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Francisco Rafael Martins Soto , Fernando Ferreira , Sonia Regina Pinheiro ,  
Fernanda Nogari , Marcia Regina Risetto , Osana de Souza & Marcos Amaku

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# Adoption of Shelter Dogs in a Brazilian Community: Assessing the Caretaker Profile

Francisco Rafael Martins Soto

*Department of Sanitary Surveillance and Zoonosis  
Municipal Health Department  
Ibiúna, Brasil*

Fernando Ferreira and Sônia Regina Pinheiro

*School of Veterinary Medicine and Zootechnique  
University of São Paulo*

Fernanda Nogari, Marcia Regina Risseto, and Osana de Souza

*Department of Sanitary Surveillance and Zoonosis  
Municipal Health Department  
Ibiúna, Brasil*

Marcos Amaku

*School of Veterinary Medicine and Zootechnique  
University of São Paulo*

A survey in Ibiúna, Sao Paulo, Brazil, of caregivers (owners) who adopted shelter dogs assessed length of ownership, proportion of male and female dogs adopted, and owners' characteristics. It addressed breeding, neutering, vaccination, and veterinary care. It used no testing to provide a good "match" between dog and future owner. Of adopted dogs, 58% were male. Only 36% of owners were located. Mean ownership length was 14.8 months (95% confidence interval = 12.4 to 17.2 months), estimated through a survival analysis method. Of adopted dogs, 40.9% lived with their owners; 34.9% had died (some had lived on the streets); 15.0% were donated; 4.3% ran away;

3.2% were returned to the city shelter. Of interviewees, 57% reported no difficulties with the adoption; 23.1% cited the animal's illness and death as the main difficulty. For contraception, 87 owners (46.7%) chained dogs to prevent contact with other animals; 56.5% were against neutering. Reasons given were compassion (58.1%), unnecessary procedure (11.4%), cost (9.5%), and behavior change (4.8%). This research motivated a design for Ibiúna shelter dog adoption to improve the proportion of successful adoptions.

The surplus of dogs and cats has resulted in euthanasia of a great number of nonhuman animals in several countries. Euthanasia of healthy unadopted animals in shelters has become an issue of increasing concern to society and animal welfare associations (Patronek, Glickman, & Moyer, 1995).

Several studies were conducted to assess what factors are related to the relinquishment of companion animals (Kass, New, Scarlett, & Salman 2001; Miller, Staats, Partlo, & Rada, 1996; New et al., 1999; Patronek, Glickman, Beck, McCabe, & Ecker, 1996; Salman, New, Scarlett, & Kris, 1998). In a study developed in the United States, the 10 main reasons for relinquishing dogs were: moving, landlord issues, cost of pet maintenance, no time for pet, inadequate facilities, too many pets in home, pet illness, personal problems, biting, and no homes for littermates (National Council on Pet Population Study and Policy [NCPSP], 2004; Salman et al., 1998).

To avoid euthanasia of healthy animals, many dogs are offered for adoption. Aiming at helping shelter workers to reduce the number of adopted pets abandoned and euthanized, Kidd, Kidd, and George (1992) studied factors related to successful pet adoptions to determine if there were significant differences between men and women, parents and nonparents, and retainers and rejecters. Posage, Bartlett and Thomas (1998), on the other hand, studied certain dog characteristics—coat color, size, and history of an indoor environment—to determine if they were associated with successful adoption.

Van der Borg, Netto, and Planta (1991) argued that a large proportion of adopted animals eventually are returned—partly because of a poor match between dog and new owner—and that testing may be a useful instrument to improve the matching between dog and potential future owner.

In some Brazilian cities the number of relinquished dogs increases every year. Few animals are adopted, and a considerable proportion of the unadopted ones are euthanized (Nova, 1998). Adoption campaigns have been carried out to reduce the number of shelter dogs who are euthanized. As far as we know, studies to assess effectiveness of such campaigns have not been conducted in Brazil.

This article describes a survey, carried out in Ibiúna, São Paulo, Brazil, in which owners who have adopted dogs were interviewed. The goal was to assess length of ownership, proportions of male and female dogs adopted, and owner profile.

In a previous study in Ibiúna (Soto et al., in press), we determined by census that the dog:human ratio in the period from 1998 to 2002 was 3.91:1 for the town as a whole, but with a mean ratio estimate of 7.67:1 and 3.91:1 for the rural and urban areas, respectively. Approximately 65% of the total human population and about 83% of the total dog population lived in the rural area. In the household dog population, males were more frequent (70.1%), and 81% of the dogs were mixed-breed.

## MATERIALS AND METHOD

This study was carried out in Ibiúna, a town of 68,000 inhabitants in 2002, 70 km from São Paulo city. In this town, relinquished dogs could be adopted either directly from the city public shelter or in dog adoption campaigns promoted by the municipal zoonosis department. Dogs had been relinquished to the shelter by their owners or had been captured in the streets. Before being offered for adoption, dogs were vaccinated against rabies and also were given vermifuges. Information about the health status of an animal before being sheltered was not available, but animals with clinical signs of disease or dogs who were malnourished were not offered for adoption.

In this work, we assess whether the adopted dogs were retained or rejected; length of ownership after adoption; and owner characteristics, considering that no postadoption actions or measures aimed at relinquishment reduction were taken. Neither behavioral testing of dogs nor other mechanisms aimed at providing a good match between dog and new owner were used. However, dogs selected for adoption were those who demonstrated less aggressive behavior in the shelter.

The analyses were based on the zoonosis department records for dogs adopted between January 1998 and December 2002. Owners from the rural and urban area of Ibiúna who adopted dogs at least 3 months before the beginning of this study ( $N=186$ ) were interviewed. Three interviewers, previously oriented on how to carry out the interviews, explained the purpose of this research to the interviewees; both open-ended and closed questions were used. The Boruchovitch and Schall (1999) work on advantages and disadvantages of open-ended questions helped in elaborating the questionnaire.

Based on interview results and also on the records, we analyzed the following topics: proportion of male and female dogs adopted; whether neutering is a method accepted by the population as a birth control method; length of ownership; owner's opinion about neutering; and which control methods are approved by the population. Based on the zoonosis department records, we analyzed the proportion of adopted dogs among those surrendered to the public shelter.

To estimate the length of ownership since adoption, we used survival analysis (Gross & Clark, 1975). Survival analysis enabled us to take into account that ani-

imals were adopted in different adoption campaigns and that some owners still were taking care of the animals when the questionnaire was applied. Using survival analysis jargon, if the owner is still with the animal at the moment of the interview, the length of ownership is considered a censored datum. