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## Kinds of pet chosen and manner of pet acquisition during COVID 19 in Serbia



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### ABSTRACT

In mid-March 2020, a state of emergency was declared in Serbia in order to prevent the spread of COVID 19. Many activities of Serbian citizens were limited or completely stopped. Citizens had to spend most of their time confined in their homes. However, some still wanted and managed to acquire pets. Therefore, the aim of this study was to examine which kinds of pets (dogs, cats and non-traditional animals) the residents of Serbia acquired during the first year of the COVID 19 pandemic and in which manner (purchase, adoption or gift). If the pets were acquired by adoption, the participants were asked from what sources they adopted them. Finally, how the characteristics of the owner and their household influenced the adoption of pets was examined. A total of 566 pet owners who acquired pets in the pre-COVID 19 and COVID 19 periods participated in the research. The COVID pandemic reduced the number of pet owners 2.7-fold in 2020 compared to 2019. Dogs were the most favourite pets acquired before (43%) and during (43%) the pandemic. During the pandemic, 61% of pets were acquired by adoption and the percentage of dogs, cats and non-traditional pets adopted directly from previous owners increased by 32%, 13% and 12%, respectively. The probability of acquiring pets by adoption was significantly increased by the presence of people older than 65 in the household (OR=2.56;  $P=0.02$ ), the absence of children up to 5 years of age (OR=0.17;  $P<0.001$ ) in the household, lower monthly incomes (OR=0.47;  $P<0.001$ ), the greater available free time of the owner (OR=2.09;  $P<0.001$ ), and the period of adoption (OR=2.42;  $P<0.001$ ).

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### Introduction

The outbreak of the COVID 19 pandemic caused by the SARS-CoV-2 virus with zoonotic potential has motivated many scientists to publish papers on the relationship between humans and animals. These works refer to the role of animals, mainly pets, in the quality of life and wellbeing of people during the first year of the pandemic (Fine, 2021; Hunjan & Reddy, 2020; Oliva & Johnston, 2020; Ratschen et al., 2020). These and similar works explain the benefits of pets in reducing experiences of stress, depression, boredom and loneliness and other negative experiences during the COVID 19 lockdown. For many people, companion animals

are social support and provide motivation for physical activity, responsibility and mindfulness during COVID 19. Therefore, scientists from various branches of biomedical and social sciences believe that pets improve the mental and physical health of their owners during the pandemic.

Also, there are a large number of published papers that looked at the role of pets and other animals in human society during the COVID 19 pandemic from the One Health perspective, the ability of pets to transmit SARS-CoV-2 to humans and vice versa (Applebaum, Adams, Eliasson, Zsembik, & McDonald, 2020a; Gautam, Kaphle, Shrestha, & Phuyal, 2020; Kiros et al., 2020; Leroy, Gouilh, & Brugère-Picoux, 2020; McNamara, Richt, & Glickman, 2020; Parry, 2020; Singla et al., 2020; Tarazona, Ceballos, & Broom, 2020).

Finally, there are also published papers related to pet welfare during the COVID 19 pandemic. In general, the authors of those papers concluded that in the first year of the outbreak, the COVID 19 pandemic changed people's lives, their daily activ-

