

## Article

# A Sequential Explanatory Study Examining the Buffering Effects of Human–Animal Interaction on Stress and Quality of Life among Work-from-Home Employees during the COVID-19 Pandemic in the Philippines

Karen Anne C. Quing <sup>1,\*</sup>, Jomar Saif P. Baudin <sup>1</sup> and Renato R. Maaliw III <sup>2</sup>

<sup>1</sup> Department of Social Sciences, College of Arts and Sciences, Southern Luzon State University, Lucban 4328, Quezon, Philippines; jbaudin@slsu.edu.ph

<sup>2</sup> CHED-IDIG GeoSpatial & Data Analytics Laboratory, College of Engineering, Southern Luzon State University, Lucban 4328, Quezon, Philippines; rmaaliw@slsu.edu.ph

\* Correspondence: kquing@slsu.edu.ph

**Abstract:** The sudden lockdown and social isolation caused by the COVID-19 pandemic substantially affected the physical and psychological aspects of our lives. This study used a sequential explanatory research design to explore how human–animal interactions (HAI) can reduce stress and improve quality of life (QOL) for employees working from home during the period. A total of 770 respondents took part in the quantitative portion of this study, comprised of 385 pet owners and 385 non-pet owners, with ten individuals randomly selected for the qualitative phase. The pet owners group was predominantly female, with 28.57% of the total sample with a mean age of 33.67 and a standard deviation (SD) of 9.46. In contrast, the majority of non-pet owners were male, making up 32.46% of the group with an average age of 29.57 and SD of 6.42. The HAI scale, work stress questionnaire, and the WHOQOL-BREF tests were utilized to evaluate the variables of this research. The results indicated significant differences in stress levels between the two independent groups. However, there were no significant differences in the overall QOL within the groups, except in the social domain. More importantly, our research showed that HAI had a buffering effect on stress and QOL among pet owners. Our research has important implications for understanding the importance of owning pets in enhancing personal welfare. These results are helpful for public health policies and endeavors to aid individuals and communities during periods of crises such as a pandemic.

**Keywords:** COVID-19 pandemic; human–animal interaction; stress; pet ownership; quality of life

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## 1. Introduction

The COVID-19 pandemic has drastically altered our lives, casting a profound shadow over our mental, physical, and social well-being. It has forced us to adapt to a new normal filled with challenges and uncertainties. In 2020, the World Health Organization (WHO) declared COVID-19, a newly discovered coronavirus, a global health emergency, which has since claimed millions of lives [1]. In response, governments worldwide implemented lockdowns to curb the virus' spread, causing a significant shift from physical to virtual interactions. A wealth of research has highlighted its impact, noting a marked increase in mental health issues—anxiety [2], depression [3], substance abuse, domestic violence [4], post-traumatic stress disorder, and sleeping disturbances [5], among other negative effects [6]. A longitudinal study in Italy examined COVID-19's impact on thousands of participants' psychological state. They found consistent levels of worry, anxiety, and perceived stress with particular attention to gender differences and

correlations overtime [7]. This indicates the repercussions on the collective well-being of individuals during the pandemic. An Irish project probed the frequency of depression and anxiety during the pandemic. A higher percentage of the participants were found to experience depression on younger age groups living outside urban areas having high loneliness and with somatic issues [8].

As a result, our homes, once places of tranquility, have transformed into extensions of our schools and workplaces. Although working from home offers benefits, it can also increase stress due to challenges in maintaining work–life balance [9–11]. Studies have indicated that home-based employees may suffer from inadequate technological resources, prolonged sedentariness, and extensive computer use [10,12]. However, engaging in positive coping strategies like physical exercise, nurturing social ties, prayer, learning new skills, and eating healthily has been shown to alleviate psychological distress [13–15]. Specifically, maintaining social connections, whether physically or virtually can significantly reduce the pandemic’s detrimental effects [16]. Experts [17] suggest that perceived social support can moderate the harmful impact of stress. Although this concept has mainly been explored in humans, its applicability to animals remains an area for further study.

Numerous studies divulged that pastoral services (PS) as a coping mechanism for stress has been shown to have a positive impact on people’s mental and emotional well-being. Individuals who engage in pastoral care and counseling services experience lower levels of stress, anxiety, and depression compared to those who do not have. By integrating spiritual and emotional support, these services can provide a unique and comprehensive way in managing stresses [18]. In addition to offering guidance and comfort, PS emphasizes the importance of fostering a sense of community and connectedness. This can be particularly beneficial in helping a person navigate through challenging times and build resilience in the face of adversity. By creating a supportive environment, pastoral care can strengthen social and emotional resources. It addresses the deeper and existential concerns that often underlie stress and contribute to a diminished QOL. Moreover, the support provided through pastoral care extends beyond immediate circumstances that can foster fortitude and a sense of purpose. This extended view can help individuals thread through stressors with greater adaptability and hope for a more sustainable improvement in their overall well-being [19].

Research has also shown that human–animal interactions (HAI) substantially benefit mental and physical well-being [20]. These include aiding in stress management, reducing anxiety in children [21], enhancing physical health [22], and lessening post-traumatic stress disorder [23]. Additionally, positive emotional states have been associated with these interactions [24]. One study [25] highlighted the positive impact of allowing dogs in the workplace on employee well-being, which is attributed to the release of oxytocin [26] during human–pet encounters. Oxytocin is a hormone known for fostering healthy social bonds, augmenting well-being, and reducing stress [27]. However, the relationship between humans and animals is not solely positive. Several articles have pointed out negative aspects, such as the emotional toll of grieving a pet’s loss [28] and the increased stress from pet care responsibilities, which were particularly noted during the pandemic [29]. Thus, the overall impact of HAI on individuals remains a topic of debate. In the Philippines, the understanding and integration of HAI into society are still in the early stages, with its potential roles largely unexplored. This gap in knowledge has unfortunately contributed to a higher incidence of animal abuse, exacerbated by the economic strains of the COVID-19 pandemic leading to an increase in pet abandonment [30]. While HAI has been studied in Western countries, its applicability and outcomes in the Philippine context or any different cultural background remain uncertain.

### *1.1. Work-from-Home Employees’ Stress and Quality of Life*

The pandemic has changed our lifestyles. Faced with the virus’ threat, individuals had to devise innovative approaches to continue their professional lives while also pri-

oritizing their health. As a result, a vast number of companies, organizations, and institutions have transitioned to work-from-home (WFH) arrangements. Telework [31] or remote work [32] has emerged as a viable solution to mitigate the disease's spread, allowing employees to carry out their duties from a distance. However, the effectiveness and advantages of this setup are still disputable [32]. Numerous documents highlight the perks of WFH such as the elimination of commute times leading to more productivity and longer sleep durations [33]—factors that boost cortisol levels [34]. Economically, those who typically rely on public transport are saving on travel expenses [35]. Perhaps most significantly, WFH enables individuals to balance their professional and domestic responsibilities more effectively causing higher rating of job satisfaction [36]. WFH is linked to job autonomy [37] and enhanced work engagement and performance [38], including quality of life (QOL) improvement [39]. On the other hand, contrary views exist. Authors [40] argued that WFH can pose occupational health issues. These include psychosocial problems due to isolation and disruption of personal lives; changes in lifestyle, such as altered sleeping and eating patterns; ergonomic concerns; and physical health, such as musculoskeletal pain. With homes turning into extensions of the workplace, many employees struggle to separate work from personal life. This blurring of boundaries often results in over-commitment and frequent overtime among those remote workers [41]. In addition, the report of [42] demonstrated that this setup aggravate work-life balance. Furthermore, the surge in technology use has led employees to experience 'technostress'.

Technostress is a type of stress linked with the ongoing use of information and communication technology (ICT) [43]. Scholars [44,45] have identified five main components of technostress: (1) techno-overload, where individuals feel compelled to work more, for longer periods, or to change their work habits that can lead to burnout, fatigue, and a diminished work-life balance. Constant connectivity and the expectation of immediate responses increase stress levels, potentially exacerbating anxiety and decreasing job satisfaction; (2) techno-invasion, which occurs when users feel they must always be connected, leading to the intrusion of work into their private lives. These experiences of being 'always on' are accompanied by pressure to respond to work communications outside of the usual working hours can result to sleep inference, personal autonomy, and resentment towards the job; (3) techno-complexity, arises when individuals believe their technical skills are inadequate, forcing them to invest more time and effort in understanding ICT complexities. The rapid pace of technological change can make it challenging for individuals to keep up leading to feelings of incompetence, reduced self-efficacy, and adds cognitive strain; (4) techno-insecurity is an experience when individuals fear losing their jobs or being replaced by someone more technologically proficient. The concern over being obsolete can create chronic fear resulting to lower job commitment, heightened job stress, and a constant pressure to upgrade skills to remain relevant in the job market; (5) techno-uncertainty is the anxiety caused by continuous updates and changes in technology. This unpredictability impacts an individual work processes as they may feel a sense of helplessness or loss of control in anticipating changes in work routines and required skills. When combined with other stressors and without effective coping strategies, technostress can lead to a range of adverse effects. These include physiological symptoms such as insomnia [46], fatigue [47], eye strain, irritability, headaches [48], as well as psychosocial issues like anxiety, depression, feelings of helplessness [46], job dissatisfaction [49], and disruptions to work-life balance [50].

