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Cats' welfare and the relationship with their tutors during quarantine caused by COVID-19 in Brazil

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ABSTRACT

This study aimed to identify behavioral changes or welfare impairments in cats in response to home isolation due to the COVID-19 pandemic in Brazil, as well as the emotional role these animals may play with their tutors. Online questionnaires were answered by 419 cat's tutors in Brazil, who reported changes in the household routine because of the COVID-19 pandemic. The questions addressed information about the cat in the household, the tutor-cat relationship, the cat behavior, the house environment, and the changes occurred in the face of social isolation. It was evident that changes in people's routines were frequent and staying longer at home was the change most reported by the participants. Thus, cats were left alone for less time compared to the period before the quarantine. This led to an increase in the amount of time that tutors spent playing or paying attention to their cats. The quarantine period generated minimal undesirable behavioral changes in the cats, and the fact that the tutors stayed home longer contributed to reducing these changes. The fact that a cat could become infected by the new corona virus SARS-CoV-2 was known by less than half of the interviewees, which did not influence any tutor to think of getting rid of their cat. We highlight that the fact that the tutors stayed longer at home, interacting with their cat, contributed to reduce the undesirable behavioral changes in the cats. This also improved the tutors' perception of the cats' needs and behaviors, also reflecting on a greater perception of happiness in cats.

1. Introduction

In the year 2019, a new species of coronavirus infecting humans was identified, known as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) (Zhu et al., 2020), causing COVID-19 (Coronavirus Disease 2019) (WHO, 2020a). It had its first cases reported in Wuhan, China (Zhu et al., 2020), but has already infected millions of people worldwide (WHO, 2020b), producing from asymptomatic to severe respiratory conditions that can progress to death (Huang et al., 2020a; Wang et al., 2020). Preventive measures such as the adoption of personal hygiene care, social distancing and voluntary isolation of individuals with respiratory signs (WHO, 2020c), as well as vaccination of the population are the main strategies to reduce the spread of the virus (Polack et al., 2020). However, several localities have adopted lockdown policies to interrupt the transmission cycle of SARS-CoV-2 (Lau et al., 2020).

These modifications imposed on the routine of millions of people have generated effects on the mental health of many individuals, already being noticed the increase in the sharing of negative emotions in social media, mainly reflecting the users' concern with health and family (Li et al., 2020). Worsening in the clinical picture of psychiatric patients has also been identified during quarantine (Hao et al., 2020).

In this context, the interspecific relationships between humans and companion animals may play an important social role, serving as emotional support in a time when thousands of people have experienced moments of insecurity. However, companion animals may also suffer losses due to the quarantine period, since the physical, sensory, and social environmental characteristics of the home may be affected by new behaviors or adaptations that their tutors and other residents may need to adopt during quarantine (Bowen et al., 2020).

An unfavorable environment can generate, even in healthy cats, nonspecific behaviors that denote illness, even if the stressor is sustained for a short time (Stella et al., 2013). Sudden movements, different or loud sounds, novel environmental elements, and the presence of strangers can act as stressors for cats (Stella et al., 2011). In this way, the cat tutor's knowledge about changes in his routine, and that these can generate behavioral disturbances in his animal, increases the attention and the bond between tutor and cat. Moreover, it allows the tutor to become aware of better controlling the environment, avoiding those stressful situations are prolonged or occur repeatedly. It is worth mentioning that unwanted behaviors may stimulate owners to abandon their cats, or even more drastic measures such as euthanasia. In this way, the study of the guardian-cat relationship in the context presented is urgent.

Therefore, this study aimed to identify possible behavioral changes or impairments in the welfare of cats due to the quarantine period caused by the COVID-19 pandemic in Brazil, as well as the emotional role these animals play with their tutors.

2. Material e Methods

To conduct the study, online questionnaires were applied for data collection. This type of approach was considered appropriate to ensure the safety of the participants and minimize the risk of infection, compared to a traditional face-to-face survey. The participants were recruited electronically and selected according to the ownership of a domestic cat, being a resident of Brazil during the quarantine period, change in routine of their residence due to the pandemic of COVID-19, and being over 18 years of age. For households with more than one cat, the tutor was asked to choose only one of the cats for the answers, preferably the one that the tutor could observe more often or that lived in the household longer.

The participation of cat tutors in the study was voluntary and, before filling out the questionnaire, they were informed about the importance, objectives and methods of the research project. The tutors who agreed to participate in the study were asked to give their informed consent. The collection of the term occurred through the Google Forms platform, and a copy was forwarded to the tutor's e-mail, which was necessary for the validation of the questionnaire response and to avoid duplicate answers. The participants were assured of confidentiality, privacy, and protection of their image, guaranteeing that the information obtained from the research would be used only in the academic sphere, and the participant who wished to terminate their participation could do so at any time.