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ities, obligations and habits, including the interaction of owners with their pets (Applebaum, Tomlinson, Matijczak, McDonald, & Zsembik, 2020b; Bowen, García, Darder, Argüelles, & Fatjó, 2020b; Christley et al., 2021; García Pinillos, 2021; Morgan et al., 2020; Parry, 2020; Ratschen et al., 2020; van Dobbenburgh & de Briyne, 2020; Vincent, Mamzer, Ng, & Farkas, 2020). The COVID 19 pandemic frightened people, made them feel insecure and unsafe, damaged their wellbeing and endangered their lives. At the same time, it is well known that the quality of life of pets is inextricably linked with the quality of life of their owners (Doane & Sarenbo, 2019). Many people lost their jobs and monthly income, which worsened the financial situation in their households. Therefore, some of them could no longer take care of their pets and had to abandon them. Some had to do this due to their deteriorating health or the health of other householders or changes in the social structure of the household (Applebaum et al., 2020b; Morgan et al., 2020). It is normal for new and unknown situations, including diseases, to scare people. It was precisely this fear that could be the reason for a number of owners abandoning their pets. This is especially dangerous when fear turns into panic, because pet abandonment can also be a public health problem (Parry, 2020). On the other hand, this pandemic has forced many pet owners, other householders and the pets to spend long times together indoors during the lockdown. If this situation did not last long, this extended stay of owners in their homes with pets would suit the animals. However, the question still arises as to what the consequences will be for them when life returns to normal. Therefore, many scientists were interested in the short-term and long-term impacts of the pandemic on the welfare of pets and the interaction of owners with their pets during this pandemic (Applebaum et al., 2020b; Bowen et al., 2020b; Christley et al., 2021; García Pinillos, 2021; Morgan et al., 2020; Parry, 2020; Ratschen et al., 2020; van Dobbenburgh & de Briyne, 2020; Vincent et al., 2020). Although abandonment was expected to be one of the worst consequences of COVID 19 for the welfare of pets, in some societies an increase in pet adoption has been found (García Pinillos, 2021; Morgan et al., 2020).

Taking into account all the above, the goal of our study was to examine whether the citizens of Serbia acquired pets in the first year of the pandemic, to what extent, in which manner and from which sources compared to the pre-pandemic situation in 2019. In other words, the aim was to examine whether the COVID 19 pandemic affected the acquisition of pets, considering kinds of pets and manners of acquisition.

## Materials and methods

The data for the study was collected using an online questionnaire in Serbian language in the period from 21 to 31 December 2020. The questionnaire was disseminated via social networks. Participants in these studies were owners who acquired pets in a pre-COVID 19 period (March 15 to December 15 2019) and during a COVID 19 period (March 15 to December 15 2020). Participants were asked to voluntarily complete the questionnaire and were informed that participation was completely anonymous and that the data would be used for scientific purposes. They were also informed that only adults aged 18 and over could complete the questionnaire.

The questionnaire consisted of several groups of questions. The first group referred to the demographic data of the owners: sex (male, female), age (18 to 30, 31 to 50, over 50), education (primary, secondary or university levels) and income (low, medium or high). Participants were also asked how much available free time during the day they can dedicate to a pet (no free time, little free time, enough free time).

The second group of questions referred to the type and social structure of the owner household: type of residential unit (apartment, house), residential area (urban, suburban, rural), number of members in the household (1 member, 2 members, 3 members and more than 3), presence of children up to 5 years of age (no children up to 5 years, presence of children up to 5 years of age), presence of persons aged 65 and older (no persons of this age in the household, there are elderly persons).

The third group of questions referred to the pets: what year did you get a pet (2019, 2020), what kind is your newly acquired pet (dog, cat, non-traditional pet - small mammal, bird, reptile, aquarium fish), possession of previously acquired pets (no, yes), manner of acquiring a new pet (purchase, adoption, gift) and if adopted, from which source it was adopted - through an agency (shelter, rescue/NGO), previous owner, found in a public place and adopted directly into the owner home, found in a public place and adopted by a finder via a social network. Under the term "purchase" we considered acquisition of pet by paying a breeder, pet store or previous owner. Under "adoption" we assumed the acquisition of pet by taking it from the previous owner, shelter, rescue organisation, NGO or directly taking of stray animals from public places into the owner home without payment. As a "gift" we considered a pet given willingly to the new owner without payment.

Multivariable logistic regression was used to examine which characteristics of owners, households and the year predicted the kind of pets acquired and the manner of acquisition (outcomes). For this purpose the following 12 characteristics were used as potential predictor variables: owner sex, age, education level, household size, presence of children up to 5 years of age, presence of householders over 65 years of age, pets already in the household, income, type of residential unit, residential area, the owner's available free time and the year of pet acquisition. These variables were coded as shown in Table 1 and used to predict the following dichotomous outcomes: acquisition of dogs (dog - code 1; acquisition of other pet kinds - code 0), acquisition of cats (cat - code 1; acquisition of other pet kinds - code 0), acquisition of non-traditional pets (non-traditional - code 1; acquisition of other pet kinds - code 0) and adoption as a manner of acquisition (code 1) compared to other manners of acquisition (code 0). The odds ratio (OR) was considered statistically significant if  $P < 0.05$ . For each OR value, a P-value and a 95% confidence interval (95% CI) are shown in corresponding tables.