It is crucial to recognize that the severity of adverse consequences experienced by WFH employees varies based on their coping mechanisms. For example, a study by [51] conveyed that social support, effective time management, deep breathing exercises, and engaging in relaxing activities significantly help employees manage stress. Furthermore, the research of [52] indicated that active coping tactics, positive reframing, and meticulous planning are also remarkably beneficial in overcoming work-related stress.

### 1.2. Benefits of Human–Animal Interaction

Human–animal interaction (HAI) examines the dynamic and reciprocal communication between human and animals [53]. This field has intrigued researchers for decades, despite mixed results [54]. Numerous researches show promising results, while others yield questionable or contradictory outcomes [55]. These discrepancies often stem from methodological limitations, variations in study designs, measurements, and the challenge of quantifying HAI [21,55,56]. Despite these hindrances, the notion that pets positively affect well-being is widely accepted. Educational, industrial, and clinical settings are increasingly incorporating animals into therapeutic programs known as animal-assisted therapy (AAT) and animal-assisted interventions (AAI) [57]. Initially, experiments on the welfare of pet ownership showcase physiological improvements, such as better cardiovascular health [58], reduced cortisol, and elevated immune function [59]. More recently, the focus has expanded to psychological benefits. Evidence suggests that pets can increase happiness [60], decrease depression and anxiety [61], offer emotional support, and provide a sense of purpose [62].

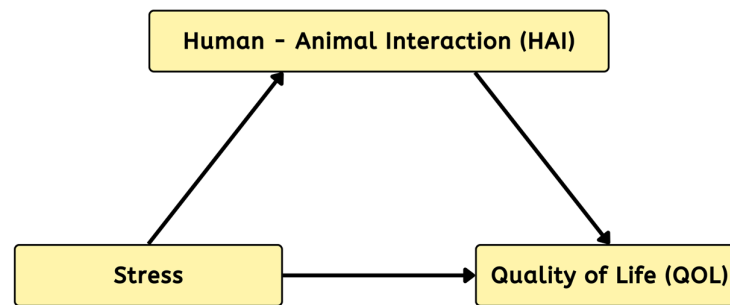
The COVID-19 pandemic underlined the potential of HAI to minimize stress levels and other mental health difficulties [63]. Previous research has marked that pet owners generally experience better emotional well-being and social functioning compared to those without pets [64]. It has been found that physical interaction between humans and animals can offer comfort and relaxation [65], largely due to the biological response it triggers: the activation of oxytocin, dopamine, and serotonin. These hormones play crucial roles in regulating mood and overall well-being [65]. Interestingly, the release of oxytocin occurs even from a single interaction with an animal, with more significant and lasting positive effects arising from continuous and positive relationships due to repeated exposure [59]. In recent years, many countries have acknowledged the importance of research and interventions focused on the human–animal bond despite varying results. However, in the Philippines, HAI remains a relatively unexplored field albeit a large pet-owning population of approximately 11.6 million. This gap in research stem from the fact that Filipinos typically acquire pets for reasons such as home security, social status, breeding for business, and less commonly for mental health support. Furthermore, amidst the presence of the Animal Welfare ACT, awareness among Filipino pet owners about this legislation is lacking [66]. Adding to this, being knowledgeable about responsible pet ownership does not necessarily translate to proper practices [67]. Consequently, the Philippines has seen a number of animal cruelty cases, with the Philippine Animal Welfare Society (PAWS) receiving forty reports of animal abuse daily [68], excluding figures from other private animal welfare organizations. The situation worsened during the pandemic when many pet owners faced unemployment and financial struggles.

At the forefront of addressing these challenges in HAI, non-governmental organizations (NGOs) such as PAWS and Communitails, Inc. have taken the lead in implementing animal-assisted therapy and interventions across the nation. PAWS, for instance, initiated the ‘Dr. Dog Program’, which deploys therapy dogs to various institutions such as hospitals, orphanages, and prisons, offering comfort and joy to the residents [69,70]. In a collaborative effort, the Loyola School’s Office of Guidance Counseling at Ateneo De Manila University introduced a therapy dog named ‘Bubu’ to assists in counseling sessions with students [69]. Although a handful of institutions have started to affirm and support the advantages of HAI through various programs, there is a noticeable lack of research exploring its effects on Filipinos particularly in the backdrop of the recent pandemic.

### 1.3. Conceptual Framework

This study’s conceptual framework investigates how HAI affects stress levels and QOL among employees in the Philippines. The sudden shift from office-based work to a WFH model has led to a spike in mental health complications among professionals. This

rise is attributed to blurred lines between work and personal life, issues with internet access, and a lack of technological expertise required for efficient work performance. Previous research emphasized social support as a critical strategy for mitigating the negative impacts of stress. Our framework (Figure 1) draws on the stress, social support, and buffering hypothesis by [17], suggesting that social support can shield individuals from the harmful effects of stress on their well-being [17,71]. Although social support is traditionally seen as a uniquely human feature, there is ongoing research into the likelihood of animals to serve as stress buffers.



**Figure 1.** Buffering effects of human–animal interaction in stress and quality of life.

#### 1.4. Objectives of This Study

Our study’s primary objective is to investigate the impact of HAI on stress reduction and quality of life among employees working from home during the COVID-19 pandemic. The following are the specific objectives of the research:

1. Measure and compare stress levels between pet owners and non-pet owners during the lockdown period.
2. Examine the overall QOL and its domains (physical, psychological, social, and environmental) among pet owners and non-pet owners.
3. Analyze how HAI influences stress levels and quality of life specifically in the social domain, with a focus on understanding how pets may mitigate the negative impacts of social isolation.

## 2. Methodology

### 2.1. Research Design

Our study utilized a sequential explanatory research design (SERD), an approach combining quantitative and qualitative methodologies in two consecutive phases: first, collecting and analyzing numerical data, and then, based on these findings, collecting and evaluating qualitative data. In detail, it provides a comprehensive understanding allowing researchers to measure and quantify the impact of HAI on variables such as stress levels and QOL, providing a broad overview. By using standardized measurements and statistical analyses, we can identify patterns, correlations, and potentially causal relationships. The qualitative phase that follows is critical for understanding the ‘why’ and ‘how’ behind the numbers. It involves detailed interviews, focus groups, or observations, providing rich, in-depth data on pet owners’ experiences, perceptions, and the meanings they attribute to their relationship with their pets. This can uncover nuanced aspects of human–animal relationships that standardized measures cannot fully capture, such as the specific ways pets contribute to their owners’ stress relief, and how these interactions improve overall well-being. Furthermore, the SERD enables cross-validation of findings wherein quantitative results provide a measure of reliability and generalizability, while qualitative findings add depth, context, and explanation, enriching the understanding of the initial results. We also considered using structural equations modeling (SEM) as it is a powerful model to quantitatively examine relation-

ships. However, we opted for SERD as it offers flexibility, holistic understanding, insight generation, and iterative refinement for our research context.

## 2.2. Respondents and Participants

Using data from the Philippine Canine Club, Inc., which reveal that there are 11,600,000 registered dog owners (whether purebred or not) in the Philippines, we partnered with various animal shelter organizations within the Luzon area and employed purposive sampling methods to recruit participants. Specifically, our study focuses solely on individuals who own canine and/or feline pets. We exclusively selected these pets due to the popularity of these domesticated animals in the country and its data availability based from registries. Moreover, by focusing on canine and feline owners, this study can address a significant portion of the pet-owning population making the findings relevant to a wider audience. We also consider limiting the scope to the two specific animals to simplify the study design and to make it more manageable in terms of logistics. To adequately assess the impact of HAI, owners were required to have had their pets for at least one year. The sampling calculation using Raosoft Sample Calculator resulted in 770 respondents, divided equally at 385 between pet and non-pet owners who are on a WFH setup. For the non-pet owners group, we gathered respondents through social media platforms and included only those who started working from home from 2019 until the data collection period.