To calculate the sample size, we considered the data of Brazilian households that had at least one cat, provided by the Brazilian Institute of Geography and Statistics (IBGE), which is 17.7% of the 65 million Brazilian households (IBGE, 2015). The sample size was obtained through the BioEstat 5.3 program using Size: a proportion test, with the following conditions: population proportion 17.7%, sample proportion 10%, test power 95% and alpha level 5% for two-sided test. Thus, the minimum sample size for the study was 260 households containing at least one cat.

The questionnaire was developed from models used by Horwitz and Rodan (2018) and Mariti et al. (2017) and adapted for this study according to the objectives described. Data collection was conducted between the months of November 2020 and January 2021, by means of Google Forms platform, which was made available to veterinarians and veterinary entities at a national level, who shared the link to cat tutors in the Brazilian territory through social networks. The questionnaire could not be edited and/or modified during the study, and third parties could not have access to the research data and participants. The questionnaire was composed of 41 questions, and the answers were objective and/or short, and addressed information about the cat of the residence, the relationship between tutor-cat, the cat's behavior, the environment, and the changes occurred in face of social isolation. According to the configuration of each objective question, the tutors could mark only one answer, or point to more than one option.

The data were collected in the researcher's individual computer, with updated antivirus and firewall programs, access to a private, non-shared internet network, and login request through a password with high security level before accessing the system and Google Forms. Responses were recorded, coded, and tabulated for frequency and statistical analysis. Descriptive frequency analysis was performed for all data obtained from the questionnaire. Correlations were analyzed by Spearman's correlation test. Comparisons of data from before and after quarantine were subjected to the Lilliefors test, and subsequently the Wilcoxon test. A significance level of 5% was used. All statistical tests were conducted in GraphPad Prism version 9.1 software. Graphs and figures were developed in Microsoft Excel.

3. Results

Answered the survey 473 cat tutors, 13 of whom were excluded for duplicate answers. Of the 460 tutors who agreed to participate in the study, 419 (91.1%) stated the occurrence of changes in household routine due to the pandemic produced by COVID-19. Only the responses of the tutors who reported changes in the residence routine (n=419) were considered for data analysis. The changes in household routine noted by the cat tutors in this study are depicted in Figure 1.

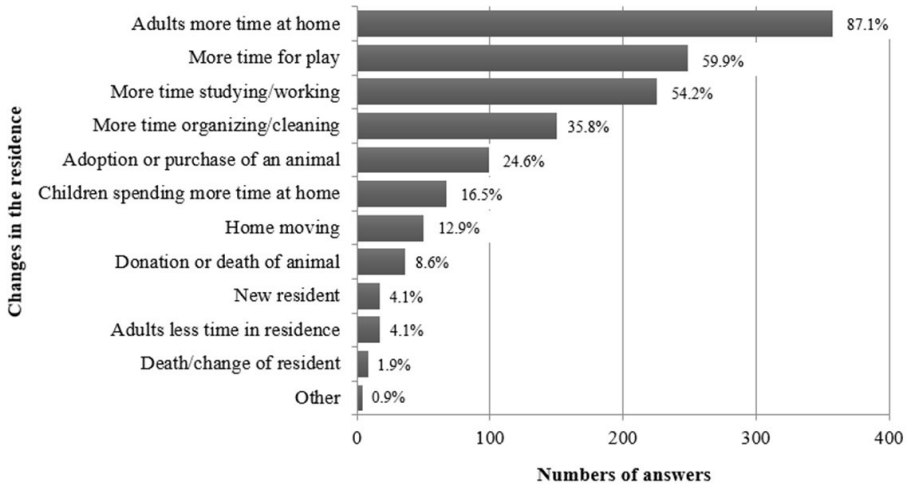

Figure 1 *– Changes in the home routine of cat tutors participating in the study, attributed to pandemic COVID-19, reported according to a questionnaire.*

About the number of cats per household, 160 respondents (38.2%) owned only one cat, 104 (24.8%) had 2 cats in the household, 60 (14.3%) owned 3 cats, 25 (6%) owned 4 cats, 48 (11.5%) owned between 5 and 10 cats, and 22 tutors (5.3%) owned more than 10 cats. The age range, sex, reproductive status, breed of the cats, and how long the cat chosen for the questionnaire has lived in the residence are represented in the Table 1.

Most respondents lived with other people (85.7%), and children were present in only 16.7% of the households (70/419). Animals of other species were present in 48.7% of the households (204/419), with the canine species being the most pointed out by the tutors of this study (181/204; 88.7%).

