



Exploring the Built Environment and Pet Ownership in Urban Apartments: A

Preliminary Analysis

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Abstract

The built environment is part of the physical environment, encompassing structures built for human activity. These elements include buildings, transportation lines, parks and more, which both impact humans and animals. Although a lot of research has been conducted on the effects of the built environment on human well-being, less research has been done on how it affects pets, especially in apartment settings, where certain shared areas and design elements can have a big impact on pet ownership experiences. The study's purpose was to understand the relationship

between pets and pet owners and their residential built environment. A 21-item online survey, administered via Google Forms, was distributed through social media platforms. The study employed a qualitative approach, drawing on the responses collected from 55 respondents, who were apartment residents aged 10 years and above, who currently or previously owned pets. Thematic analysis of the survey data revealed three key themes, demonstrating the relationship between pets and their built environment within urban apartment settings. These findings emphasize the importance of urban planning and its role in shaping pet ownership experiences, which highlights the necessity to consider the needs of pets and pet owners in urban settings.

Keywords: *Apartments, Built Environment, Design, Pet Ownership, Urbanization*

Introduction

The term '*built environment*' refers "to all areas and structures built by humans, ranging from parks and individual buildings to entire towns and neighborhoods, as well as vital infrastructure such as transportation, energy, and water". Human creativity has led to the integration of materials and energy to construct the environments in which we live, work, and play. Our daily routines, living arrangements, and access to necessary services are all significantly impacted by this vast network. However, its development necessitates enormous resource consumption, which has a negative impact on the environment and prompts long-term solutions (Naess, 2016).

Urbanization, the global shift of populations from rural to urban areas, has dramatically reshaped our world in recent decades. While offering immense potential for economic prosperity, technological innovation, and human progress, this surge in urban population also presents significant challenges, including overburdened resources, gridlocked transportation, environmental pollution, and socioeconomic inequalities. It is crucial to address these challenges

to ensure sustainable urban growth and to enhance the quality of life in increasingly crowded cities (Hosono, 2022; Palma, 2015).

The impact of urban living extends beyond human inhabitants, significantly influencing the well-being of pets. Confined spaces within urban dwellings can restrict natural pet behaviors, such as exploration and physical activity, potentially leading to behavioral issues like aggression and anxiety. Additionally, the inherent noise and congestion of urban environments can create stressful conditions for pets. However, urban planning can incorporate pet-friendly design elements, such as dedicated parks and walking trails, which not only enhance pet welfare by providing exercise and social outlets but also foster a more active and connected community for human residents (Jegatheesan, 2024).

The built environment significantly differs from natural habitats, presenting unique challenges for various species. For instance, amphibians and reptiles who require specific temperatures and humidity levels, struggle to thrive in the dry and controlled conditions of apartments. Small mammals, who are accustomed to burrowing and extensive foraging, face limitations in confined spaces that lack natural substrates. Birds, evolved for flight, experience severe restrictions in apartments, which negatively impacts their physical and psychological well-being. Similar issues affect domesticated animals, such as dogs and cats, including noise pollution and restricted access to outdoor spaces. These elements may have detrimental effects on the health and behavior of several species in urban environments (Perry, 2020).

Urban living presents unique challenges for dogs, with the prevalence of breed-specific needs, significantly influencing their adaptability. Mikkola et al. (2021) and Pongrácz (2024) stipulate that larger breed, with their higher energy levels and exercise requirements, may experience increased reactivity in urban environments due to limited space and constant stimulation, while

smaller breeds may initially appear better suited to confined spaces but still require consideration for their specific temperaments and activity levels. This ultimately requires a comprehensive understanding of breed-specific characteristics and individual needs, ensuring harmonious coexistence for dogs and their human companions.

Building upon the challenges faced by canines, it is crucial to acknowledge the constraints faced by felines in apartment settings. While often perceived as more adaptable to indoor environments, cats also experience limitations. The absence of vertical space for climbing and scratching can significantly impact their behavior, potentially leading to frustration and disruptive behaviors. Moreover, restricted opportunities for outdoor exploration can contribute to boredom and a decline in their overall well-being (Hahn, 2024; Ranjana, 2024).