All statistical computations were performed in the statistical software package Stats.Blue (<https://stats.blue/>).

## Results

A total number of 566 pet owners voluntarily participated in the study. Of that number, 412 participants (73%) acquired pets during the pre-COVID 19 period (March 15 to December 15 2019), while 154 participants (27%) became pet owners during the COVID 19 period (March 15 to December 15 2020). At the time of acquiring a new pet, 45% of participating households already had a pet. 52% of the participants answered that they had enough free time per day. During the COVID 19 pandemic, the percentage of participants who had enough free time per day (59%) increased by 10% compared to pet owners who had enough free time per day before the pandemic (49%). More detailed demographic data of participants are presented in Table 1.

The frequency of pet owners regarding the kind of pets and the time and manner of their acquisition are shown in Table 2. The overall sample (N=566) was dominated by owners of traditional pets (65%) - dogs (42%) and cats (23%). The total sample also included 35% of non-traditional pet owners (small mammals, birds, reptiles and fish). Among them, the most common were bird

**Table 1**  
Demographic data of participants in the study

Code	Characteristics	pre-COVID 19 period – Code 1		COVID 19 period – Code 2		Grand total	
		N	%	N	%	N	%
	Total	412	100	154	100	566	100
	Sex						
1	Male	106	26	61	40	167	30
2	Female	306	74	93	60	399	70
	Age						
1	18 – 30	244	59	73	47	317	56
2	31 – 50	120	29	54	35	174	31
3	51 – 65	48	12	27	18	75	13
	Education level						
1	Primary	0	0	0	0	0	0
2	Secondary	157	38	61	40	218	39
3	University	255	62	93	60	348	61
	Members in household						
1	1	80	19	17	11	97	17
2	2	92	22	34	22	126	22
3	3	180	44	72	47	252	45
4	≥3	60	15	31	20	91	16
	Children ≤ 5 years						
0	No	336	82	102	66	438	77
1	Yes	76	18	52	34	128	23
	Members ≥ 65 years						
0	No	362	88	135	88	497	88
1	Yes	50	12	19	12	69	12
	Pets already in household						
0	No	242	59	71	46	313	55
1	Yes	170	41	83	54	253	45
	Income						
1	Low	76	18	18	12	94	17
2	Medium	196	48	81	52	277	49
3	High	140	40	55	36	195	34
	Residential unit						
1	Apartment	268	65	101	66	369	65
2	House	144	35	53	34	197	35
	Residential area						
1	Urban	274	67	97	63	371	66
1	Suburban	91	22	42	27	133	23
2	Rural	47	11	15	10	62	11
	Free time						
0	No free time	50	12	28	18	78	13
1	Little free time	161	39	35	23	196	35
2	Enough free time	201	49	91	59	292	52
	Grand total	412	73	154	27	566	100

owners (12%). The outbreak of the COVID 19 pandemic reduced pet acquisition from 73% in 2019 to 27% in 2020. This means that in 2020, the number of all newly acquired pets, dogs, cats and non-traditional pets dropped by 2.7, 2.8, 3.2 and 2.3 times respectively. The outbreak of the COVID 19 pandemic did not affect the manners in which pets were acquired. However, the outbreak of the COVID 19 pandemic changed the percentages of animals acquired through purchase, adoption or as a gift. Comparing the pre-pandemic (2019) with the pandemic (2020) periods, it can be noticed that the percentage of new pets acquired by adoption in the total sample increased by 12% during the pandemic period (to 61% of pets being adopted). During the pandemic period, the percentage of pets acquired as a gift (8%) also increased by 2% compared to the pre-pandemic period (6%).

