Pets' impact on people`s well-being in COVID-19: A quantitative study

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Abstract: *Introduction*: The global coronavirus pandemic and the governmental restrictions to prevent the virus from spreading have generated anxiety, impacting people's well-being. Former research suggested a positive impact of pets on their owner's well-being, however little research has been conducted within the context of the COVID-19 pandemic in which isolation measures and restrictions were implemented in many countries. *Objective*: This cross-sectional study was conducted to investigate the influence of pets on people's well-being, social connectedness, coronavirus anxiety, and the relationship of pet attachment on well-being during the current COVID-19 pandemic. *Methods*: Participants (N=72) were opportunistically recruited online across several countries. Data was analyzed using a MANOVA and linear regression. *Results*: The results indicated that there were no significant differences between pet owners and non-pet owners in terms of well-being, social connectedness, and coronavirus anxiety. Furthermore, a statistically significant relationship between higher pet attachment and greater well-being was not found. *Implications*: Future research should focus on greater sample sizes and longitudinal data, with a focus on how pet-related interventions may improve well-being.

Keywords: Well-being, Pets, Coronavirus Anxiety, Social Connectedness, Pet Attachment, Covid-19

Introduction

Government interventions regarding COVID-19 played an essential part in reducing transmission, but these measures have had psychological impacts on people's well-being (Xin et al., 2021). Quarantine restrictions including social distancing and quarantine were associated with decreasing mental health levels, social avoidance and higher stress (Brooks et al., 2020). Confinement at home led to a sudden and dramatic decrease in interaction with friends and family (Xin et al., 2021). Anxiety during epidemics has been well-documented over the last years (Kotera, 2021), including the SARS epidemic in 2003 (Wing & Leung, 2012). Early studies conducted in India, Turkey, China and Japan found that anxiety was a common psychological problem at the beginning of the COVID-19 pandemic (Roy et al., 2020; Qiu et al., 2020; Özdin & Bayrak, 2020; Kotera et al., 2022b). This sustained anxiety has been associated with clinically relevant symptoms and development of mental disorders (Lee et al., 2020).

According Maslow's theory (1943), when an individual's basic needs are not met, negative emotions such as anxiety arise. During emergency situations, individuals seek security and safety, mostly through emotional security, and control (Bhandari et al., 2021; Kotera et al., 2022b). However, during the pandemic many people were isolated from social and instrumental support, leading to loneliness and anxiety (Brooks et al., 2020; Cherry, 2021). The experience of certainty has been consistently supported as being important to mental well-being within Maslow's theory. Feelings of uncertainty have been widely reported during the pandemic, and is a contributing factor in developing anxiety (Taylor & Asmundson, 2020).

It is important to consider ways to reduce anxiety. Pet ownership may reduce anxiety by providing individuals with a set routine and loneliness reduction (Bolstad et al., 2021). The presence of a pet is likely to increase positive feelings of happiness and security and reduce negative emotions, such as isolation and stress (Brooks et al., 2018). Individuals managed their anxiety during the pandemic due to pet caring routines and consistency (Nieforth & O'Haire, 2020). Additionally, pet owners engaged more in outdoor activities during the pandemic than non-pet owners (Applebaum et al. 2020). During the COVID-19 pandemic, pet owners had greater well-being and positive emotions than non-pet owners (Grajfoner et al. 2021). The companionship of a pet may also provide owners with a feeling of social support (Brooks et al. 2018). During the pandemic, isolation from social support networks had the potential to negatively impact well-being (Bzdok & Dunbar, 2020). In times of social distancing restrictions, pets may provide social companionship and emotional support, while people experience a lack of human support (Applebaum et al., 2020).

Another factor that may impact the well-being of pet owners is pet attachment. Attachment can be defined as a close emotional bond between individuals, which is sought for increased feelings of for security and well-being (Bowlby, 1973). Research has suggested that attachment can form

between pet owners with their pets, in a similar way to human attachment theory (Beck & Madresh, 2015; Zilcha-Mano et al., 2012). Aligning with Bowlby's proposal that infants seek proximity from their mothers in stressful situations, individuals use their pets as a safe haven in times of threat (Zilcha-Mano et al., 2012). With stay-at-home restrictions and jobs shifted to home settings, pet owners spent more time with their companion animals and strengthened their relationship (Bussolari et al., 2021). This attachment between pet and pet owner may be essential to improve the owner's well-being during unprecedented times of social isolation such as during the pandemic.