According to the questionnaire responses, 327 tutors or household members (78%) sought information about the possibility of cats becoming infected with SARS-CoV-2 from different sources, and more than one option could be indicated, as described in Figure 2; the remainder did not seek information (79/419; 18.9%) or did not know (13/419; 3.1%). Less than half of the tutors (179/419; 42.7%) believed that cats could become infected with SARS-CoV-2, and only 102 tutors (24.3%) asked whether there was a coronavirus vaccine for their cat.

Variables	n (419)	%
Cat's age		
< 6 months	8	1.9
6 months to 1 year	39	9.3
> 1 years to 5 years	242	57.7
> 5 years to 10 years	98	23.4
> 10 years	32	7.6
Sex of the cat		
Female	232	55.4
Male	187	44.6
Reproductive status		
Castrated	389	92.8
Non-castred	28	6.7
Did not know	2	0.5
Breed		
Non-breed	368	87.8
Persian	18	4.3
Siamese	18	4.3
Other breeds	15	3.6
How long the cat has lived in the household		
< 6 months	17	4.06
6 months to 1 year	59	14.08
> 1 year to 5 years	219	52.27
> 5 years to 10 years	93	22.19
> 10 years	31	7.4

Table 1 *– Population of cats, according to the variables age, sex, reproductive status, breed, and time living in the household obtained through a questionnaire applied to their tutors (n = 419) who reported changes in the household routine due to the COVID-19 pandemic.*

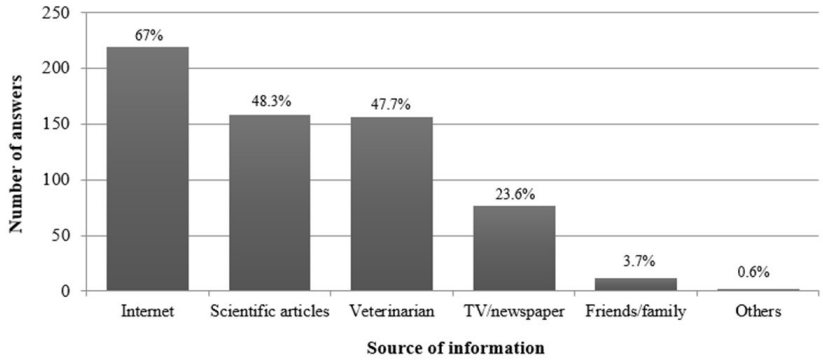

Figure 2 *– Locations where tutors and/or household members sought information about the possibility of cats becoming infected with SARS-CoV-2, reported according to questionnaire.*

The tutors were asked about the indoor or outdoor habits of their cats before and during quarantine, and the data obtained are shown in Figure 3, with no significant difference (p = 0.3875).

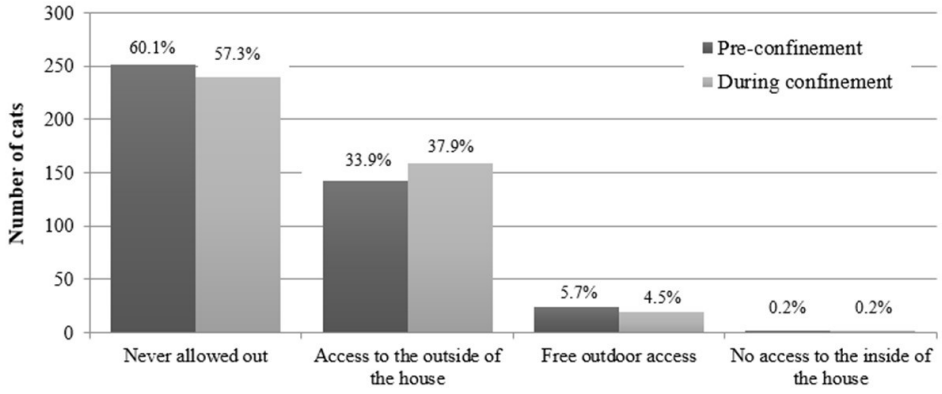

Figure 3 *– Indications from tutors regarding indoor and outdoor habits of their cat pre-confinement, and during confinement, reported according to questionnaire.*

According to the responses obtained, only 19 tutors (4.5%) restricted the cat's access to some room of the house, with four cats (4/19; 21.1%) not having access to the room of a person infected with SARS-CoV-2, and one cat (1/19; 5.3%) to the room of a person in the risk group. Other reasons reported for restrictions were urinating/defecating in inappropriate locations (3/19; 15.8%), avoiding fights (2/19; 10.5%), not messing up the house (1/19; 5.3%), preventing the cat from hiding (1/19; 5.3%), avoiding street access (1/19; 5.3%), animal was damaging wires (1/19; 5.3%), developed dermatitis (1/19; 5.3%), and temporary home (1/19; 5.3%). Three tutors (3/19; 15.8%) also noted other reasons.

About changes in household routine due to the COVID-19 pandemic, the frequency of house cleaning been increased to 339 tutors (80.0%) and 283 (67.5%) modified the cleaning products used. About the cat hygiene routine, 359 (85.7%) tutors didn't change the routine, 58 (13.8%) had adopted new measures and two (0.5%) decreased the frequency of care. It was possible to point out more than one change imposed by the tutors in the hygiene routine of their cats, which are shown in Figure 4. The changes did not correlate with whether the tutor thought the cat could become infected with SARS-CoV-2.

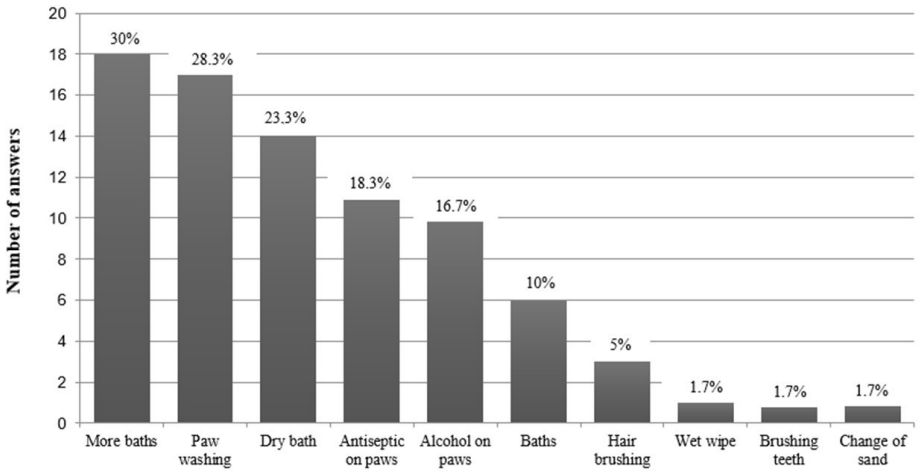

Figure 4 *– Changes in the cats' hygiene routine due to the COVID-19 pandemic, as reported by their tutors through a questionnaire.*

When asked about the time they spent giving attention or playing with their cats, 179 tutors (42.7%) increased their time with their cats during the quarantine period, 214 (51.1%) maintained it, while 26 (6.2%) tutors decreased their time with their cats. Overall, the quarantine period increased the amount of time spent playing with or paying attention to the cats of the tutors in this study ($p = <0.0001$) (Figure 5). The tutors were asked if they had bought or made any toys for their cat, and 345 (83.3%) said yes, as cardboard box (264/349), ball (214/349), wand (191/349) and scratcher (189/349) being the most cited toys.

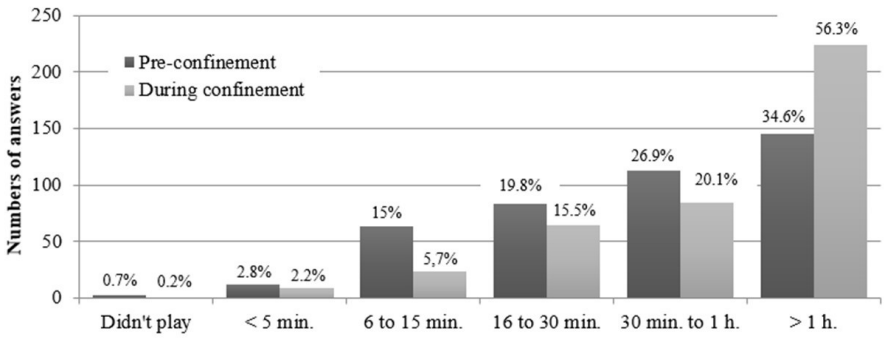

Figure 5 *– Average time that cat tutors participating in this study reported spending giving attention to or playing with their cat's pre-confinement and during confinement, reported second questionnaire.*

The tutors were also asked about the amount of time the cat was left alone before and during quarantine, and 277 tutors (66.1%) reported that their cats spent less time alone during quarantine; 129 (30.8%) reported no change; and 13 tutors (3.1%) reported that their cats spent more time alone during quarantine than before. Overall, the quarantine period was conducive to cats spending less time alone in the household compared to the period before quarantine ($p = <0.0001$) (Figure 6).