Different kinds of pets were adopted from different sources (adopted from previous owners, NGOs/rescue organisations, shelters, found in public places) before the COVID 19 pandemic (Figure 1). Shelters and NGOs (rescue organisations) were the main sources for dog adoption before the pandemic (49%). 23% of the total number of adopted dogs was found and directly taken from public places into an owner home. Compared to other animals in 2019, adopted cats were mostly found in public places and directly adopted by the owner (69%) without the mediation of a

shelter, rescue organization or a previous owner. Non-traditional pets were mostly adopted from previous owners before the pandemic. During the pandemic, most of the pets were acquired by adoption from the previous owner except cats. This was true for both dogs (44%) and non-traditional pets (90%). Cats continued to be adopted directly from public places by owners who found them (48%). Thus, during the pandemic in 2020, the percentage of dogs, cats and non-traditional pets adopted directly from previous owners increased by 32%, 13% and 12%, respectively.

Multivariable logistic regressions revealed that significant predictors for acquiring dogs (Table 3) by any manner were education level (OR=0.61;  $P=0.02$ ), presence of children up to 5 years of age (OR=3.29;  $P<0.001$ ), household members older than 65 years (OR=12.02;  $P<0.001$ ) and pets already in the household (OR=2.15;  $P<0.001$ ). Increasing the level of education reduced the chances of someone becoming a dog owner by 0.61 times compared to other kinds of pets (OR=0.61;  $P=0.02$ ). The presence of children up to 5 years of age, householders older than 65 years and other pets already in the household significantly ( $P<0.001$ ) increased the chances of someone acquiring dogs rather than other kinds of pets by 3.29, 12.2 and 2.15 times, respectively. Significant predictors for acquiring cats were the age (OR=0.60;  $P=0.02$ ) and education level (OR=2.49;  $P<0.01$ ) of the owner, the presence of children

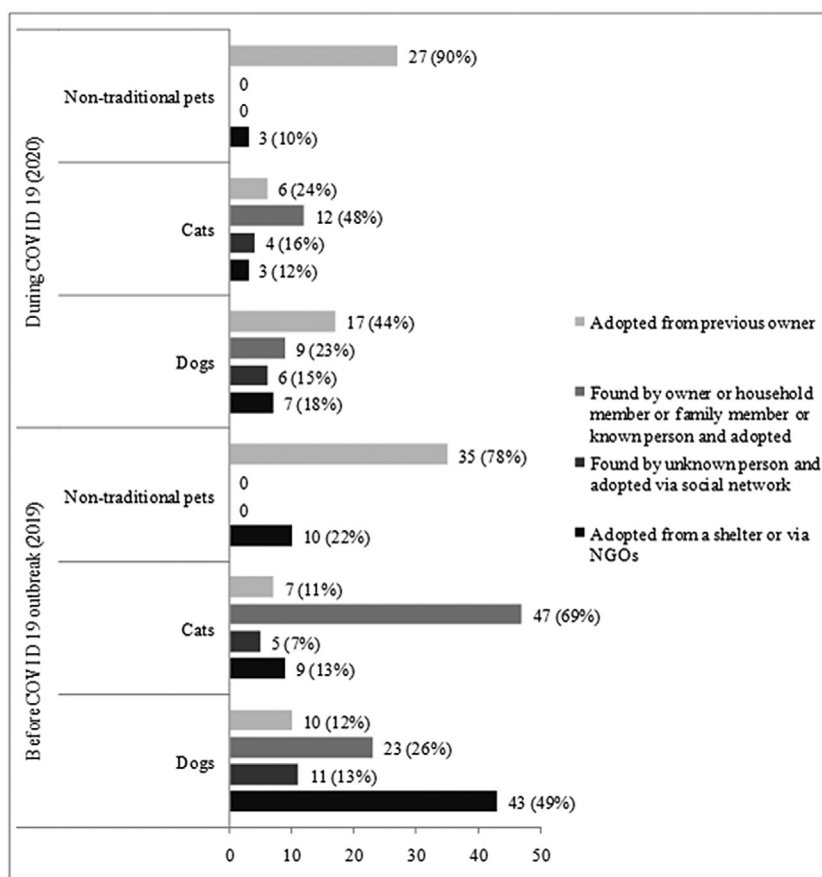


Figure 1. Sources of pet adoption before and during a pandemic.

