning or spending time with pets. Therapy programs involving pets, such as animal-assisted therapy, could be introduced as a complementary treatment for depression.

2. Encourage Social Interaction through Pet Activities: While stress and anxiety levels were not significantly impacted by pet companionship, prior research suggests pets can indirectly boost mental health by enhancing social support. Organizing pet-related community activities, such as group walks or pet therapy sessions, could foster social interaction and improve overall well-being.

3. Leverage Pets in Therapeutic Settings for Broader Mental Health Benefits: Although the study did not find a significant effect on stress or anxiety, engaging with pets has been linked to the release of oxytocin, which can improve mood and social bonds. This suggests that incorporating pets into therapeutic settings, especially for patients dealing with social isolation or mood disorders, could provide broader psychological benefits.

4. Raise Awareness about the Psychological Benefits of Pet Companionship: Educational campaigns could help inform the public about the mental health benefits of having pets, particularly the role of pets in reducing feelings of isolation and loneliness. Encouraging pet adoption, especially for individuals who may benefit from enhanced social support, can be an effective public health strategy.

5. Support for Pet Owners during Challenging Times: The COVID-19 pandemic highlighted the importance of pets in alleviating isolation and loneliness. Future programs should provide resources for pet owners during stressful situations, ensuring they can maintain their relationship with their pets as a source of emotional support.

6. Further Research on Pet Impact on Anxiety and Stress: While the current study did not find significant effects on anxiety and stress, more focused research on different types of pets, companionship intensity, and owner-pet activities may reveal nuanced relationships with these aspects of mental health.

By promoting pet companionship in targeted ways and fostering social support through pet-related activities, individuals could experience enhanced mental well-being, particularly in terms of reduced depression.

Implications

The implications of this study on the relationship between pet companionship and mental health are significant, both for mental health practitioners and for broader public health strategies. Key implications include:

- Targeted Mental Health Interventions: The study's findings highlight the potential for pet companionship to be integrated into mental health treatment, especially for individuals dealing with depression. Mental health practitioners may consider recommending pet-assisted therapies or encouraging patients to adopt pets as part of their therapeutic approach, particularly when dealing with depressive symptoms.
- Public Health and Well-being Initiatives: The demonstrated positive impact of pet companionship on depression levels suggests that public health initiatives could promote pet adoption as a strategy to enhance mental well-being. Public campaigns could focus on how pets contribute to mental health, particularly by reducing feelings of depression and loneliness. Additionally, support systems and resources could be developed for potential pet owners to help them navigate the responsibilities and benefits of pet ownership.
- Focus on Social Support Mechanisms: While the study did not find significant effects of pet companionship on stress and anxiety, it aligns with existing research indicating that pets enhance social support networks. This reinforces the idea that pets can serve as social catalysts, encouraging human interaction and fostering emotional bonds. The implication here is that mental health strategies might incorporate pet-related activities that promote social connectedness and community engagement.
- Animal-assisted Therapy (AAT) Development: Given the significant reduction in depression levels associated with pet companionship, there is a clear opportunity to expand the use of animal-assisted therapy (AAT) in clinical settings. Incorporating therapy animals into programs for individuals with mood disorders, particularly depression, could enhance treatment outcomes and provide an additional non-pharmacological approach to mental health care.
- Need for Further Research: The study opens avenues for further research into the nuanced effects of pet companionship on mental health. Future studies could explore the specific types of pets, the intensity of the owner-pet relationship, and the role of pet-related activities in affecting stress and anxiety. Understanding these dynamics in more depth could refine how pet therapy and pet ownership are used as mental health interventions.
- Mental Health Resilience During Crises: The study's findings, along with related research, suggest that pet ownership can provide mental health benefits during periods of isolation, such as during pandemics or other crises. Policymakers and mental health professionals should consider the role of pets in building resilience and emotional support systems during times of social or physical isolation.

Delimitation

This study is limited by its use of a cross-sectional design, which provides a snapshot of the relationship between pet ownership and psychological well-being at a single point in time. As a result, the study cannot infer causality or assess changes in mental health over time. Additionally, the study focuses on a specific urban population in Bengaluru, India, which may limit the generalizability of findings to rural or non-Indian populations. The inclusion of participants aged 18 to 60, while offering a broad view of the working-age population, may exclude insights from younger or older individuals whose experiences with pets and mental health may differ. Furthermore, only pet owners with at least one pet and those without pets were included; the study does not consider the differences between types of pets or the duration of pet ownership, which may also influence psychological well-being. Lastly, the study relies on self-reported data via the DASS-21, which, while widely validated, may be subject to biases such as social desirability or inaccurate self-assessment.

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Appendix

DASS-21 Scale

1 (s) I found it hard to wind down

2 (a) I was aware of dryness of my mouth

3 (d) I couldn't seem to experience any positive feeling at all

4 (a) I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)

5 (d) I found it difficult to work up the initiative to do things

6 (s) I tended to over-react to situations

7 (a) I experienced trembling (e.g. in the hands)

8 (s) I felt that I was using a lot of nervous energy

9 (a) I was worried about situations in which I might panic and make a fool of myself

10 (d) I felt that I had nothing to look forward to

11 (s) I found myself getting agitated

12 (s) I found it difficult to relax

13 (d) I felt down-hearted and blue

14 (s) I was intolerant of anything that kept me from getting on with what I was doing

15 (a) I felt I was close to panic

16 (d) I was unable to become enthusiastic about anything

17 (d) I felt I wasn't worth much as a person

18 (s) I felt that I was rather touchy

19 (a) I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)

20 (a) I felt scared without any good reason

21 (d) I felt that life was meaningless