Urban noise pollution can have detrimental effects on pets. Abou-Zeid (2024) demonstrated that urban noise significantly impairs the antipredator reactions of Eurasian Magpies. This phenomenon is relevant for all urban pets, as constant noise pollution can mask critical auditory cues, potentially increasing stress levels and hindering their ability to effectively perceive and respond to environmental stimuli (Arcangeli, 2022).

Hickman et al. (2018) highlight the requirement of appropriate housing design for various species, including a careful consideration of space allocation, the provision of environmental enrichment, and the fulfillment of needs specific to animal species. The well-being of aquatic creatures' hinges on adequate tank size and habitat diversity. Insufficient space can induce stress and abnormal behaviors, which prompts the need for meticulously maintained aquariums, to ensure physical and psychological health. This is particularly pertinent in apartment settings where space limitations necessitate careful planning to create optimal living conditions for aquarium inhabitants within confined environments (Brando et al., 2022).

Landlords frequently express concern about possible property harm and liability risks associated with pet ownership. Hence, Palluzi (2013) proposed a multifaceted strategy to address concerns surrounding pet-friendly housing, while safeguarding landlord interests. This approach involves implementing comprehensive pet policies that educate both landlords and tenants, and establishing rigorous pet screening procedures, aiming to foster a more inclusive rental market that encourages responsible pet ownership. These strategies empower pet owners to adapt their living spaces to accommodate their pets' needs by designating specific areas for their pets or by simulating natural habitats, demonstrating responsible pet-ownership and contributing to a harmonious cohabitation environment for both humans and animals (Linne & Angilletta, 2024).

Urban apartment complexes have incorporated features such as pet-friendly terraces and communal green spaces, that cater to the needs of canine residents. The Urban Forest apartment tower in South Brisbane, designed by Koichi Takada Architects, sought to integrate 827 trees and over 27,000 plants, effectively providing a '*traditional backyard experience*' for residents and their pets (Koichi Takada Architects, 2020). Filazzola (2019) highlights the importance of creating suitable habitats for various animals, by incorporating elements like green walls and vertical spaces, which can create stimulating environments for cats, enhancing their well-being and contributing to the overall biodiversity of urban ecosystems.

Small mammals and birds flourish in settings that resemble their native habitats. To support biodiversity, Animal-Aided Design (AAD) strongly emphasizes incorporating animals into the planning process of urban projects. Apartments can provide appropriate living conditions for these species by incorporating elements like indoor gardens and balconies that are accessible to birds (Weisser & Hauck, 2024). The needs of various species must also be taken into account. For example, reptiles require heat gradients and areas to bask, which might be challenging to offer in

normal apartments (Bates, 2022), whereas amphibians require fresh water alongside high humidity (Whitaker, 2021). Advanced filtration ensures optimal water quality, and embedded temperature controls mimic natural fluctuations (Tüzen & Aycı, 2023). On the other hand, efficient architecture minimizes artificial lighting and maximizes natural light to support natural cycles. While flats cannot completely recreate natural ecosystems, they do offer better urban settings for healthy pets. (Frischmann, 2010).

In a nutshell, the built environment greatly influences pets' living arrangements in urban settings, which offers both benefits and drawbacks. Despite the spatial and environmental constraints of urban apartments, sustainable architecture and green infrastructure create more hospitable and supportive living spaces. To ensure the well-being of pets within urban dwellings, collaboration among designers, developers, and pet owners is crucial, necessitating a holistic approach that considers not only basic housing needs but also the psychological and physical well-being of animals. Cities can demonstrate a commitment to a more humane and balanced urban future by creating urban spaces that support both human and animal residents, emphasizing sustainability and inclusivity.