up to 5 years of age ( $OR=0.28$ ;  $P<0.001$ ), the presence of people over the age of 65 ( $OR=5.28$ ;  $P<0.001$ ) and the presence of other pets in the household ( $OR=4.99$ ;  $P<0.001$ ). Older people were 0.60 times less likely to acquire a cat compared with other kinds of pets ( $OR=0.60$ ;  $P=0.02$ ). More educated people were 2.49 times more likely to acquire a cat than other kinds of pets ( $OR=2.49$ ;  $P<0.01$ ). The presence of children under the age of 5 in households reduced the chances of someone becoming a cat owner compared to other kinds of pets by 0.28 times ( $OR=0.28$ ;  $P<0.001$ ). However, the presence of household members over 65 years of age and the presence of pets already in the household separately increased the chances of someone owning a cat compared to other kinds of pets by 5.28 ( $OR=5.28$ ;  $P<0.001$ ) and 4.99 ( $OR=4.99$ ;  $P<0.001$ ) times, respectively. Significant predictors for acquiring non-traditional pets were the age ( $OR=1.60$ ;  $P<0.01$ ) and education level ( $OR=0.30$ ;  $P<0.001$ ) of the owner, the presence of children up to 5 years of age ( $OR=6.15$ ;  $P<0.001$ ), the presence of people over the age of 65 ( $OR=2.80$ ;  $P<0.02$ ) and income ( $OR=0.69$ ;  $P=0.02$ ). Contrary to cats, older owners were more likely to choose a non-traditional pet ( $OR=1.60$ ;  $P<0.01$ ) as were owners in households with children up to 5 years of age ( $OR=6.15$ ;  $P<0.001$ ) and with people aged over 65 years ( $OR=2.80$ ;  $P<0.01$ ). It is noticeable that the higher level of education ( $OR=0.30$ ;  $P<0.001$ ) and higher monthly income ( $OR=0.69$ ;  $P=0.02$ ) were related to the acquisition of traditional rather than non-traditional pets.

Significant predictors for acquiring pets by adoption (Table 4) were the presence of children up to 5 years of age ( $OR=0.17$ ;  $P<0.001$ ), the presence of people older than 65 ( $OR=2.56$ ;  $P=0.02$ ), monthly income ( $OR=0.47$ ;  $P<0.001$ ), the available free time of the owner ( $OR=2.09$ ;  $P<0.001$ ) and the year of adoption ( $OR=2.42$ ;

$P<0.001$ ). The COVID 19 period (2020) significantly increased ( $P<0.001$ ) the chances for the adoption of all pet kinds by 2.42 times compared to the pre-COVID 19 period (2019). It is noticeable that lower monthly income and the period of the acquisition were related to the higher probability that pets were acquired by adoption compared to other manners of acquisition ( $P<0.001$ ).

## Discussion

Our results show that the COVID 19 pandemic reduced the acquisition of pets by 2.7 times in the COVID 19 period compared to the pre-COVID 19 period. In addition to the difficulties in pet acquisition due to closed pet shops, breeder facilities, shelters and prohibited direct visitation to pet breeders, it is possible that the reduction in the number of new pet owners during the COVID 19 period was influenced by the fear of infection, i.e. the belief that pets can transmit the infection to humans. It is true that information about the potential of pets to transmit COVID 19 to humans was inaccessible to ordinary citizens. Clearer explanations emerged in the later months of the first year of the pandemic, and they were available to people using scientific literature in English (Costagliola et al., 2021). On the other hand, those people who use the Internet had access to a large amount of inaccurate information about the transmission of the SARS-CoV-2 virus from animals to humans. False information about pets as carriers of the virus to humans was also spread on social networks. O'Sullivan (2020) paid special attention to this false information.