Regarding the tutor's perception of cats being more or less stressed during the quarantine period, 367 tutors (87.6%) affirmed that cats were less stressed and 325 tutors (77.6%) thought the cats being happier during this period. The fact that the cat was more stressed did not correlate with an increase in the animal's grooming routine ($r = -0.05$; $p = 0.2684$), nor with the presence of children longer at home ($r = 0.02$; $p = 0.7313$). The happiest cats were those that were left alone for less time ($r = -0.1375$; $p = 0.0048$) and that their tutors bought toys during quarantine ($r = 0.10$; $p = 0.0457$).

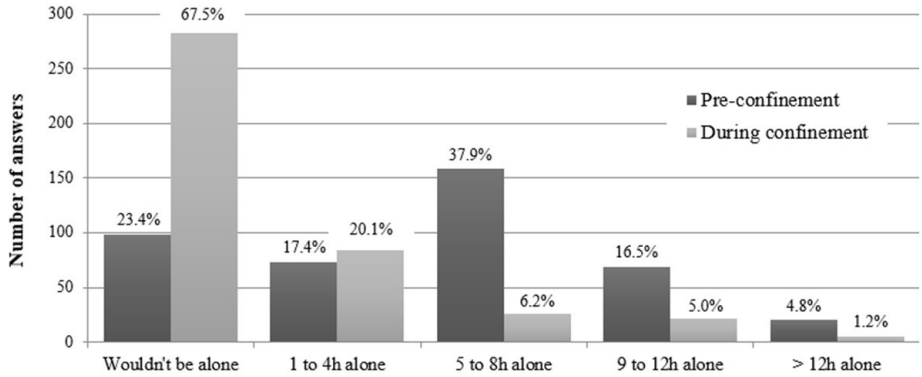

Figure 6 *– Average time that the tutors participating in this study reported leaving their cats alone before and during quarantine, reported second questionnaire.*

More than half of the respondents (249/419; 59.4%) stated that their cats showed behavioral changes during the quarantine period, which were classified as either positive or negative; with 135 tutors (54.2%) reporting only positive changes, 31 (12.5%) reporting only negative changes, and 83 (33.3%) reporting both changes. The remaining tutors either reported no behavioral changes in their cats (154/419; 36.8%) or did not know (16/419; 3.8%). Among the positive changes reported by cat tutors (n=218), more time with the tutor (175; 80.28%), more affectionate (158; 72.5%) and being calmer (62; 28.4%) were the most reported. Less destruction and less scratching were reported by 14 tutors (6.4%) each.

The negative changes, observed before and during quarantine, are shown in Figure 7; some of them were significantly reduced during quarantine compared to before this period. Cats that exhibited negative behaviors were reported by their tutors to be more stressed during the quarantine period. While cats that spent more time with their tutor were reported as more affectionate and calmer, and those that destroyed less were happier during the quarantine period (Table 2).

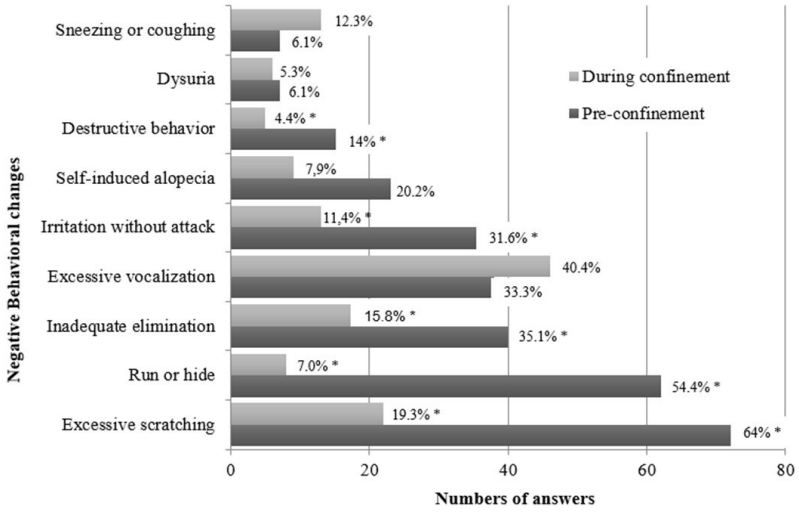

Figure 7 *– Negative behavioral changes identified in cats before and during the COVID-19 quarantine period, reported by their tutors via questionnaire. * excessive scratching (p = <0.0001), run or hide (p = <0.0001), inappropriate elimination (p = 0.0010), non-attacking irritation (p = 0.0013) and destructive behavior (p = 0.0125).*

Also, about negative changes, no correlation was observed between the occurrence of sneezing with increased housekeeping (r = 0.018; p = 0.7151), nor with modification of cleaning products (r = -0.005; p = 0.9244), as well as increased cat hygiene routine (r = -0.05; p = 0.3552). Self-induced alopecia also did not correlate with increased cat grooming routine (r = 0.02; p = 0.6199).

Negative behaviors	**Stress**	
	R	**p-value**
Sneezes	0.1439	0.0032
Dysuria	0.1395	0.0042
Destructive behavior	0.2952	<0.0001
Self-induced alopecia	0.1671	0.0006
Irritation, no attack	0.4386	<0.0001
Excessive vocalization	0.3248	<0.0001
Inappropriate elimination	0.2451	<0.0001
Run or hide	0.1614	0.0009
Excessive scratching	0.2069	<0.0001
Positive behaviors	**Happiness**	
	R	**p-value**
More time with the tutor	0.2159	<0.0001
More affectionate	0.2214	<0.0001
Quietest	0.1750	0.0003
Minimized destruction	0.1007	0.0394
Less scratching	0.0055	0.9102

Table 2 *– Correlations found between negative behaviors and increased stress, and positive behaviors and increased happiness of cats during the quarantine period occasioned by the COVID-19 pandemic, as reported through a questionnaire administered to cat tutors.*

It was found that 315 cats (75.2%) defecated or urinated only in the litter box before quarantine, and 56 cats (13.4%) besides the litter box also used other places for defecation and urination, such as yard/garden (35; 62.5%), floor (12; 21.4%), carpets in the house (9; 16.1%), toilet mat (6; 10.7%), living room (1; 1.8%) and towels (1; 1.8%). Of the cats that used only the litter box prior to quarantine, 26 tutors (26/315; 8.3%) reported that the cat changed its defecation and

urination elimination to another location during quarantine (13 yard/garden; 3 floor; 1 carpets in the house; 9 other location), and only five (19.2%) of these reported changing the litter box. In addition, another 15 cats (3.6%) that urinated or defecated in places other than the litter box before quarantine, began to eliminate in yard/garden (7), in the litter boxes (6) or other locations not specified (2).

Of the 239 tutors who reported behavioral changes, 57 (23.9%) sought veterinary help to solve the problem, 139 (58.2%) did not seek help, and 43 (18%) did not answer this question. Of those who sought veterinary help, 38 tutors (38/57; 66.7%) reported that their cats showed positive and negative behavioral changes; 16 (28.1%) reported only negative changes, and only 3 (5.3%) reported positive changes.

According to the responses obtained, no tutor thought about getting rid of the cat during the quarantine period. Moreover, the vast majority of the tutors (414; 98.8%) reported considering the cat important for the family to face the quarantine period, due to the reasons described in Figure 8, with each tutor able to point to more than one reason.

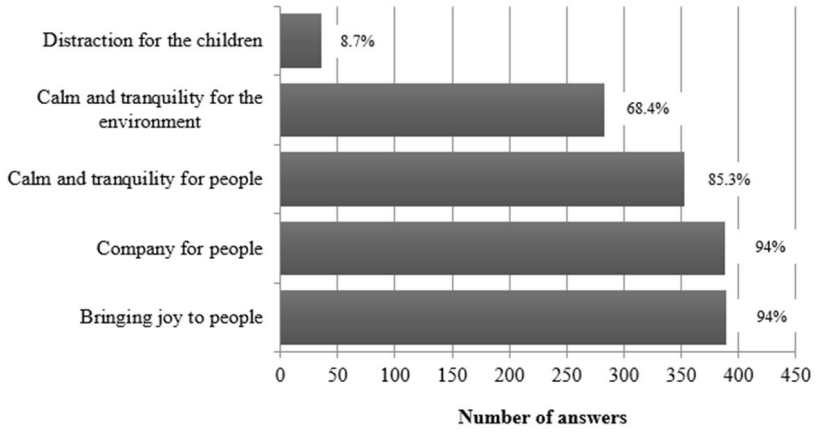

Figure 8 *– Reasons attributed to the cats by their tutors, when considering that they were important to face the quarantine period in COVID-19, informed through a questionnaire.*

4. Discussion

This paper evaluated the behavior of cats as perceived by their tutors during the quarantine period caused by COVID-19. The results highlight the connections established between humans and their cats, as well as the role this bond played during the pandemic. Although the pandemic was a global stressor, the tutors reported that their cats were happier during this period, possibly because of the increased time that the tutors spent in their homes, and thus undesirable behavioral changes in the cats apparently did not increase during this period.

To answer the questionnaire, the tutors were not aware that only those who presented changes in their home routine would answer the survey until the end, so we could observe that more than 90% of the interviewees reported changes in their routine. Staying at home more, spending more time studying and working, and cleaning or organizing the home were the main changes in the routine pointed out in this study. Studies conducted in other locations, pointed out that working at home during the quarantine period increased by more than 40% (Ferreira et al., 2021, Turna et al., 2021).