Review of Literature

Humans have had a long history of pet ownership, starting with dogs and other animals. According to Global Animal Health Association (2022), approximately 50% of the world's population owns at least one pet. Pet ownership has been linked to many benefits on physical and mental health, such as a reduction in feelings of loneliness due to the presence of pets and also experiencing unconditional love on the behalf of the pets, which increases levels of confidence in people and gives them a sense of purpose (Sykes, 2024). There is also a reduced likelihood for pet owners to

go through cardiovascular health problems due to enhanced physical activity. Childhood exposure to pets has also been linked to resistance towards development of allergies (Gellner, 2015).

Cohen-Shacham et al. (2016) define Nature Based Solutions (NBSs) as “*actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.*”

In simpler words, NBSs encompass potential strategies or solutions to enhance ecosystems, providing economic, environmental and social benefits. Granai, Borrelli, Mariti and di Lacovo (2024) studied the potential of human animal relationships as potential NBSs. They stated that there has not been much research conducted to assess the impact of animals as potential NBSs to increase the quality of life and wellbeing for both humans and animals themselves.

While the pet owners are at work, the houses are the only environment the pets are exposed to, during that period. Hence, Jackson (1994) implored residential planners and architects to consider the physical and emotional needs of the pets when building residential spaces, by ensuring that the houses have adequate space for the pets to move around and relax by installing structures around the house that could also meet the needs of pets. Residential planners, architects and pet owners have made adjustments in residential spaces accommodating a variety of pets. Some examples include placing a dog bed under a side table, installing cat flaps on doors to allow easy access and movement to all rooms within the apartment, creating designated rooms for pets, placing food in different corners of the house for guinea pigs’ due to their foraging tendencies (DRD, 2023), altering the settings of the apartments to closely match the environmental needs of reptiles etc. (Wormald, 2023).

The Covid-19 period led to the implementation of numerous lockdowns, prompting people to remain at their residential spaces for their safety and others.’ A USA based survey showed that,

due to social distancing rules, 70% of the respondents reported an increase in the amount of time spent with their pets (Shahbandeh, 2024), rising from 13.2% in 2003 to 19.7% in 2021 (Lautz, 2023). However, pet owners had also undergone difficulties caring for their pets, such as a decreased ability to meet the needs of pets and to access veterinary care, having to balance work and pet care while staying at home and financial trouble, in case of layoffs (Applebaum et al., 2020). This led to an abundance of stress in both pets and their owners, due to restriction of movement outside their houses.

Pet ownership comes with numerous responsibilities, including providing them with good quality nutritious food and clean water, providing them with necessary medical care and shelter, and other responsibilities. The experiences people have with their pets can significantly impact their views towards animals in general and can shape attitudes and form behaviors working towards animal protection (Amiot et al., 2023). While pets provide numerous benefits, it is, unfortunately, not uncommon to see them being abused. Statistics, in the UK, show that there are around 1.1 million homeless cats and dogs (Pepper, 2023). This shows how pets are entirely dependent on their owners, and how insufficient care can negatively impact pets. Hence, it becomes crucial for people to think of pets as part of the vulnerable population.

Methodology

Sample

The study used a qualitative and interpretative approach to evaluate the impact of built environment on pets and its influences on the decisions made by pet owners with regards to the mental and physical needs of the pets. The sample of the study consisted of apartment-dwelling current and former pet owners aged 10 years and above. The 55 respondents included 32 females,

21 males, and 2 undisclosed. Purposive and snowball sampling techniques were used for data collection.

Procedure

A survey was conducted using Google Forms, the link for which was shared using social media platforms like WhatsApp, Instagram and Reddit, which led to the collection of 55 responses. The survey consisted of 21 questions, including multiple choice questions and open-ended questions. The average time to complete the survey is 10 minutes. Consent was obtained from the subjects and confidentiality of the data was assured.

Data analysis

Prevalence rates and thematic analysis were used to identify patterns in the survey questions and their responses, understanding pet ownership in urban settings. The questions were divided into broader categories and were elaborated upon, using peer reviewed studies that specifically talk about human animal relationships in built environment.