## 2.3. Research Instruments

We used three standardized tests to evaluate the participants' HAI levels: the Human–Animal Interaction Scale (HAIS), a work stress questionnaire, and a quality of life (QOL) scale. The HAIS, a 24-item self-assessment tool developed by [72], is specifically designed to describe and assess HAI. Participants evaluate their level of engagement in various behaviors (e.g., watching, petting, grooming) with an animal on a 5-point scale after their interaction. They also rate the animal's actions (e.g., sniffing, licking, initiating interaction). This scale is versatile, applicable in any research, clinical, or service setting, and can be used to document interactions with any animal species, including dogs, cats, horses, hamsters, birds, and fish. Its reliability and validity have been confirmed through multiple studies involving a total of 295 adults, comprising 59.50% men ( $n = 173$ ) and 40.30% women ( $n = 117$ ). The HAIS's overall reliability, as measured by Cronbach's alpha, is 0.82, indicating consistent measurement across various participants, settings, and species. The scale showed internal consistency with scores from 0.72 to 0.89, demonstrating its reliability across different contexts and with different animal species.

A group of prominent scientists [73–77] developed the Work Stress Questionnaire (WSQ), a self-assessment tool designed to identify individuals at risk of taking sick leave due to occupational stress. This tool stands out for its ability to detect stress without requiring specific diagnoses, thus addressing a wide range of patient concerns. The consistency in responses to the questionnaire varied significantly from 55% to 98%, with a median percentage agreement (PA) of 77%. To evaluate the questionnaire's reliability, the analysis considered factors such as relative rank variance and concentration for each item. However, the analysis did not include the second part of two items—knowledge of work assignments and involvement in workplace conflicts due to a lack of sufficient responses. Participants were only asked to answer the second part of these items if they responded 'No' and 'Yes' to the first part, respectively, which explains the low response rate for these sections. The PA assessment focused on the initial items. With one exception, the questionnaire items showed stable results over time, reflecting both sporadic and consistent accuracy in their scale positioning and the concentration of responses at the group level. The relative variance was close to zero for all items, indicating minimal individual differences between the initial test and the retest phases, underscoring the questionnaire's stability.

The World Health Organization's Quality of Life (WHOQOL)—BREF assessment, the third instrument developed by the WHOQOL group was designed by fifteen international field centers. Its aim was to create a QOL evaluation tool that could be used universally. Initially, the WHOQOL contained 236 items covering various aspects of life quality. A pilot version was tested in several centers, involving over 300 individuals dealing with diverse health conditions. Based on this pilot, 100 items were selected for the WHOQOL-100, a more refined evaluation tool. The subsequent field trial version included 24 facets identified as crucial for assessing QOL, along with four additional questions addressing overall life quality and health. A recent analysis grouped these 24 facets into four main categories: physical, psychological, social relationships, and environmental, facilitating a more organized assessment. During this study, the internal consistency of each category was evaluated using Cronbach's alpha, with scores from 0.66 to 0.84. These scores indicate good internal consistency, though the score for the third category (social relationships) requires cautious interpretation. This is because it was based on scores from three facets—personal relationships, social support, and sexual activity instead of the minimum four usually recommended for assessing internal reliability. To assess the test–retest reliability, data from the majority of participants (87%) from four field trial centers were used. These centers were Bath, Harare, Tilburg, and Zagreb, with respondents being university students in all but Harare where the sample included both ill and well individuals. The retest interval varied between two to eight weeks. Item correlations were generally high, ranging from 0.56 (concerning safety in daily life) to 0.84 (regarding financial adequacy), indicating the tool's reliability across different domains: 0.66 for physical health, 0.72 for psychological, 0.76 for social relationships, and 0.87 for environmental.

#### *2.4. Data Gathering and Ethical Considerations*

From the start, the team obtained consent from the original authors of the psychological test for assessing this study's variables. After securing the necessary permissions, we commenced the recruitment of participants. We utilized referrals, social media platforms, and partnerships with animal welfare organizations to reach potential respondents. Each recruit was then provided with a detailed informed consent form. This document clearly outlined this study's goals, procedures, and the extent of their involvement. It also addressed their right to withdraw at any time, potential risks and benefits, and assured them of their privacy and confidentiality rights. We also explained how the results would be disseminated. Following this, a registered psychometrician oversaw the psychological assessments and an external statistician assisted in the data compilation and analysis process. It is important to note that respondents were not offered any financial compensation or incentives for their participation.

#### *2.5. Data Analysis*

We compiled and analyzed the data through suitable methods. Frequency and percentage distributions detailed the demographic characteristics of the participants. Moreover, descriptive statistics and the Mann–Whitney U (MWU) test were utilized to assess the extent of significant differences of HAI, QOL, and stress levels among pet and non-pet owners. The MWU is a non-parametric statistical test for comparing differences between two independent groups when the assumption of normality in the data cannot be satisfied but can also be considered an exact fit for a well-balanced dataset. It serves as an alternative to the *t*-test when the data do not meet its assumptions. Both the results of QOL and WSQ were significant after calculating the Shapiro–Wilk normality test suggesting a non-normal distribution of data on both pet and non-pet owners. The skewness on most of the domains of QOL and WSQ also shows negative skewness or far from zero. Hence, the MWU test were utilized to compare the two groups. This mediation analysis was conducted using path plot analysis by Jeffrey's Amazing Statistics Program (JASP). In response to the non-normal distribution of data, robust mediation analysis techniques

were used to ensure the reliability and validity of the results. Robust mediation techniques are designed to handle violations of normality assumptions.

### 3. Results

#### 3.1. Quantitative Results

Table 1 presents the distribution of pet owners by gender. Females constitute the largest group, accounting for 28.57% of the total sample. The representation of other genders is relatively balanced, with those preferring not to disclose their gender being the smallest subgroup at 22.33%.

**Table 1.** Frequency and percentage distribution of the pet owner's gender.

| Gender            | Frequency | Percentage Distribution |
|-------------------|-----------|-------------------------|
| Male              | 101       | 26.20%                  |
| Female            | 110       | 28.57%                  |
| LGBTQI++          | 88        | 22.90%                  |
| Prefer not to say | 86        | 22.33%                  |
| Total             | 385       | 100%                    |

Table 2 depicts the frequency distribution of pet owners by their occupation, as classified by the 2012 Philippine Standard Occupational Classification (PSOC). The data reveal that professionals comprise the majority with 223 individuals or 57.92% of the total sample.

**Table 2.** Frequency and percentage distribution of the pet owners' classification according to occupation.

| Occupation  | Frequency | Percentage Distribution |
|---|-----------|-------------------------|
| Manager   | 8         | 2.07%                   |
| Professional  | 223       | 57.92%                  |
| Technician and associate professional               | 48        | 12.46%                  |
| Clerical support worker                             | 98        | 25.45%                  |
| Service and sales worker                            | 5         | 1.29%                   |
| Skilled agricultural, forestry, and fishery workers | 3         | 0.77%                   |
| Total   | 385       | 100%                    |

Table 3 shows the distribution of pet types among participants. Most of the group consists of dog owners, making up 54.28% of the total sample with 209 individuals. Owners of both dogs and cats figured in at 144 instances or 37.40%. Lastly, a small portion, 8.31% accounts solely of cat owners.

**Table 3.** Frequency and percentage distribution of the pet owner's classification of pet.

| Pet   | Frequency | Percentage Distribution |
|-------|-----------|-------------------------|
| Dog   | 209       | 54.28%                  |
| Cat   | 32        | 8.31%                   |
| Both  | 144       | 37.40%                  |
| Total | 385       | 100%                    |

Table 4 reveals the frequency distribution of individuals who do not own pets, categorized by their gender. Interestingly, males dominate this category, accounting for 32.46% of the entire sample size. Among the various genders, those who chose not to disclose their gender make up the smallest proportion, accounting for only 11.94% of the total distribution.



**Table 4.** Frequency and percentage distribution of the non-pet owners' gender.

| Gender            | Frequency | Percentage Distribution |
|-------------------|-----------|-------------------------|
| Male              | 125       | 32.46%                  |
| Female            | 111       | 28.83%                  |
| LGBTQI++          | 103       | 26.75%                  |
| Prefer not to say | 46        | 11.94%                  |
| Total             | 385       | 100%                    |

Table 5 illustrates the frequency table of non-pet owners, organized according to their occupation classification based on the 2012 Philippine Standard Occupational Classification (PSOC). The majority of pet owners consist of professionals at 212, making up 55.06% of the entire sample size. Technicians and associate professionals constitute 25.97% of the workforce, followed by clerical support workers at 15.58%.