Only a few studies included the impact of pets on psychological health (Debbra et al., 2019; Zhi et al., 2020). Of these studies, the majority had small sample sizes and focused only on a specific group of participants, such as children (Zhi, Aziz & Taib, 2020) or older adults (Debbra et al., 2019). Further research in the field of human-animal bond on well-being is required (Ratschen et al., 2020), specifically within the context of the COVID-19 pandemic.

The study aimed to investigate whether there is a difference between pet owners and non-pet owners in the context of well-being, social connectedness, and coronavirus anxiety in the current COVID-19 pandemic. In addition, this study has explored whether pet attachment is a predictor of well-being. It was hypothesised that pet-ownership will be significantly related to higher social connectedness, greater well-being and lower coronavirus anxiety compared to individuals without pets (H1). An additional hypothesis for pet owners only was that higher pet attachment will be significantly related to greater well-being (H2). This study compared the analysed results with existing findings to further understand the relationship between the variables and generate support for the hypotheses based on further evidence.

Methods

Design

A cross-sectional survey was conducted and all participants completed three questionnaires about general well-being, social connectedness, and coronavirus anxiety on the online platform Qualtrics. An additional questionnaire was taken place for pet owners to evaluate their pet attachment.

Participants

The study used convenience sampling enabling efficient data collection (Kotera et al., 2021b). The researcher disseminated invitations

through international social media groups and the University Research Participation Scheme. A sample size of 89 was calculated via G*Power (Large effect 0.09, Alpha 0.05, Power 0.8). To investigate a cross-cultural population, individuals from different countries were eligible to participate in this study (Kotera et al., 2021a). The inclusion critera was that individuals had to be over the age of 18 and had no previous diagnosed mental health illnesses.

Procedure

Participants were recruited by a virtual invitation via Facebook groups, email and the University's Research Participation Scheme, where students sign up and participate in different studies. The invite contained a link to Qualtrics, which hosted the Participant Information Sheet. Prospective participants were asked to complete a set of eligibility questions. Individuals who were eligible for the study viewed the consent form. Individuals who were not eligible for the study were screened out. All participants were asked to create a unique code for identification and completed a demographics questionnaire. The three main questionnaires included the General Wellbeing Scale, Social Connectedness Scale and Coronavirus Anxiety Scale. An additional questionnaire for pet owners (Pet Attachment Questionnaire) was also completed through Qualtrics. On average it took 20 minutes for participants to complete the questionnaires. A debrief sheet was outlined to participants, reminding them of the details of the study and the right to withdraw.

Materials

The General Wellbeing Scale (Norman et al., 2000) was used to measure well-being, as its psychometric properties are among the most valid and reliable indices of overall life satisfaction (Norman et al., 2000). The literature demonstrated a high internal and adequate reliability ($\alpha = 0.9$) recommending the wide use of the scale, whenever an indicator of the general well-being of an individual is required (Peterson et al., 2017). The General Wellbeing Questionnaire had 18 questions in total. There were five optional answers for each question, where the participant had to choose that best describes how they have felt and how things have been going for them during the past month. In the first 14 questions, the score ranked from 0 to 5. Questions 15 to18 were measured on a six-point scale in a range from 0 to 10. The scores were added up and a higher overall score indicated a more positive well-being. An example question would be: "Have you been feeling emotionally stable and sure of yourself?" or "How relaxed or tense have you been The Scale showed high reliability in the present sample (α= .87; Appendix J).

The Social Connectedness and Social Assurance Scale (SCSAS; Lee & Robins, 1995) was used to examine social connectedness (eight questions). This scale measured all three aspects of belongingness: connectedness, affiliation, and companionship. The items reflected a general emotional distance between self and others. These items of the scale were evaluated for content validity and consistency and reached a consensus by the judging panel (Lee & Robbins, 1995). The data was collected using a six-point Likert scale: (1= agree to 6= disagree). Higher scores indicate a more reported sense of social connectedness. The maximum score was 48, minimum 8. An example statement was: "I don't feel I participate with anyone or any group." (Lee & Robbins, 1995). The SCSAS indicated acceptable reliability (α= .96) in the present study.