A number of citizens probably could not acquire pets by purchase due to their poor financial situations, because many lost their jobs in the first year of the pandemic. Many explanations

**Table 2**  
Kind of pet and manner and time of pet acquisition

Manner of acquisition Pet kind	Total sample			
	Purchased N (%)	Adopted N (%)	Gift N (%)	Total N (%)
Dog	105(44)	126 (52)	10 (4)	241 (42)
Cat	29 (22)	93 (72)	8 (6)	130 (23)
Small mammals	23 (51)	19 (42)	3 (7)	45(8)
Birds	38 (58)	25 (38)	3 (4)	66 (12)
Reptiles	16 (33)	23 (47)	10 (20)	49 (9)
Fish	21 (60)	8 (23)	6 (17)	35 (6)
Sum N (100%)	232 (41)	294 (52)	40 (7)	566 (100)
Before COVID 19 (2019)				
Dog	82 (46)	87 (49)	8 (5)	177 (43)
Cat	25 (25)	68 (69)	6 (6)	99 (24)
Small mammals	19 (83)	4 (17)	0 (0)	23 (6)
Birds	32 (64)	17 (34)	1 (2)	50 (12)
Reptiles	12 (33)	18 (50)	6 (17)	36 (9)
Fish	15 (56)	6 (22)	6 (22)	27 (6)
Sum N (100%)	185 (45)	200 (49)	27 (6)	412 (73)
COVID 19 (2020)				
Dog	23 (36)	39 (61)	2 (3)	64 (43)
Cat	4 (13)	25 (81)	2 (6)	31 (20)
Small mammals	4 (18)	15 (68)	3 (14)	22 (14)
Birds	6 (38)	8 (50)	2 (12)	16 (10)
Reptiles	4 (31)	5 (38)	4 (31)	13 (8)
Fish	6 (75)	2 (25)	0 (0)	8 (5)
Sum N (100%)	47 (31)	94 (61)	13 (8)	154 (27)

deal with other consequences of the COVID 19 pandemic on people's quality of life (El Keshky, S., Basyouni, Sabban, & A., 2020) and the impact of job loss, income loss and their consequential impact on mental health, including feelings of depression and anxiety (Witteveen & Velthorst, 2020). The acquisition of pets by purchases dropped by approximately 1.5 times during the COVID 19 period compared to the pre-COVID 19 period. At the same time, the acquisition of pets by adoption increased by 1.2 times. During the pandemic period, however, adopted pets were mostly taken over from previous owners (dogs and non-traditional animals) or directly adopted from public places where they were found (dogs and cats) compared to the pre-COVID 19 period.

We should not be surprised that the adoption of pets increased during the first year of the pandemic. In other parts of the world, too, dog adoption has been found to be surprisingly large (Morgan et al., 2020). Our research determined that a significant proportion of cats and dogs were adopted directly from public places before and during the COVID 19 pandemic outbreak. This finding undoubtedly indicates that the problem of pet animals without

**Table 4**  
Multivariable logistic regression for manner of pet acquisition adjusted for all characteristics (Null model)

Predictors	Adoption (Code 1) N=294 Purchase or gift (Code 0) N=272		
	P	OR	95% CI
Sex (ref: Male)	0.27	0.77	0.48-1.23
Age (ref: 18-30)	0.12	0.77	0.55-1.07
Education (ref: Secondary)	0.06	0.65	0.42-1.02
Members in a household (ref: 1)	0.21	1.16	0.92-1.47
Children up to 5 (ref: No)	< <b>0.001</b>	0.17	0.10-0.31
Members 65+ (ref: No)	<b>0.02</b>	2.56	1.16-5.63
Pets already in a household (ref: No)	0.28	1.28	0.81-1.99
Residential unit (ref: Apartment)	0.39	1.27	0.74-2.17
Residential area (ref: Urban and Suburban)	0.71	0.87	0.41-1.83
Income (ref: Low)	< <b>0.001</b>	0.47	0.34-0.64
Free time (ref: No free time)	< <b>0.001</b>	2.09	1.58-2.76
Year of pet acquisition (ref: 2019)	< <b>0.001</b>	2.42	1.53-3.85

owners roaming freely in public places in Serbia is continuously present.