Results and Discussion

Based on the formation of the questions and the responses obtained, four themes were identified, highlighting the relationship between pets and pet owners and the built environment. The following themes were identified: *the impact of built environment on pets, socioeconomic factors of pet ownership, dynamics of pet ownership* and *the role of pets in the lives of humans*.

Theme 1: *The Impact of Built Environment on Pets*

The built environment is a component of the physical environment which includes urban structures, transportation facilities and other infrastructure, particularly with characteristics like accessibility and connectivity, which also has an impact on the physical and mental health of people and pets (Wang et al., 2023). There is a mutually dependent relationship between pets and

their owners, with pets relying on owners for food, shelter, and love, while owners rely on pets for emotional stability and mental strength (American Veterinary Medical Association, 2024). The Farm Animal Welfare Council developed a method named *Five Freedoms* to ensure optimal well-being of animals under the care of humans, which includes freedom from hunger and thirst by providing access to fresh water and nutritious food, freedom from discomfort by providing shelter and a place to rest, freedom from pain, injury, or disease by prevention or providing treatment in case of injuries or illnesses, freedom to express normal behavior by providing sufficient space, proper facilities, and company of the animals' own kind and freedom from fear and distress by avoiding treatments which cause mental suffering (Thiry, 2024).

Human activity has had an influence on the ecosystem, causing repercussions in the neurobehavior of the animals (Arcangeli et al., 2022). People sometimes tend to cage their pets, when residing in apartments, leading to lack of stimulation and an increase in boredom, especially in dogs and cats (Pham, 2022). Studies have reported that fish that do not grow with a sibling display altered swimming, show lack of foraging for food etc. (Arcangeli et al., 2022). Veterinary articles and newspapers have used snake enclosures as examples of unsatisfactory housing practice, due to spatial restrictions preventing the snakes from fully stretching themselves (Warwick, 2020). Limited access to parks and natural surfaces like grass and soil can induce physical problems in dogs and cats, such as joint problems and increased risks of heat strokes (Gewirtz, 2024).

52.7% of the respondents reported less frequent socialization, while only 14.5% reported the opposite. The ability of the animals to interact with other people or animals depends on the sociability of the species themselves or on the social behavior developed in their early years (Hargrave, 2021). There may be limited opportunities for social interaction, residing in urban environments and depending on the types of pets owned, possibly resulting in social anxiety and

behavioral problems (Horwitz, 2020). Hearing damage has been reported in pets raised in urban settings, due to the noises of cities like the honking of vehicles, bursting of firecrackers during festivals etc., which has also been linked to lower vocalization of frogs (Greenfield, 2023).

People, when buying, adopting or rescuing animals, often forget to consider the amount of space present in their apartments (Stonegate Living, 2023). Larger breeds of dogs often face mental and physical turmoil staying in apartments, owing to factors like lack of spatial freedom which leads to an increase in aggressive behavior, lack of exercise which leads to weight gain, as supported by 69.1% of the respondents, and lack of opportunities for expressing natural behaviors (Harvey, 2016). Damage can also be inflicted on the furniture and the walls of the apartments, as backed by 61.8% of the respondents, including scratching of sofas, expulsion of body fluids onto carpets, bad odor etc. There might also be complaints from neighbors due to the types of pets owned, especially exotic pets, and the noises emitted from the pets, especially barking's, loud wails etc., causing stress in the pet owners (Stonegate Living, 2023).

Theme 2: Socio Economic Factors Influencing Pet Ownership

Pet ownership benefits brain function, general health, and emotional well-being by providing companionship and unconditional love. It increases physical activity, lowers blood pressure and cholesterol, and may reduce heart attack risk (Levine et al., 2013). Pets act as buffers against stress, enhancing perseverance, mood, emotional regulation, and psychological health (Silva, 2024). Recent studies have shown that pets also improve social relationships by acting as social facilitators, fostering connections in public spaces and promoting a sense of belonging (Taniguchi et al., 2018). They strengthen communities by encouraging dialogue, building new relationships, and reinforcing existing social ties (Wood et al., 2017).