The Coronavirus Anxiety Scale (CAS; Lee, 2020) assessed coronavirus anxiety. This tool included five questions and each item of the scale captures a unique anxiety manifestation and reflected the frequency of the symptom over the past two weeks. The content validity of CAS was shown by the items, which represented physiological agitation symptoms associated with clinically increased anxiety and correlations between the scores of the scale and relevant measures further supported the construct validity of the instrument (Lee, 2020). Participants had to choose one of five options (0= Not at all, 1= Rare, less than a day or two, 2= Several days, 3= More than seven days, and 4= Nearly every day over the last two weeks). A higher score reflected a higher coronavirus anxiety. An example statement from this scale was: "I lost interest in eating when I thought about or was exposed to information about the coronavirus" (Xiang et al., 2020). This scaling format was based on the DSM-5's cross-cutting symptom measure for self-rating adults (APA, 2013). The scale showed high reliability here (α= .60).

The Pet Attachment Questionnaire (PAQ; Zilcha-Mano et al., 2011) was used to examine attachments to pets using a 7-point Likert scale (1= Disagree Strongly, 4= Neutral / Mixed, 7= Agree Strongly) to measure the relationship between the participants and their pets. The Cronbach's Alpha ranged between .86 and .89, indicating a high-test reliability (α= .66.), In addition, various studies supported the convergent, discriminant and content validity of the PAQ (Zilcha-Mano et al.,2011). The scale included 26 statements, only the first item is a reversed one. An example statement from this questionnaire was: "I'm worried about being left alone without my pet" (Zilcha-Mano, et al.,2011).

Analytic strategy

First, a multivariate analysis of variance (MANOVA) was used to investigate if there was a statistical difference in general well-being, social connectedness and coronavirus anxiety between pet owners and non-pet

owners (Kotera et al., 2020). Second, a linear regression was conducted using the pet owners' data to investigate if pet attachment could predict the variance in well-being (Kotera et al. 2022a). SPSS was used for the analyses.

Results

In sum, 72 people participated in the study, 23 participants had to be removed from the analysis, due to more than 60% incomplete data. Therefore, 49 completed questionnaires from 32 pet owners and 17 non-pet owners were valid. The collected samples in this study were independent. A random sample was chosen from the bigger pet-owner group to create an equal sample size to conduct the MANOVA analysis. The sociodemographic characteristics of the participants are summarized in table 1.

Table 1

Sociodemographic Characteristics of the Participants

Sample Characteristics	Number of Participants	
	n	%
Participants total	49	
Gender		
Men	15	31
Woman	34	69
Divers	0	0
Age (mean)	36,5	
Age Range	23-61	
Pet owners	32	
Pets owned*		65
Dogs	24	
Cats	15	
others	4	75
		47
		13
Marital Status		
Single	24	49
Married	25	51
Divorced	0	0
Widowed	0	0
Country origin		
Germany	16	33
UK	14	29
Hong Kong.	9	18
Ireland	4	8
others	6	12
Occupational status		
Working full-time	34	69
Working part-time	4	8
Furlough	0	0
Other	11	23

Note N=49 participants

* Considered pet owners with more than one and different kinds of pets.

The first aim of this study was to investigate whether there is a difference between pet owners and non-pet owners in social connectedness, well-being and coronavirus anxiety in the current pandemic. A one-way multivariate analysis of variance (MANOVA) was conducted. Before analysing the data, parametric assumptions were checked. The dependent variables are on interval scales and in the Histograms and Plot Charts, no outliers were identified.

The S-W normality test showed significant results for three values (social connectedness of pet owners and coronavirus anxiety for pet owners and non-pet owners, S-W= p< .05; Appendix K). In addition, the social connectedness and coronavirus anxiety value of the pet owner group had a skewness z-score of -2.29 and 2.68 which falls out of the +/- 1.96 range (Appendix L), indicating that the assumptions of normality are not given. As most values indicated that the assumptions of normality were met and the MANOVA is highly robust and efficient (van Aelst & Willems, 2011), the analysis was continued.

Table 2 shows Means (M), Standard Deviations (SDs), 95% confidence intervals (CI), Skewness and Kurtosis with Standard Errors (SE) for each dependent variable.

Table 2

Descriptive statistics for well-being, social connectedness, and coronavirus anxiety in pet owners (PO) and non-pet owners (NPO).

Variable	M (SD)	95% CI Lower	95% CI Upper	Skewness (SE)	Kurtosis (SE)	K-S test (sig)	S-W Test (Sig)
PO well-being	64.44 (3.65)	63.12	65.75	.179 (.414)	-.205 (.809)	.042	.578
NPO well-being	63.59 (4.33)	61.36	65.82	.140 (.550)	-.166 (1.063)	.200	.944
PO social connectedness	39.44 (8.71)	36.30	42.58	-.946 (.414)	-.176 (.809)	.003	.001
NPO social connectedness	36.76 (9.63)	31.81	41.72	-.606 (.550)	-.977 (1.063)	.200	.086
PO corona virus anxiety	6.25 (1.61)	5.67	6.83	1.108 (.414)	.087 (.809)	.000	.000
NPO corona virus anxiety	6.59 (1.70)	5.72	7.46	.914 (.550)	-.132 (1.063)	.024	.008

Prior to performing the MANOVA, a series of Pearson correlations were conducted between the dependent variables

Levene's test showed a non-significant result (p > 0.05), which indicates that the variances are equal and there is no difference in variances of both groups (Appendix M). Additionally, a Box's M test with a value of .7.731 was associated with a p-value of .327 (Appendix N), which was interpreted as non-significant (p <.005). Thus, the covariance matrices between the two groups were assumed to be equal for the purposes of conducting the MANOVA.

The multivariate result was statistically not significant, Wilk's Lambda = .976, F = (3.30) = .250 (Appendix O), indicating no difference in the levels of general well-being, social connectedness and coronavirus anxiety between pet owners and non-pet owners.

Table 3 displays the means for pet owners and non-pet owners on the dependent variables.

Table 3

A comparison of means (with Standard Deviations) for pet owners and non-pet owners for general well-being, social connectedness, and coronavirus anxiety (N=34).

	Pet owner mean (SD)	Non-pet owner mean (SD)	Total
Well-being	64.24 (4.35)	63.59 (4.33)	63.91 (4.29)
Social connectedness	37.06 (9.23)	36.76 (9.63)	36.91 (9.29)
Coronavirus anxiety	6.12 (1.54)	6.59 (1.70)	6.35 (1.61)

As shown in Table 3, the mean of the pet owner group scored slightly higher in well-being and social connectedness. Still, in contrast, coronavirus anxiety showed a slightly lower overall score among pet owners than non-pet owners (Appendix P). However, these differences are not significant: Pet ownership and well-being (F(1, 32)=-.189, p = -.667), social connectedness (F(1,32)= .008, p= -.928 and coronavirus anxiety (F(1,32)=-.718, p= -.403 (Appendix Q).

The second aim of this study was to examine whether higher scores on pet attachment will lead to greater well-being in female pet owners using a correlational design.

Before analysing the data, parametric assumptions were first checked. There were no problems with normality tests (KS- and S-W, p>0.5). There were also no issues with skewness and kurtosis within the range of +/- 1.96. The variables are on interval scales, there were no outlier issues, and the data is normally distributed. Lastly, there were no problems with the VIF statistics for each predictor, each had a value less than 10 .Since the parametric assumptions were met, a linear regression analysis

was used to examine the relationship between pet attachment and the scores of general well-being. Table 4 shows the correlations between the variables.

Table 4

Descriptive statistics for pet attachment and well-being.

Variable	M (SD)	95% CI Lower	95% CI Upper	Skewness (SE)	Kurtosis (SE)	K-S test (sig)	S-W Test (Sig)
Pet attachment	60.34 (2.10)	56.06	64.63	.263 (.414)	-.089 (.809)	.200	.638
Well-being	64.44 (.65)	63.12	65.75	.179 (.414)	-.205 (.809)	.042	.578

Table 5

Correlations coefficients (and significant levels) for the predictor and outcome variable

	Well-being
Pet attachment	64.24 (4.35)

The data was analysed using linear regression using the Enter method. The regression equation produced a negative effect (R^2= .31, R^2_{adj}= -.001), indicating that pet attachment was not a significant predictor of the general well-being ($F(1,30)$= .966, p = .333) (Appendix W). There was no significant relationship between pet attachment and general well-being reported (t= -.983, df= 31, p= .333).

Discussion

The present study investigated whether pet ownership predicts greater general well-being, higher social connectedness, and lower coronavirus anxiety. In addition, it was analysed if higher pet attachment is associated with greater general well-being.

The results indicate that well-being, and social connectedness was higher in pet owners. Coronavirus anxiety was lower in pet owners when examining the means compared to non-pet owners, however, this was not significantly confirmed by the MANOVA. Therefore, the first hypothesis (H1) "Pet ownership will be significantly related to higher social

connectedness, greater well-being and lower coronavirus anxiety compared to individuals without pets" is rejected. A linear regression was conducted to investigate the study's second aim: a higher pet attachment is associated with higher general well-being. The results of the regression indicated a non-significant result. Therefore, the second hypothesis (H2) for pet owners only "higher scores on pet attachment will be significantly related to greater well-being" is rejected.

Pets have been found to have a positive influence on people's well-being and the present study combines the factor of pet ownership, well-being, and social connectedness, pet attachment, and anxiety in the current pandemic. The previous literature review suggested that people, especially children and older adults, cope better with stress and showed to be more resilient when owning a pet (Powell et al., 2019). However, these findings are not supported by the present study. Previous studies finding similar results or even a negative influence of pet ownership on well-being include Applebaum et al. (2020) and Hurn et al. (2020). Their studies suggested that pet owners might experience higher distress due to government restrictions and reduced pet care, which may lead to lower well-being. In addition, pet owners' increased stress levels could be echoed by their animals, which might also lead to decreased well-being (Bussolari, 2021).

Ratschen (2020) found that strong pet attachment indicates higher psychological and increased stress levels. Higher pet attachment is related to higher psychological vulnerability in pandemics (Ratschen, 2020), while other studies linked pet ownership to higher anxiety and stress levels (Field et al., 2009).

A strength of the present study is that it was the first study that investigated the differences between pet owners and non-pet owners on their well-being, social connectedness and coronavirus anxiety and the relationship between the levels of pet attachment and well-being. However, the calculated required sample size of 89 participants was not fulfilled. With only 49 valid surveys, the statistically insignificant effect in the study can be a result of this insufficient sample size. Accordingly, further research could be conducted using higher sample sizes to test for statistically significant results. Due to the quantitative approach, only self-reported data was collected by using an online questionnaire. Accordingly, participants could not explain their choices to gain a wider understanding of their situation and the link between social connectedness, pet attachment and the anxiety of the current virus. Therefore, future research could benefit from using a combination of quantitative and qualitative research: The inclusion of semi-structured interviews can help to understand the context of the participant's answers and identify the unique experiences and meaning. In addition, future research could focus on one country and consider the specific COVID-19 quarantine restrictions and how they affect the well-being pet owners and non-pet owners.

In conclusion, this study contributed to the literature by focusing on the well-being of pet owners and non-pet owners during the current

pandemic, and its relationship to coronavirus anxiety, social connectedness, and pet attachment. The results of this study found that there were no significant difference between pet owners and non-pet owners in all of these factors. In addition, the hypothesis of a stronger pet attachment being an indicator for greater well-being in pet owners could not be confirmed. This topic is currently of special interest given that many people spend more time isolated at home, resulting in decreased well-being, a situation in which animals could have a positive impact on individuals. Previous studies have found a positive impact of pet ownership on well-being in general, and in particular during the coronavirus pandemic. Various potential reasons for non-significance in the current study were discussed, such as sample size and geographic differences in pandemic quarantine and lockdown measures. Future research could consider the discussed impact of length of pet ownership or focus on one country only and consider the specific COVID-19 quarantine restrictions and how they affect the well-being, social connectedness, and coronavirus anxiety in pet owners and non-pet owners.

Funding
No funding was received for this study.

Declaration of conflict of interest
The authors declare that they have no conflict of interest.

Availability of data and material
The data that support the findings of this study will be made available by the first author upon reasonable request.

Author's contributions
The lead author (JK) was involved in conceptualisation, data collection and analysis and writing up the project. The second author (JL) was involved in the critical revision of the manuscript. The third author (YK) contributed to conceptualisation and review/edition. The second author (ET) took a supervisory role and was engaged in conceptualisation, writing, and reviewing the project.

Ethics and informed consent
Informed consent was obtained from all individual participants in the study.

Ethics Approval
This study has received ethical approval from the University ethics board (ETH2021-3486).

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