Aspects related specifically to animals in the household, such as playing more with cats or adopting/purchasing a pet were also highly cited modifications by respondents. A study evaluating the role of dogs during quarantine demonstrated that tutors who played with their animals exhibited mental and physical health benefits (Bussolari et al., 2021). These benefits specifically were not assessed through this study, but positive aspects of the cat's presence such as, companionship and joy for tutors were reported.

In Brazil (Peduzzi, 2020) and elsewhere (Ho et al., 2021), animal adoption has increased, reflecting a possible need for companionship in this period where many people have been lonely. Due to so much uncertainty and false news about the spread of SARS-CoV-2 among people and animals, most tutors have sought information about the possibility of cats becoming infected with the virus. The internet was the primary source of information about the risk of cats becoming infected with SARS-CoV-2 for the tutors in this study. According to an American survey, the internet is used by a high number of tutors (94.4%) to obtain information about their pet's health (Kogan et al., 2012), and in times of pandemic, there has been an increase (83%) in the use of digital resources, primarily for accessing news (Turna et al., 2021).

he internet facilitates access to scientific information, but also to misinformation that can create public health risks (Cuan-Baltazar et al., 2020). It is recommended that veterinarians take advantage of this medium to enhance client education and provide quality information, which can enhance relationships between tutors and veterinarians (Kogan et al., 2012). Although it is impossible to determine whether the information obtained by the tutors was from reliable

sources, it was noted that almost half of them had access to scientific articles, also provided by access to information in digital media.

The fact that the cat can become infected with SARS-CoV-2 was reported by 42.7% of respondents. The species is known to be susceptible to SARS-CoV-2 infection (Gaudreault et al., 2020, Shi et al., 2020), developing clinical signs, but without apparent ability to transmit the infection to humans (Csiszar et al., 2020, Gaudreault et al., 2020). This type of information, if conveyed inappropriately (O'Sullivan, 2020), can cause alarm in the population and increase the number of cat abandonments around the world, as already reported in some localities (Huang et al., 2020b, Kim, 2020), including in Brazil (Peduzzi, 2020). Surveillance of this species can be considered as a complement in the control of disease in humans (Shi et al., 2020), but not a reason for abandonment.

A few tutors have sought out coronavirus vaccines for their cats, even though SARS-CoV-2 has only recently been identified and efforts to develop vaccines against this virus have been focused on human immunizers. A vaccine to confer protection against Feline Coronavirus (CoVF) and thereby prevent the development of Feline Infectious Peritonitis (FIP) in cats was developed some years ago. However, there is no scientific evidence that this vaccine can confer any protection against SARS-CoV-2 and its use for this purpose is not recommended (WSAVA, 2020).

Although cat access to the street was reported by a minority of tutors (5.7%), even before quarantine, five tutors restricted street access after quarantine was initiated. Even though the zoonotic potential of this disease has not been established, the possible risk of the cat acquiring diseases in the outdoor environment, including COVID-19, and bringing them into homes, is low (Csiszar et al., 2020). Perhaps if more cats in this study had access to the street prior to quarantine, the number of restrictions would have been higher. No tutor restricted access to rooms because they thought their cat might become infected with SARS-CoV-2. Still, restricting cats to rooms in the home where there are people infected with SARS-CoV-2 is recommended (Csiszar et al., 2020), but perhaps due to tutors' lack of knowledge about the possibility of cat infection, only a very small portion of tutors reported performing restrictions.

Regardless of whether the tutor thought the cat might become infected with SARS-CoV-2, household cleaning habits, in terms of cleaning frequency and type of products, were modified during quarantine, which was also noted by Dillon et al. (2020). These habits have been considered important in the face of the COVID-19 pandemic, including for residential settings (Shin and Kang, 2020). An increase in the exchange of cleaning products has also been reported, underscoring this concern for SARS-CoV-2 infection. Most tutors reported that they had not changed their cats' hygiene routines. This result may demonstrate either ignorance on the part of the tutors of the possibility of cats becoming infected with SARS-CoV-2, or that they do not consider the cat to be a source of infection for humans.

Most tutors in this study reported playing with or giving attention to their cat for more than 30 minutes before (61.6%) and during (76.4%) quarantine. Cats that play with tutors have fewer behavioral problems (Strickler and Shull, 2014). Also, it was reported that gentling exercises and human interaction can help reduce stress and improve cat welfare (Houser and Vitale, 2022). In this way, the quarantine may have improved the well-being of the cats.