**Table 5.** Frequency and percentage distribution of the non-pet owners' classification according to occupation.

| Occupation                            | Frequency | Percentage Distribution |
|---------------------------------------|-----------|-------------------------|
| Manager                               | 5         | 1.29%                   |
| Professional                          | 212       | 55.06%                  |
| Technician and associate professional | 100       | 25.97%                  |
| Clerical support worker               | 60        | 15.58%                  |
| Service and sales worker              | 8         | 2.07%                   |
| Total                                 | 385       | 100%                    |

Table 6 displays the levels of HAI among pet owners, as measured by the HAI. This section of the scale assesses the desirable and undesirable aspects of the relationship and interaction between humans and animals. The scale includes 18 statements evaluating how individuals interact with animals and how animals respond to them. The table also demonstrates that the selected respondents' responses suggest a high level of HAI, with a total weighted mean of 59.143 and a standard deviation of 8.285. This suggests that pet owners typically experience a higher degree of beneficial HAI, which play a significant part in their overall well-being.

**Table 6.** Mean and standard deviation of the pet owners' level of human–animal interaction.

|                                      | Mean   | Standard Deviation | Minimum | Maximum |
|--------------------------------------|--------|--------------------|---------|---------|
| Human–animal interaction (HAI) Score | 59.143 | 8.285              | 24      | 73      |

Table 7 shows the average QOL of pet owners. For interpretation, we utilized the following transformed scores: 0–20 (poor), 21–40 (moderate), 41–60 (good), and 61–80 (very good). The overall results for the participants are measured as 'very good' (mean = 65.909). The highest result is their QOL based on social relationships (mean = 67.684), followed by the QOL based on environmental (mean = 66.891) and psychological (mean = 64.286). The lowest level of the QOL by the pet owners is physical (mean = 63.655). Notably, all QOL domains were rated as 'very good'.

**Table 7.** Mean and standard deviation of the pet owners' level of quality of life.

|                          | Mean   | Standard Deviation | Interpretation |
|--------------------------|--------|--------------------|----------------|
| Physical (Phy)           | 63.655 | 17.544             | Very good      |
| Psychological (Psy)      | 64.286 | 19.974             | Very good      |
| Social relationship (SR) | 67.684 | 22.937             | Very good      |
| Environment (Env)        | 66.891 | 18.870             | Very good      |
| Overall (Ovr)            | 65.909 | 20.013             | Very good      |

Table 8 shows the perceived stress levels of pet owners due to indistinct organization and conflicts encountered at work. With a median of 1.00 for all items with inter-quartile ranges (IQR) of 2, 1, 0 which indicates no to moderate variability of responses to the scale. The perceived stress in this factor indicates no to low stress perception.

**Table 8.** Mean and standard deviation of the pet owners' perceived stress (PS) levels owing to the following items in indistinct organization and conflicts of pet owners.

|   | Median | IQR   |
|---|--------|-------|
| PS owing to increased work load                 | 1.000  | 2.000 |
| PS owing to unclear goals at workplace          | 1.000  | 1.000 |
| PS owing to unclear work assignments            | 1.000  | 0.000 |
| PS owing to unclear leadership                  | 1.000  | 0.000 |
| PS owing to conflicts at work                   | 1.000  | 2.000 |
| PS owing to involved in conflicts at work       | 1.000  | 0.000 |
| PS owing to supervisor not solved the conflicts | 1.000  | 0.000 |

Note: Medians of 1.00 to 2.00 show no/low stress perception.

Table 9 presents the perceived stress level of pet owners caused by individual demands and commitments they experienced at work. The perceived stress of the participants shows no to low stress perception with a median of 2.00 for most items and 1.00 for the remainder with an IQR of 2 for all of the items suggests moderate variability of responses to the scale.

**Table 9.** Mean and standard deviation of the pet owners' perceived stress (PS) levels owing to the following items in individual demands and conflicts of pet owners.

|  | Median | IQR   |
|--|--------|-------|
| PS owing to high demands on oneself at work        | 1.000  | 2.000 |
| PS owing to engaged in one's work                  | 2.000  | 2.000 |
| PS owing to think about work after the working day | 2.000  | 2.000 |
| PS owing to unclear leadership                     | 2.000  | 2.000 |
| PS owing to conflicts at work                      | 1.000  | 2.000 |
| PS owing to involved in conflicts at work          | 2.000  | 2.000 |
| PS owing to supervisor not solved the conflicts    | 1.000  | 2.000 |

Note: Medians of 1.00 to 2.00 show no/low stress perception.

Table 10 shows the average level of the QOL of the selected non pet-owners. The overall results of the participants are measured to be 'very good' (mean = 65.730). The highest result is their QOL based on the environment (mean = 74.826), followed by the QOL based on the physical domain (mean = 72.721) and psychological (mean = 66.180), respectively. The lowest level of the QOL by the pet owners is social relationship (mean = 64.410). Notably, all of the domains of their QOL can be interpreted as 'very good'.

**Table 10.** Mean and standard deviation of the non-pet owners' level of quality of life.

|                          | Mean   | Standard Deviation | Interpretation |
|--------------------------|--------|--------------------|----------------|
| Physical (Phy)           | 72.721 | 14.316             | Very good      |
| Psychological (Psy)      | 66.180 | 14.660             | Very good      |
| Social relationship (SR) | 64.410 | 14.041             | Very good      |
| Environment (Env)        | 74.826 | 15.137             | Very good      |
| Overall (Ovr)            | 65.730 | 14.385             | Very good      |

Table 11 shows the level of perceived stress of non-pet owners owing to indistinct organization and conflicts they experienced at work. With a median of 3.00 in most of the items and the lowest median of 2.00 with IQR from 2 to 3, this suggests moderate to substantial levels of variability among the responses. The perceived stress of the participants in this factor shows low to average work stress perception.

**Table 11.** Mean and standard deviation of the non-pet owners' perceived stress (PS) levels owing to the following items in indistinct organization and conflicts of non-pet owners.

|   | Median | IQR   |
|---|--------|-------|
| PS owing to increased work load                 | 2.000  | 2.000 |
| PS owing to unclear goals at workplace          | 2.000  | 2.000 |
| PS owing to unclear work assignments            | 2.000  | 2.000 |
| PS owing to unclear leadership                  | 3.000  | 2.000 |
| PS owing to conflicts at work                   | 3.000  | 2.000 |
| PS owing to involved in conflicts at work       | 3.000  | 3.000 |
| PS owing to supervisor not solved the conflicts | 3.000  | 3.00  |

Note: Medians of 1.00 to 2.00 show no/low stress perception.

Table 12 shows the level of perceived stress of non-pet owners owing to individual demands and commitment they experienced at work. With a median of 3.00 in most of the items and 2.00 for the rest with an IQR of 1 and 2, this shows low to moderate variability of responses. The perceived stress of the participants in this factor shows low to average work stress perception.

**Table 12.** Mean and standard deviation of the non-pet owners' perceived stress (PS) levels owing to the following items in individual demands and commitment of non-pet owners.

|  | Median | IQR   |
|--|--------|-------|
| PS owing to high demands on oneself at work        | 2.000  | 2.000 |
| PS owing to engaged in one's work                  | 2.000  | 2.000 |
| PS owing to think about work after the working day | 2.000  | 2.000 |
| PS owing to hard to set limits                     | 3.000  | 1.000 |
| PS owing to high responsibility for one's work     | 2.000  | 2.000 |
| PS owing to working overtime                       | 3.000  | 2.000 |
| PS owing to sleep disturbance on account of work   | 2.000  | 1.000 |

Note: Medians of 1 to 2 show no/low stress perception.

Table 13 shows the differences between the level of perceived work stress of pet owners and non-pet owners. Using the Mann–Whitney U test, the result shows a significant difference between the perceived stress owing to indistinct organization and conflicts of the pet and non-pet owners ( $u = 116,611$ ,  $p \leq 0.001$ ,  $r_{rb} = 0.573$ ). Similar results can be observed for perceived work stress owing to individual demands and commitment which was found to have a significant difference between the pet and non-pet owners' responses ( $u = 88,902$ ,  $p \leq 0.001$ ,  $r_{rb} = 0.200$ ). With a left-tailed alternative hypothesis, it can

be concurred that non-pet owners have a higher perceived work stress level than pet owners.

**Table 13.** Comparison of perceived work stress levels between pet owners and non-pet owners.

|   | U                                     | <i>p</i>  | Rank-Biserial Correlation ( <i>r<sub>rb</sub></i> ) |
|---|---------------------------------------|-----------|---|
| PS owing to high demands on oneself at work | 116,611                               | <0.001    | 0.573   |
| PS owing to engaged in one's work           | 88,902                                | <0.001    | 0.200   |
| Assumption Checks                           |                                       |           |   |
|   | Indistinct organization and conflicts |           | Individual demands and commitment                   |
|   | Non-pet owner                         | Pet owner | Non-pet owner      Pet owner                        |
| Skewness                                    | 0.052                                 | 1.971     | 0.345      0.687                                    |
| Standard error of skewness                  | 0.124                                 | 0.124     | 0.124      0.124                                    |
| Kurtosis                                    | −1.386                                | 2.675     | −1.131      −0.880                                  |
| Standard error of kurtosis                  | 0.248                                 | 0.248     | 0.248      0.248                                    |
| Shapiro–Wilk                                | 0.851                                 | 0.527     | 0.850      0.770                                    |
| <i>p</i> -value of Shapiro–Wilk             | <0.001                                | <0.001    | <0.001      <0.001                                  |

Note: For all tests, the alternative hypothesis specifies that non-pet owner is greater than pet owner group.

Table 14 shows the differences between the level of QOL of pet owners and non-pet owners. Using the MWU test, the result shows a significant difference between the QOL on the social relationship domain of the pet and non-pet owners ( $u = 64,048$ ,  $p \leq 0.001$ ). Other domains of QOL show no significant difference between pet owners and non-pet owners. With a right-tailed alternative hypothesis, it can be concurred that pet owners have a higher level of QOL on social the relationship domain than the pet owners.

**Table 14.** Comparison of quality of life between pet owners and non-pet owners.

| Domain                   |               |          | U                          | <i>p</i> | Rank-Biserial Correlation ( <i>r</i> <sub>rb</sub> ) |              |                                 |
|--------------------------|---------------|----------|----------------------------|----------|--|--------------|---------------------------------|
| Physical (Phy)           |               |          | 95137                      | 1.000    | 0.284  |              |                                 |
| Psychological (Psy)      |               |          | 77122                      | 0.835    | 0.041  |              |                                 |
| Social relationship (SR) |               |          | 64048                      | <0.001   | −0.136   |              |                                 |
| Environment (Env)        |               |          | 90919                      | 1.000    | 0.227  |              |                                 |
| Overall (Ovr)            |               |          | 72480                      | 0.298    | −0.022   |              |                                 |
| Assumption Checks        |               |          |                            |          |  |              |                                 |
|                          |               | Skewness | Standard error of skewness | Kurtosis | Standard error of kurtosis                           | Shapiro–Wilk | <i>p</i> -value of Shapiro–Wilk |
| Overall (Ovr)            | Non-pet owner | −0.021   | 0.124                      | −1.268   | 0.248  | 0.948        | <0.001                          |
|                          | Pet owner     | −0.318   | 0.124                      | −0.048   | 0.248  | 0.951        | <0.001                          |
| Physical (Phy)           | Non-pet owner | 0.156    | 0.124                      | −1.138   | 0.248  | 0.954        | <0.001                          |
|                          | Pet owner     | −0.345   | 0.124                      | 0.234    | 0.248  | 0.987        | 0.002                           |
| Psychological (Psy)      | Non-pet owner | −0.052   | 0.124                      | −1.228   | 0.248  | 0.947        | <0.001                          |
|                          | Pet owner     | −0.419   | 0.124                      | 0.021    | 0.248  | 0.979        | <0.001                          |
| Social relationship (SR) | Non-pet owner | 0.060    | 0.124                      | −1.103   | 0.248  | 0.963        | <0.001                          |

|                   |               |        |       |        |       |       |        |
|-------------------|---------------|--------|-------|--------|-------|-------|--------|
| Environment (Env) | Pet owner     | −0.501 | 0.124 | −0.215 | 0.248 | 0.952 | <0.001 |
|                   | Non-pet owner | −0.011 | 0.124 | −1.313 | 0.248 | 0.941 | <0.001 |
|                   | Pet owner     | −0.525 | 0.124 | 0.269  | 0.248 | 0.976 | <0.001 |

Note: For all tests, the alternative hypothesis specifies that non-pet owner is greater than pet owner group.

Table 15 shows the direct effect of the perceived stress of pet owners on their level of QOL. The perceived work stress owing to individual demands and commitment was found to have a direct negative effect on the participants' overall QOL and it is found to be significant ( $z = -5.367, p \leq 0.001$ ). This direct effect shows that the higher the level of their stress owing to individual demands and commitment, the lower their level of overall QOL. The perceived work stress owing to indistinct organization and conflicts was found to have a direct negative effect on QOL based on the physical domain and also found to be significant ( $z = -2.419, p = 0.016$ ). Similar results can be found for the effect of perceived work stress owing to individual demands and commitment to QOL on the physical domain ( $z = -5.875, p \leq 0.001$ ), the effect of perceived work stress owing to individual demands and commitment to QOL on the psychological domain ( $z = -5.307, p \leq 0.001$ ) and the direct effect of perceived work stress owing to indistinct organization and conflicts to QOL on the psychological domain ( $z = -2.968, p = 0.003$ ). A negative direct effect can also be found on the perceived work stress owing to individual demands and commitment to QOL on the social relationship domain ( $z = -4.464, p \leq 0.001$ ). However, perceived work stress owing to indistinct organization and conflicts was found to have no significant direct effect on QOL on the social relationship domain ( $z = -0.703, p = 0.482$ ). Finally, perceived work stress owing to individual demands and commitment has a significant direct negative effect to QOL on environment domain ( $z = -4.470, p \leq 0.001$ ). The same results apply to the direct negative effect of perceived work stress owing to indistinct organization and conflicts to QOL on the environment domain ( $z = -2.296, p = 0.022$ ).

**Table 15.** Direct effects of perceived stress levels to the quality of life among pet owners group.

|   |               | Estimate | Std. Error | z-Value | 95% Confidence Interval |        |        |
|---|---------------|----------|------------|---------|-------------------------|--------|--------|
|   |               |          |            |         | p                       | Lower  | Upper  |
| PWS—Indistinct organization and conflicts | → QOL—Overall | 1.774    | 1.394      | −1.273  | 0.203                   | −4.506 | 0.958  |
| PWS—Individual demands and commitment     | → QOL—Overall | −5.789   | 1.079      | −5.367  | <0.001                  | −7.902 | −3.675 |
| PWS—Indistinct organization and conflicts | → QOL—Phy     | −2.961   | 1.224      | −2.419  | 0.016                   | −5.359 | −0.562 |
| PWS—Individual demands and commitment     | → QOL—Phy     | −5.749   | 0.979      | −5.875  | <0.001                  | −7.667 | −3.831 |
| PWS—Indistinct organization and conflicts | → QOL—Psy     | −4.092   | 1.379      | −2.968  | 0.003                   | −6.794 | −1.390 |
| PWS—Individual demands and commitment     | → QOL—Psy     | −5.442   | 1.025      | −5.307  | <0.001                  | −7.452 | −3.432 |
| PWS—Indistinct organization and conflicts | → QOL—SR      | −1.242   | 1.765      | −0.703  | 0.482                   | −4.702 | 2.218  |
| PWS—Individual demands and commitment     | → QOL—SR      | −6.198   | 1.388      | −4.464  | <0.001                  | −8.919 | −3.477 |
| PWS—Indistinct organization and conflicts | → QOL—Env     | −2.996   | 1.305      | −2.296  | 0.022                   | −5.554 | −0.439 |
| PWS—Individual demands and commitment     | → QOL—Env     | −4.528   | 1.013      | −4.470  | <0.001                  | −6.513 | −2.542 |

Note: Robust standard errors, robust confidence intervals, and ML estimator.

Table 16 shows the indirect effects of perceived stress of pet owners on their QOL when mediated by HAI. All of the results showed no significant indirect effect of perceived work stress owing to individual demands and commitment as well as perceived work stress owing to indistinct organization and conflicts on overall QOL including all domains, namely physical, psychological, social relationship, and environment. The results suggest that full mediation was present when mediator variables of both desirable and undesirable HAI were in play, making the effect of perceived stress on QOL insignificant.

**Table 16.** Indirect effects of perceived stress levels to the quality of life among the pet owners group when mediated by human–animal interaction.

|   |       |               | Estimate | Std. Error | z-Value | 95% Confidence Interval |        |       |
|---|-------|---------------|----------|------------|---------|-------------------------|--------|-------|
|   |       |               |          |            |         | p                       | Lower  | Upper |
| PWS—Indistinct organization and conflicts | → HAI | → QOL—Overall | −0.021   | 0.082      | −0.254  | 0.799                   | −0.182 | 0.140 |
| PWS—Individual demands and commitment     | → HAI | → QOL—Overall | −0.147   | 0.142      | −1.031  | 0.303                   | −0.425 | 0.132 |
| PWS—Indistinct organization and conflicts | → HAI | → QOL—Phy     | −0.014   | 0.058      | −0.241  | 0.810                   | −0.127 | 0.099 |
| PWS—Individual demands and commitment     | → HAI | → QOL—Phy     | −0.097   | 0.120      | −0.812  | 0.417                   | −0.332 | 0.137 |
| PWS—Indistinct organization and conflicts | → HAI | → QOL—Psy     | −0.033   | 0.127      | −0.261  | 0.794                   | −0.283 | 0.217 |
| PWS—Individual demands and commitment     | → HAI | → QOL—Psy     | −0.233   | 0.170      | −1.367  | 0.172                   | −0.567 | 0.101 |
| PWS—Indistinct organization and conflicts | → HAI | → QOL—SR      | −0.015   | 0.065      | −0.236  | 0.814                   | −0.144 | 0.113 |
| PWS—Individual demands and commitment     | → HAI | → QOL—SR      | −0.108   | 0.158      | −0.687  | 0.492                   | −0.417 | 0.201 |
| PWS—Indistinct organization and conflicts | → HAI | → QOL—Env     | −0.043   | 0.166      | −0.259  | 0.795                   | −0.369 | 0.283 |
| PWS—Individual demands and commitment     | → HAI | → QOL—Env     | −0.303   | 0.181      | −1.668  | 0.095                   | −0.658 | 0.053 |

Note: Robust standard errors, robust confidence intervals, and ML estimator.

Figure 2 shows the path analysis of the direct and indirect effects of perceived work stress on overall quality of life (QOL (Ovr)) as mediated by HAI. The figure shows that perceived work stress owing to indistinct organization and conflicts (Woac) has a negative direct effect on QOL (Ovr) of pet owners ( $c = -1.8$ ). Similar results can be observed in the direct effect of perceived work stress owing to individual demands and commitment (Wdac) to QOL (Ovr) of the respondents ( $c = -5.8$ ). It can be noted that negative results show an inverse relationship between the two variables. Notably, when mediated by HAI, the indirect effect of both perceived Woac and Wdac to QOL (Ovr) turns out to be positive ( $b = 0.14$ ). The result of path analysis shows that HAI mediates the effects of perceived stress on the overall QOL of pet owners.

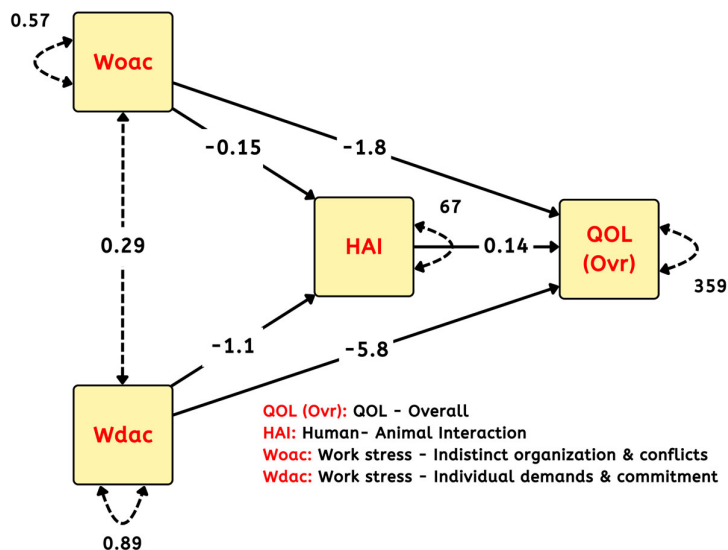
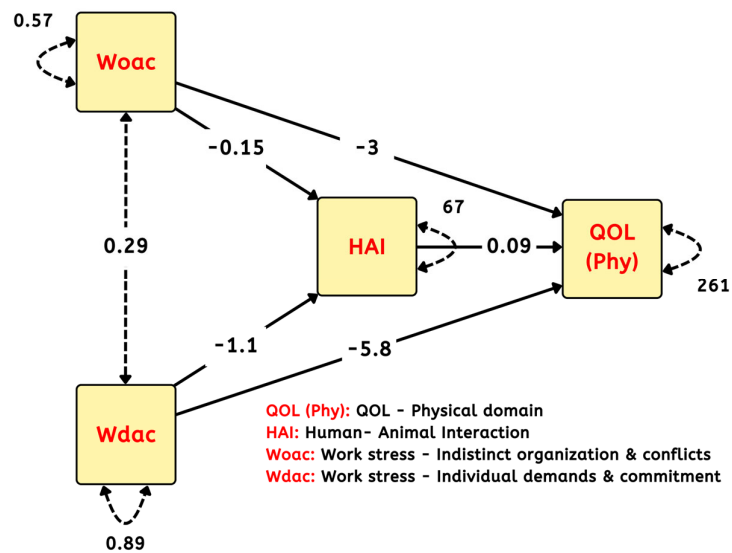
**Figure 2.** The path plot of mediation analysis of perceived work stress to overall quality of life.

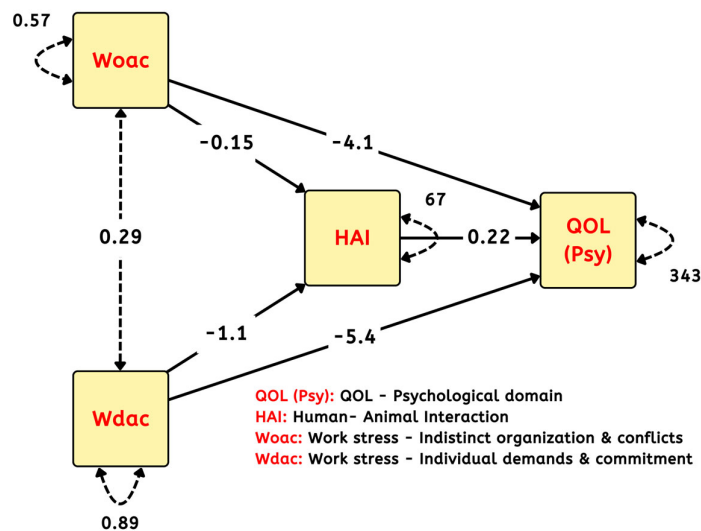
Figure 3 shows the path analysis of the direct and indirect effects of perceived work stress on QOL in the physical domain (QOL (Phy)) as mediated by HAI. The figure shows that perceived work stress owing to indistinct organization and conflicts (Woac) has a negative direct effect on QOL (Phy) of pet owners ( $c = -3$ ). Similar results can be observed in the direct effect of perceived work stress owing to individual demands and commitment (Wdac) on QOL (Phy) of the respondents ( $c = -5.8$ ). It can be noted that negative results show an inverse relationship between the two variables. However, when mediated by HAI, the indirect effect of both perceived Woac and Wdac on QOL (Phy)

turns out to be positive ( $b = 0.09$ ). The result of path analysis shows that HAI mediates the effects of perceived stress on physical QOL of pet owners.



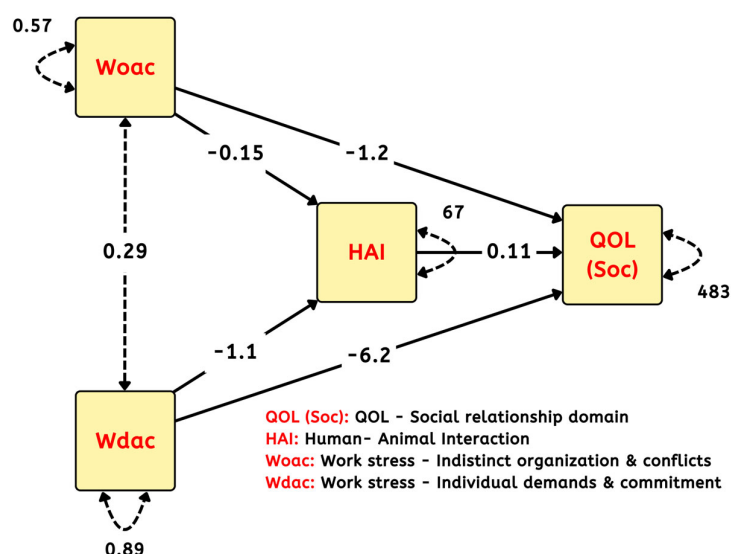
**Figure 3.** The path plot of mediation analysis of perceived work stress to quality of life on physical domain.

Figure 4 shows the path analysis of the direct and indirect effects of perceived work stress on QOL in the psychological domain (QOL (Psy)) as mediated by HAI. The figure shows that perceived work stress owing to indistinct organization and conflicts (Woac) has a negative direct effect on QOL (Psy) of pet owners ( $c = -4.1$ ). Similar results can be observed in the direct effect of perceived work stress owing to individual demands and commitment (Wdac) on QOL (Psy) of the respondents ( $c = -5.4$ ). It can be noted that negative results show an inverse relationship between the two variables. Notably, when mediated by HAI, the indirect effect of both perceived Woac and Wdac on QOL (Psy) turns out to be positive ( $b = 0.22$ ). The result of path analysis shows that desirable HAI mediates the effects of perceived stress on psychological QOL of pet owners.



**Figure 4.** The path plot of mediation analysis of perceived work stress to quality of life on psychological domain.

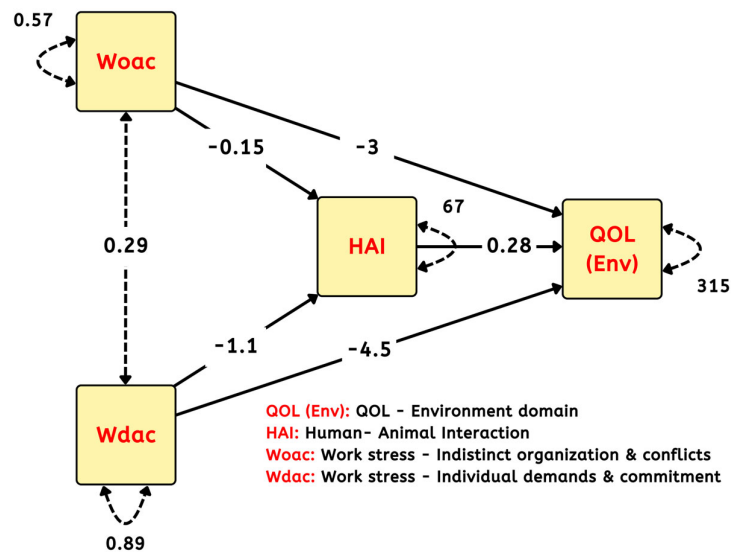
Figure 5 shows the path analysis of the direct and indirect effects of perceived work stress on QOL in the social relationship domain (QOL (Soc)) as mediated by HAI. It shows that perceived work stress owing to indistinct organization and conflicts (Woac) has a negative direct effect on QOL (Soc) of pet owners ( $c = -1.2$ ). Similar results can be observed in the direct effect of perceived work stress owing to individual demands and commitment (Wdac) on QOL (Soc) of the respondents ( $c = -6.2$ ). It can be noted that negative results show an inverse relationship between the two variables. Notably, when mediated by HAI, the indirect effect of both perceived Woac and Wdac on QOL (Soc) turns out to be positive ( $b = 0.102$ ). The result of path analysis shows that desirable HAI mediates the effects of perceived stress on social relationship QOL of pet owners.



**Figure 5.** The path plot of mediation analysis of perceived work stress to quality of life on social relationship domain.

Figure 6 shows the path analysis of the direct and indirect effects of perceived work stress on QOL in the environment domain (QOL (Env)) as mediated by HAI. It shows that perceived work stress owing to indistinct organization and conflicts (Woac) has a negative direct effect on QOL (Env) of pet owners ( $c = -3$ ). Similar results can be observed in the direct effect of perceived work stress owing to individual demands and commitment (Wdac) on QOL (Env) of the respondents ( $c = -4.5$ ). It can be noted that negative results show an inverse relationship between the two variables. Notably, when mediated by desirable HAI, the indirect effect of both perceived Woac and Wdac on QOL (Env) turns out to be positive ( $b = 0.284$ ). The result of path analysis shows that HAI mediates the effects of perceived stress to environmental QOL of pet owners.





**Figure 6.** The path plot of mediation analysis of perceived work stress to quality of life on environment domain.

### 3.2. Qualitative Results

Ten participants took part in the qualitative part of this study. Four participants were working as virtual assistants, another four were teachers, one worked as a recruitment officer, and the remaining participant was a quality assurance engineer. When the transcript was obtained, the data were analyzed using Braun and Clarke's six steps in thematic analysis. These steps were utilized because it offers a flexible approach that can be seamlessly integrated into quantitative methods. Furthermore, by employing repeated identification of codes and themes, the researchers were able to conduct a detailed exploration and meaning of the data by identifying recurring patterns and themes that could contribute to more significant results. Based on the analysis, the following themes and sub-themes emerged which demonstrate how HAI affects the stress levels of the pet owners during the COVID-19 pandemic. Additionally, it shows the effects of HAI on the pet owners' QOL.

Table 17 displays the impact of HAI on pet owners' stress levels amid the COVID-19 epidemic. The effects can be classified into two categories based on the identified themes: protective and reinforcing factors for stress. Most participants in this study believed that their pets helped reduce their stress levels, acting as protective factors. They claim that simply having their pets around provides them with comfort and relaxation, thus decreasing their stress levels. Interacting with them through play or petting their animals can also help reduce their stress levels. Additionally, most participants acknowledged that their pets serve as their emotional support during the pandemic. They stated that their pets frequently cling to them and remain by their side when they feel lonely. It appears that their pets have an intuitive understanding of their emotions and experiences at that moment. Nevertheless, there were occasions when owning a pet could potentially exacerbate their stress levels. According to the responses, some pet owners were unable to visit a veterinarian during emergencies because of pandemic restrictions. As a result of this lack of access, several pet owners lost their pets, leading to loneliness. However, they noted that pet loss is an inherent aspect of owning a pet. While the loss of a pet is painful, it cannot be compared to the joy they brought into their lives. Overall, having a pet during the pandemic was still more beneficial and improved their stress levels.

**Table 17.** Effects of human–animal interactions to the pet owners’ stress levels.

| Themes             | Sub-Themes                      | Sample Verbatim  |
|--------------------|---------------------------------|--|
| Protective factors | Emotional support               | <p>“It is like our pets know if we are sad or worried because they become clingier towards us.”<br/>—Participant 2</p> <p>“During lockdown, there were times that I had mental breakdowns and experienced extreme sadness. Then Ryle will just come to me, then he will lift up my head while I am crying. He would really make sure that I pay attention and not to be sad.”<br/>—Participant 4</p> <p>“Pets, to me, are like humans. I talk to them when I am sad. Especially during the pandemic, when I felt worried for my family because I could not return home. So if I am upset, I talk to them, and they just stare at me as if they are listening to me. And the experience of having someone listen to you without passing judgement was quite comforting. So certainly, my dogs definitely helped me a lot during the lockdown period. I felt I had a companion.”<br/>—Participant 10</p> |
|                    | Stress relievers                | <p>“My pets’ presence helped me feel relaxed. Whenever I was stressed at work or even because of doing household chores, I felt relaxed just by seeing them or playing with them. My pets relieved my stress.”<br/>—Participant 3</p> <p>“My pet helped a lot in my mental health during the pandemic. Whenever I feel stressed because of work, I would just spend some time petting her and it would already comfort me.”<br/>—Participant 7</p>   |
| Reinforcing factor | Health-related problems of pets | <p>“During lockdown, there was no resident veterinarian here in our province. Unfortunately, my cat got sick because of a feline virus, and I did not know what to do to her. I was really stressed, and I really panicked because I thought I would lose her.”<br/>—Participant 5</p> <p>“There was a time when Suga (dog) suddenly lost his appetite for two days. Of course, I panicked because the veterinarian near our place was not always accessible. So, my other option was to bring him to the veterinarian in the next city which was a little further away from where I lived. Unfortunately, I did not know how to drive, and my father, who drove, was a senior citizen who was also not permitted to go out. There was no means of transportation to get him to the veterinarian. It was a great challenge for me as a pet owner.”<br/>—Participant 9</p>                              |
|                    | Pet loss                        | <p>“To be honest, all I recall about the pandemic is the cat I lost. It was quite difficult for me because I couldn’t do anything to treat her (the cat) for the feline virus. So I was quite depressed when I lost her. I understand that pet death is a part of being a pet owner, and their loss is extremely difficult. But the pain will</p>  |

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never be greater than the happiness that she brought into my life.”

—Participant 6

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Table 18 illustrates the impact of HAI on the QOL of pet owners, categorizing participants’ responses into psychological, physical, and social themes. From a psychological perspective, respondents revealed that their pets act as motivators to enhance their work ethic. Ownership of a pet has spurred them to elevate their job performance to cater to their pets’ needs and ensure a comfortable living for them. Furthermore, the majority indicated that adopting a pet fostered a heightened sense of responsibility within them. They acknowledged the commitment involved in pet ownership, emphasizing the duty to care for their animals. In addition, many participants expressed that having a pet has endowed them with a sense of purpose. They find fulfilment and satisfaction in the act of caring for their pets, asserting that the joy their pet brings motivates them to provide a fulfilling life in return.