Our survey determined that a large number of pets were adopted directly from previous owners in the first year of the pandemic. The many reasons why previous owners had to leave or give their pets to other people during a pandemic have already been discovered and well defined (Applebaum et al., 2020b; Morgan et al., 2020). They could be related to the health, economic and social problems of owners and other household members, or problems related to the health and behaviour of pets.

In our study, some owners acquired pets as a gift. The acquisition of pets as gifts could have an accompanying danger of owner dissatisfaction and the possibility the animals will be abandoned. However, Weiss, Dolan, Garrison, Hong, and Slater (2013) expressed the opinion that pets can still be acquired as a gift because this is also a type of adoption. In our study, non-traditional pets were more often acquired as gifts than were traditional pets.

Our research showed that non-traditional pets were adopted both before and during the COVID 19 pandemic. Schuppli, Fraser, and Bacon (2014) and Grant, Montrose, and Wills (2017) noticed a trend towards keeping non-traditional pets including parrots, reptiles, amphibians, rabbits and small species of rodents. These authors considered that many owners of non-traditional animals have neither the facilities nor knowledge to provide these kinds of animals with their special requirements in captivity. Poor conditions for keeping non-traditional pets in captivity can impair their welfare. This can result in owner dissatisfaction with non-traditional pets, because they do not meet the owner's expectations. There-

**Table 3**  
Multivariable logistic regression for kinds of acquired pets in both years adjusted for all characteristics (Null model)

Predictors	Dogs (Code 1) N=241 Other pets (Code 0) N=325			Cats (Code 1) N=130 Other pets (Code 0) N=436			Non-traditional pets (Code 1) N=195 Traditional pets (Code 0) N=371		
	P	OR	95% CI	P	OR	95% CI	P		
Sex (ref: Male)	0.44	0.84	0.55-1.30	0.79	0.93	0.55-1.56	0.19	0.74	0.46-1.17
Age (ref: 18-30)	0.96	1.01	0.73-1.40	<b>0.02</b>	0.60	0.39-0.91	< <b>0.01</b>	1.60	1.13-2.26
Education (ref: Secondary)	<b>0.02</b>	0.61	0.40-0.93	< <b>0.01</b>	2.49	1.43-4.33	< <b>0.001</b>	0.30	0.18-0.47
Members in a household (ref: 1)	0.74	0.96	0.78-1.21	0.64	1.07	0.81-1.41	0.98	1.00	0.78-1.29
Children up to 5 (ref: No)	< <b>0.001</b>	3.29	1.90-5.69	< <b>0.001</b>	0.28	0.13-0.59	< <b>0.001</b>	6.15	3.50-10.82
Members 65+ (ref: No)	< <b>0.001</b>	12.02	4.73- 30.52	< <b>0.001</b>	5.28	2.24-12.45	< <b>0.01</b>	2.80	1.33-5.92
Pets already in a household (ref: No)	< <b>0.001</b>	2.15	1.41-3.28	< <b>0.001</b>	4.99	2.83-8.80	0.31	0.78	0.49-1.26
Residential unit (ref: Apartment)	0.81	0.94	0.55-1.59	0.67	0.87	0.45-1.67	0.44	1.25	0.71-2.20
Residential area (ref: Urban and Suburban)	0.65	0.84	0.40-1.77	0.54	0.74	0.29-1.93	0.86	0.93	0.41-2.11
Income (ref: Low)	0.17	0.82	0.61-1.09	0.05	1.43	0.99-2.07	<b>0.02</b>	0.69	0.50-0.94
Free time (ref: No free time)	0.06	1.29	0.98-1.68	0.08	1.33	0.96-1.83	0.50	1.11	0.83-1.48
Year of pet acquisition (ref: 2019)	0.30	1.26	0.82-1.93	0.47	0.83	0.49-1.39	0.82	0.95	0.60-1.49

fore, owners can abandon their non-traditional pets, giving them to other people. However, abandoning non-traditional pets during a pandemic can also be linked to the health, economic and social problems of owners and other household members or problems related to the health and behaviour of pets.