Socioeconomic conditions have a substantial impact on individual choices about pet ownership. People from wealthier backgrounds are more likely to get pets because they may see pets as symbols of social status or as reflections of their standards of life (Wu, Liu, & Yang, 2024). On the other hand, people from lower socioeconomic strata might experience additional challenges to pet ownership, including lack of resources, limited availability of healthcare for pets, and housing limitations (McDowall, 2023). Purewal et al. (2019) found that sociodemographic factors, including family structure, parental education, and financial status, significantly influence the likelihood of pet ownership among adolescents. They also found that social factors and pet ownership decisions at different stages of life are intricately correlated. The American Society for the Prevention of Cruelty to Animals estimates that owning a dog cost between \$1,400 and \$2,800 per year, underscoring the enormous financial commitment involved (Mantz, 2023). Stone et al. (2021) demonstrates that these costs can exacerbate housing instability, especially for vulnerable populations. This emphasizes the need for careful consideration of the long-term financial implications of pet ownership to ensure both pet well-being and owner stability.

The quality of the pet-owner relationship and pet well-being are significantly influenced by the duration of daily interaction. Data analysis reveals a varied range of engagement, with 34.5% of the respondents spending 4 to 6 hours daily with their pets, 30.9% spending 1 to 3 hours, 25.5% spending 7 or more hours, and 9.1% spending less than one hour. This distribution suggests a wide spectrum of pet-owner interaction, likely influenced by factors such as employment, family structure, and personal time constraints. Regular interaction is essential for pets, especially dogs and cats, to ensure adequate physical exercise and mental stimulation. Individuals with flexible schedules, such as students 40% and retirees 5.5%, are generally better positioned to dedicate substantial time to their pets, fostering stronger human-animal bonds and promoting animal well-

being. In contrast, those employed full-time 36.4% may encounter difficulties providing sufficient attention, potentially leading to negative impacts on their pets' health and behavior.

Gates (2019) found a positive correlation between income and pet care expenses. Pet owners from lower socioeconomic backgrounds, however, could experience financial challenges. Low-income pet owners sometimes have to make difficult trade-offs due to financial constraints, which might result in financial obstacles for treatment or pet needs, both of which can have a detrimental effect on the pets' welfare (Arluke and Rowan, 2020). According to Applebaum & Maclean (2021), changing economic conditions can compel people to make difficult decisions about pet ownership, which is why 5.3% of respondents were hesitant to obtain a pet.

A key consideration in deciding pet ownership is the living circumstances of the pet owners and the amount of space in their homes. Families and individuals in metropolitan regions, where housing is frequently scarce and costly, are more likely to choose smaller pets like cats or birds than big dogs. As Salmonsén (2024) notes, even in multifamily settings, the growing popularity of pet ownership—particularly of dogs and cats—drives a need for pet-friendly housing, suggesting a possible change in urban living trends. Other factors, such as noise level, the availability of outdoor spaces, access to veterinary care, etc., may also have an impact on decisions regarding pet ownership in addition to physical space. For instance, individuals who live in a noisy area might be less likely to choose pets who are sensitive to loud noises.

The survey's responses showed a wide range of views on the best places to keep pets. 56.4% of respondents chose villas as their preferred dwelling choice, citing the roomy accommodations that allow for plenty of pet activities. This preference aligns with the principles explored by Jackson (1994), who advocated for adaptable housing design to better accommodate companion animals.

Architectural modifications can improve the suitability of different types of homes for pet ownership. Nevertheless, it is recognized that this viewpoint might not be universally applicable because regional and personal variables can affect these choices.