Although many tutors already spent considerable time on such activities with their cats, even before the quarantine, 42.5% of tutors increased this time after the pandemic began. This quarantine period led many people to stay longer in their homes, creating a sense of isolation, and cats were seen as companionship and friendship for their tutors, which was also suggested by a similar study conducted by Bussolari et al. (2021) with dog tutors. Thus, the increased time spent with cats likely enabled the strengthening of animal-tutor bonds, as observed with dogs during the pandemic period (Bussolari et al., 2021).

According to the responses obtained in this study, it was observed that cats spent less time alone in the home after the pandemic began. It is possible that cats miss their tutors when alone, but the length of time it takes to generate this feeling is not yet known (Eriksson et al., 2017). Apparently, in this study, the perceived happiness of tutors of their cats were influenced by being left alone for less time and with more access to toys. The purchase of toys for their cats during quarantine may reflect the tutors' concern for the welfare of their animals. Environmental enrichment is considered a necessity for cat welfare, which can be achieved through toys, which can stimulate natural cat behaviors (Ellis et al., 2013).

Positive behavioral changes, considered good, were reported by most tutors, and may be a consequence of the tutors' increased time in the homes during the quarantine period. Undesirable behaviors, or negative behavioral changes, were reported before and during quarantine, and overall, most negative behaviors decreased after the onset of the pandemic. In a similar study, improvement in cat behavior during the pandemic was also reported by tutors, with a greater expression of positive behaviors occurring compared to negative behaviors (Bowen et al., 2020). We suggest that the species has coped well with the social isolation situation and the longer length of time people stay in residences.

The occurrence of coughing or sneezing in the cats in this study increased in quarantine, and its occurrence did not correlate with the modification of household hygiene. Respiratory signs may occur secondary to infections and may develop more easily in stressful situations (Tanaka et al., 2012), and no correlation was found with this factor. However, the fact that the tutor remains longer in the residence may have led to greater observation of these behaviors.

Another behavior that also increased during quarantine was excessive vocalization. Cats may vocalize to get something, such as human attention or to request food (Pongrácz and Szapu, 2018), or this may be an indicator of stress and separation-related problems (Eriksson et al., 2017, Machado et al., 2020). Since tutors have been staying longer in their

homes, cats may have increased vocalization to strengthen bonds with their tutors (Quaranta et al., 2020), since only 12.41% of tutors reported that their cat was more stressed during quarantine.

Although negative behavioral changes in cats have been pointed out by most of their tutors, only a small portion have sought veterinary help, perhaps because some changes may not have been identified. Considering that 114 tutors reported at least one negative alteration, less than half of these tutors sought veterinary assistance. Studies have shown that cat tutors take their cats less frequently to veterinary care (Lue et al., 2008, Silva et al., 2010). The reasons for this could be that this species is still underserved with regard to health, possibly due to the tutor's difficulty in taking their cat to the clinic or due to unpleasant experiences in previous visits to the veterinary doctor (Baralon et al., 2017). However, 39.6% of cat tutors in one study reported concern about access to medicines and veterinary care during the pandemic (Bowen et al., 2020).

Still, no tutor in this study thought of getting rid of his or her cat, even in the face of unwanted behavior or the possibility of infection of their cats with SARS-CoV-2. Possibly this is because the presence of cats is associated mainly with joy, companionship, and tranquility. A similar study conducted with dog tutors during the first months of the COVID-19 pandemic pointed out that these animals assisted in reducing the distress and stress generated, serving as a distraction, decreasing feelings of loneliness and isolation, as well as improving the mental health of the tutors (Bussolari et al., 2021).

Thus, it can be stated that human interaction with animals is important, and studies have already recognized how cats play the role of companions in their tutors' lives (Pongrácz and Szapu, 2018). Considering all the above, a concern that arises related to social isolation is the return to normal activities after the pandemic, since cats have become accustomed to the prolonged presence of humans in the household, which may cause future problems related to separation (Shoesmith et al., 2021), being a suggestion for future studies.

Despite the facility, speed and low cost of using the Internet, research with techniques only online may generate results that are not representative of the population. The electronic questionnaire is only applicable when the population has computers with Internet access; the response rate depends to an important extent on the strategy for approaching the respondents; there is the limitation imposed by the knowledge necessary to use the computer, which does not qualify anyone as a respondent; younger participants were more likely to use the Internet to obtain pet health information. Also, online surveys have low data reliability, since many respondents can falsify information, which is not verifiable.

5. Conclusion

It was concluded that the quarantine period generated minimal undesirable behavioral changes in the cats. On the contrary, the fact that the tutors stayed longer at home, interacting with the cat, contributed to reduce these changes. This fact may also improved their perception of the cats' needs and behaviors, reflecting on a greater perception of happiness in their cats.

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