Our research revealed that the probability is significantly higher that owners of non-traditional pets would live in households with children up to 5 years of age, persons over 65 years of age, in households with lower monthly income and with owners having lower education levels compared to dog or cat owners. A positive predictor for cat ownership but not for dog ownership was pets already in the household. A positive predictor for cat and non-traditional pet ownership but not for dog ownership was the presence of persons over 65 years. This is easy to understand because neither cats nor non-traditional pets need to be walked, and they can be fun for the elderly, especially in the time of full lockdown during the pandemic. In addition, there is evidence that homebound older adults who owned cats reported significantly lower levels of depression symptoms than dog owners (Branson, Boss, Cron, & Turner, 2017).

Different researchers have studied the impact of different socio-demographic characteristics on pet ownership (Fraser et al., 2020; Saunders, Parast, Babey, & Miles, 2017), but the exact association between owner demographic characteristics and pet ownership is not yet known (Saunders et al., 2017). However, our results clearly indicated that age, education level, the social structure of the household and income affected the kind of pet that was acquired. The presence of children up to 5 years of age, people older than 65, and other pets already in the owner's home positively or negatively predicted the kind of new pet acquired. The manner of pet acquisition was also affected by these characteristics, accompanied by the available free time that owners had for their pets and the period when they become pet owners with respect to the COVID 19 pandemic. Overall, the pandemic reduced but did not stop the acquisition of pets. We assume that acquiring pets during the pandemic supported many owners and their household members in overcoming their negative experiences during the COVID 19 lockdown. This was also observed in other parts of the world (Droit-Volet et al., 2020; Hunjan & Reddy, 2020; Ratschen et al., 2020). The large number of pets directly accepted from previous owners indicates that the new owners acted humanely and helped those who could no longer take care of their pets during the pandemic for health, economic or social reasons.

## Conclusion

The COVID-19 pandemic changed our lives, but in all societies, including Serbian society, a number of people still had an authentic human desire to own pets. In fact, this disease with zoonotic potential, in the first year of the pandemic, produced a decrease in the number of owners who acquired new pets compared to the number of new pet owners before the pandemic in Serbia. However, it failed to change people's affinity for the kind of pets they acquired. This pandemic affected the manners by which people acquired pets and favoured the adoption of pets in relation to other manners of acquiring them. The main source of adoption for dogs and non-traditional pets during the COVID 19 pandemic in Serbia was adoption from the previous owners. However, unowned stray cats found in public places were still directly adopted and taken into new owners' homes.

We believe the results obtained in our study can serve as a good demonstration model for pet acquisition during the COVID-19 pandemic. It is a realistic assumption that a smaller number of people acquired new pets during the COVID 19 pandemic than in pre-pandemic times, because all methods of acquiring pets were

difficult to implement due to reduced transportation, closed pet shops, shelters and rescue organizations, and avoidance of direct visits to kennels. Therefore, our and similar research could have national and regional significance in order to gain insight into the affinities and attitudes of people towards pets at a time when their habits and lifestyles have changed due to a pandemic disease with zoonotic potential.

However, the study has two main limitations. The first relates to the method of data collection for the study and the second relates to the time when we collected the data. It was not possible to directly contact owners of new acquired pets. The main limitation of the study was the manner in which we conducted the data collection. We collected data for this study in a short period of December, when the number of COVID patients in Serbia began to grow compared to the previous period since the beginning of the pandemic. Due to the tightening of preventive measures, we were not able to conduct face-to-face interviews. Also, we collected data for this study in the last week of December that includes the period of religious and state holidays, so we assume that most people were interested in their holiday organisation and not in responding to the survey.

## Authorship statement

All authors equally participated in the design of the study, conceived of the study, participated in its coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

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## Conflict of Interest

The authors declare they have no conflict of interest.

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