The present study revealed that a multitude of factors contribute to pet relinquishment, including time constraints- 21.1%, potential health issues- 10.5%, the loss of a pet- 42.1%, allergies- 10.5%, current living arrangements- 44.5%, and financial constraints- 5.3%. Allergic reactions can affect one's quality of life, causing symptoms like coughing, sneezing, eyesores, and skin rashes, highlighting a well-established link between pet allergies and decreased pet ownership (Asthma and Allergy Foundation of America, 2022). The loss of a pet signifies a significant shift in pet ownership status and serves as a vivid reminder of the profound grief and emotional upheaval that can result (McNicholas & Collis, 2014). Applebaum & MacLean, 2021 showed in their study on pet surrender that giving up an animal is rarely a simple or thoughtless decision but rather involves consideration and emotional pain. Additionally, they found that a major contributing factor to pet surrender was home instability. This could include limitations outlined in rental contracts, home relocation challenges, or just a lack of available space.

A significant amount of time must be dedicated to providing your pet with proper care, which includes feeding, grooming, playing, exercising, and seeing the veterinarian. Extensive work schedules, demanding professional commitments, and other personal responsibilities can make it extremely difficult for individuals and families to regularly provide for the various requirements of their pets. This emphasizes how crucial it is for prospective pet owners to assess their time constraints realistically before committing to animal care (Schelle, 2024).

Theme 3: *The Role of Pets in the Lives of Humans*

Due to the positive impacts of pets on people, people have made financial efforts to maintain and further develop this relationship (Rault et al., 2020), by making adjustments in their houses and in their lives, to accommodate the needs of their pets. 16% of the respondents reported that they chose to limit personal consumption to meet the needs of their pets, like providing them with toys, taking them to veterinary clinics for regular checkups etc., while 72.7% have made necessary changes in their apartment, including the installation of balcony nets to keep cats and dogs from falling off the balconies (Blackwell, 2023), limiting ownership of plants that are poisonous to animals etc. Pet owners assign designated spaces for feeding, sleeping etc., if they are not able to set separate rooms for their pets.

Cats tend to feel secure when they are at a height, making it easier for them to look for potential threats. Installing vertical cat trees can reduce feelings of fear and will reduce the likeliness of them running away (Conklin, 2019). Amphibians are very sensitive to temperature, as it can impact their metabolism and immune function. If they are kept in conditions that are not appropriate for them, they have a higher risk of developing infections and illnesses. Pet owners can ensure optimal conditions through proper ventilation, maintaining appropriate water temperatures by using water chillers and air conditioners and more (Whittaker and Yaw, 2021).

Environmental attitudes are described as “*the collection of beliefs, affect and behavioural intentions a person holds regarding environmentally related activities or issues*” (Shooshtarian, Rajagopalan and Sagoo, 2018). Climate change and global warming have increased temperatures, raising the risk of burning animal's paws on concrete and asphalt, causing mobility issues (Gewirtz, 2024). Additionally, the rise in illness-causing agents affects both individuals and their pets. Therefore, pet owners must prioritize sustainability while meeting their pets' needs, including

using sustainable alternatives for pet food. 56.4% of the respondents reported their interest in sustainable pet products, including the use of pet food brands that have been certified by the Aquaculture Stewardship Council or the Marine Stewardship Council. These councils make sure the pet food's protein is produced and sourced responsibly. This involves employing fish and insects as sources of protein since they contribute to lowering carbon emissions, which benefits the environment (Gardner, 2018). This led to the increase in the consumption of these products by 60% in the UK, according to the Marine Stewardship Council (Han, 2023). Pet owners can purchase toys made from recycled or natural materials like hemp, bamboo, or organic cotton (Ecobnb, 2023). 36.4% of the respondents believe in participating in environment based community initiatives, while 47.3% postulate that pet ownership leads to an increased awareness of environmental issues, along with the need to follow an eco-friendly lifestyle. Pets are seen as part of the self-concepts of pet owners, which provides a link to nature. This motivates people to think and care about nature, thinking of it as an extension of their identities, which helps in stimulating pro environmental behaviors (McConnell, 2023).