In examining the impact on the physical aspect of QOL, a primary finding was the positive effect of the acquisition of a pet on the owner’s well-being. This benefit manifests through promoting activities such as walking and playing. Participants indicated that having a pet proved advantageous for sustaining physical activity levels during the pandemic, which they deemed vital for their health. On the side of social relationships, three sub-themes emerged: the enhancement of social bonds, the provision of companionship, and the improvement of social skills. A significant number of participants highlighted the pivotal role their pets played in strengthening family relationships, noting that it not only brought family members closer but also encouraged joint physical activities, which served as a relief from stress and boredom amidst the lockdown. Furthermore, the majority viewed their pets as steadfast confidants during these uncertain times, finding comfort and peace in their presence. This companionship was particularly valued for its ability to counter feelings of loneliness while isolated from friends and family. Lastly, pets were credited with bolstering individuals’ social competencies. Participants observed that pets display diverse personalities, necessitating adaptable interaction strategies. The adaptability they reported improved their social skills, proving beneficial in broader social interactions.

**Table 18.** Impacts of human–animal interactions to pet owners’ quality of life.

| Themes        | Sub-Themes                          | Sample Verbatim   |
|---------------|-------------------------------------|---|
| Psychological | Source of motivation to Work harder | <p>“If I did not have any pets, I would not have any motivation. It was because of them that I became motivated to work harder so I could earn more to sustain their needs, and to expand our house to give them enough space to sleep in. Without them, I don’t think I would be able to work hard enough to have my own house.”</p> <p>—Participant 1</p> |
|               |                                     | <p>“I must work hard for my pet. I feed her high-quality foods, and her shampoo is even more expensive than mine. I want to provide for her needs, which is why I feel motivated to work harder so I can buy anything she needs or wants.”</p> <p>—Participant 5</p>  |

|          |                                  |   |
|----------|----------------------------------|---|
|          | Became a more responsible person | <p>"I believe I became more responsible after becoming a pet owner since I had to find ways in order to sustain their needs."<br/>—Participant 2</p> <p>"I became more responsible since I cannot be lenient because my pets rely on me. If I lived alone, I could get up at any time, but because I have pets, I need to get up early to walk them. They are also like human beings. They require food, water, and care."<br/>—Participant 7</p>   |
|          | Gave purpose and meaning In life | <p>"My pets were a big help in my recovery. During the pandemic, I was clinically diagnosed with depression. Because of the medications, I spent much of my time in my bed sleeping. But because of my pets, I was motivated to go out and walk them in our backyard and prepare their food since I could not just leave them alone. Then I noticed they were always following me wherever I went, and that is when I realized and decided to cope because no one would look after them. That is why my dogs became my motivation for fighting and feeling driven to deal with my depression."<br/>—Participant 3</p> <p>"My pet brought meaning to my life. It is a pleasant and fulfilling feeling for me to know that I'm providing him with the greatest life possible. Because, as a parent, you feel good when you see your child happy and healthy, right? I feel the same way about my pet. I am happy when I see my pet happy and healthy. That is why it has become one of my life's purposes to provide him with a fulfilling life, knowing that my pet's life is short."<br/>—Participant 9</p> |
| Physical | Being physically active          | <p>"Our pets actually helped us bond during the pandemic. At that time, we were always bored because you know, there was nothing much to do aside from work and household chores. So there were times when we would just talk and play with our pets, and then my parents would join us. So our pets became a way for us to spend more time together as a family."<br/>—Participant 2</p> <p>"During the pandemic, there were just three of us at home. Me, my father, and my dog. So, when we had nothing to do, I would play with my dog. Then my father would see us and think we were funny. So, in a sense, my father and I got to do something together during the pandemic to pass the time with the help of our dog."<br/>—Participant 10</p>   |
| Social   | Improves social relationship     | <p>"Our pets actually helped us bond during the pandemic. At that time, we were always bored because you know, there was nothing much to do aside from work and household chores. So there were times when we would just talk and play with our pets, and then my parents would join us. Our pets became a way for us to spend more time together as a family."<br/>—Participant 2</p> <p>"During the pandemic, there were just three of us at home: me,</p>  |

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|                          | <p>my father, and my dog. So, when we had nothing to do, I would play with my dog. Then my father would see us and think we were funny. So, in a sense, my father and I got to do something together during the pandemic to pass the time with the help of our dog.”</p> <p>—Participant 10</p>  |
| Serves as a companion    | <p>“Since the pandemic, I started working from home. Since then, Vanilla (the dog) and I have become closer. So she would always follow me while I was working. And I am happy about that, because I never felt alone while isolated at the time.”</p> <p>—Participant 4</p> <p>“My dog would constantly follow me wherever I went. Then, during the pandemic, I tried to play the ukulele again. So, my dog was simply staring at me as I played. It was as if he was my audience, enjoying the music. That is why I never felt alone because of Suga (the dog).”</p> <p>—Participant 9</p> |
| Helps with social skills | <p>“My dogs helped me learn how to socialize. Because pets, like humans, have diverse personalities. There are shy pets, animals that prefer to be alone, and pets with cheerful personalities. So, you know, I have to be sensitive to their attitude in order to interact with them effectively. They are similar to people with whom you must interact. So, in some ways, I am able to apply the techniques I use with my pets to the people I engage with. Because of this, I believe my social skills have improved.”</p> <p>—Participant 8</p>   |

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#### 4. Discussions

Our study aims to explore the impact of HAI on mitigating stress and augmenting the QOL for individuals working from home during the COVID-19 pandemic. Employing a mixed-methods approach, this research assessed and compared stress levels and QOL among people with and without pets during the emergency crisis. Furthermore, it investigates the role of HAI in influencing the relationship between stress and QOL among pet owners.

Quantitative analysis reveals significant differences in reported stress levels between individuals who own pets and those who do not. However, no significant differences were identified in the QOL between pet owners and non-pet owners across most domains, with the exception of the social domain. This area, which focuses on personal relationships and social support, showed a notable difference. The qualitative phase of this study highlighted the benefits of pet ownership, divulging that pets provide emotional support and help alleviate stress. To give emphasis, pets contribute to enhancing their owner’s QOL in psychological, physical, and social dimensions. During the pandemic, most respondents were able to maintain physical activity, which led to health improvements. Owning dogs, in particular, fostered a sense of responsibility, motivated owners to put forth greater effort, and imbued their lives with purpose. Pet ownership also remedied the loneliness stemming from isolation by offering companionship and social support.

Attachment theory, a prevalent theoretical framework, explains the positive impact of animal companionship on human stress levels and QOL by asserting a fundamental

human need for belonging [78]. The research by [79] further elucidates that pets can serve the primary regulatory functions of an attachment figure, offering their owners a safe haven and a secure base. This underscores that despite significant differences in human-to-human and HAI, the emotional bond between a pet owner and their pet can rival the strength of many human relationships, offering similar mental health benefits and even enhancing social connections [58,80]. Indeed, the pursuit of affection is a key motivation behind pet ownership, transcending mere social support. It encompasses the inherent joy found in shared activities and spontaneous interactions, ultimately improving QOL [80].

The delineation of the social domain as the area where pet owners differed significantly from non-pet owners underscores the impact of HAI on social ties and relationships. Our findings carries compelling implications for understanding how pet ownership can contribute to a sense of belonging and social support that are critical components of QOL especially during prolonged periods of isolation and crisis. This insight implied a deeper understanding and significance of the human–animal bond in bolstering individual’s resilience and well-being. Furthermore, the revelation that the emotional bond between a pet owner and their pet can rival the strength of many human relationships is noteworthy. It suggests that the companionship and support derived from HAI can have a profound impact on an individual’s emotional and psychological well-being, transcending the conventional understanding of social support. The unique value of HAI in enhancing social connections and emotional well-being cannot be overstated. As we continue our journey to unprecedented challenges, it is important to recognize and appreciate the role of HAI in providing invaluable support and companionship to individuals. This acknowledgement not only validates the bond between humans and their pets but also underscores the need to further explore and prioritize the well-being of both humans and animals in our society.

Our study is far from being perfect and it is imperative to acknowledge and expound on the limitations specific to the Philippines’ setting and we did not take into account the racial, cultural, economic, and socio-economic factors that might affect the comprehensiveness of our findings. Without accounting for these influential factors, the insights provided may not accurately reflect similar findings for other countries.

## 5. Conclusions and Recommendations

This study adds to the growing body of evidence supporting the benefits of pet ownership for individuals’ well-being, especially during a pandemic. Our empirical and qualitative findings reveal that, amidst a pandemic, pet owners report lower levels of stress compared to those without pets, attributing to a higher QOL through the supportive role of HAI. Although our results found no substantial differences in the overall QOL between the two groups, the aspect of social relationships and support, referred to as the social domain, was notably stronger among pet owners. Our study has far-reaching implications on the significance of pet ownership in enhancing individual well-being. These findings are significant for public health initiatives and policies to support individuals and communities, specifically in times of crises such as a pandemic. In accordance with the findings of this study, the researchers recommend that future research should investigate the effects of HAI on children, adolescents, and homeless pet owners as the participants in the current study were working adults. Currently, there is a lack of studies examining the impact of pet ownership on the well-being of Filipinos or other races.

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