58.2% of respondents noted society's positive attitude towards pets, while 18.2% and 21.8% observed tolerant and neutral attitudes, respectively. Pet ownership during childhood fosters positive attitudes towards animals and nature (Jacobson and Chang, 2018). Respondents reported enhanced stability, happiness, reduced stress, and a more meaningful life with pets. It is linked to increased oxytocin, regulated cortisol (Applebaum et al., 2020), improved quality of life, reduced loneliness, and boosted immunity (Scoresby et al., 2021). Many also noted increased responsibility, tolerance, and discipline, prioritizing pets' needs and reflecting their care commitment.

Conclusion

Pets significantly improve human well-being by enhancing quality of life and reducing risks of obesity, stress, and anxiety. They serve specialized roles, such as service and emotional support animals, offering crucial assistance like detections, alerts, and guardianship. Even domesticated birds like peacocks contribute to emotional stability (Foster, 2018). Dogs, known for being ideal companions, help facilitate social connections and are often recommended for children facing social challenges (Lindsay & Thiyagarajah, 2021). Maintaining pet well-being requires consistent effort, including regular exercise and mental stimulation, to prevent health issues and destructive behaviors. Despite the benefits, factors such as grief from losing a pet, financial constraints, allergies (pet dander, saliva, fur, etc.), health concerns (e.g., zoonotic diseases), separation anxiety, time constraints, and socioeconomic factors can prevent people from owning pets and affect their ability to provide proper care.

Housing stability and access to pet-friendly housing significantly impact decisions to acquire or keep pets, especially in urban areas. Despite challenges like apartment living, the human-animal bond offers unconditional love and support. Pet-proofing, secure environments, quality interaction, and access to pet-friendly spaces improve pets' quality of life in urban settings.

While this study offers insights into the impact of the built environment on pets and their owners, several limitations must be acknowledged. The survey questions, while intended to gather qualitative insights, did not focus on aspects such as apartment types (e.g., number of rooms, locality, number of occupants in an apartment etc.), potentially leading to varied responses.

Additionally, the reliance on qualitative data and the minimal use of quantitative measures limits the generalizability of the findings and the ability to conduct statistical analysis. The limited resources for this research introduce potential biases, influenced by the researchers' prior

experiences with pet care, which may have affected data interpretation. The small sample size (55 respondents) restricts the ability to generalize findings to the broader population of urban pet owners. Additionally, the use of social media platforms for survey distribution may have introduced sampling bias, as it may not have reached a representative sample of all apartment-dwelling pet owners. To address these limitations, future research should prioritize expanding sample sizes and diversifying data collection methodologies. Investigating the potential of technological advancements to enhance pet wellness within urban dwellings presents a promising avenue for future research.

Acknowledgements

We extend our deepest gratitude to all those who contributed to the successful completion of this research. We are also deeply grateful to Miss. Reshma Ravindran for her assistance in ensuring the ethical conduct and academic integrity of this research through the plagiarism check. Her support was greatly appreciated. Furthermore, we would like to express our sincere thanks to all the participants of this study for generously sharing their valuable experiences, which were crucial for the success of this research. Finally, we extend our heartfelt gratitude to our families and friends for their unwavering support, constant encouragement, and understanding throughout this journey.

Authors note

We would like to express our gratitude to all the respondents for completing the survey. Purposive and snowball sampling techniques were used in the study. Consent was obtained from the participants and anonymity of responses was maintained.

Funding statement: This research study did not receive funding from external sources. It was self-funded, with no financial support provided by institutions or organizations.

Conflict of Interest Declaration: The authors declare no affiliations with any organization or entity with a financial interest in the subject matter. There are no conflicts of interest, as the researcher has no financial or personal interests that could influence the outcomes.

Author Contributions: AK (first author) and SS (corresponding author) conceptualized the study, collected data from personal journals and lived experiences, and conducted qualitative analysis using thematic coding. AGS (co-author) contributed to the study design, provided feedback on the analysis, and assisted with manuscript revision. All the authors approved the final manuscript.

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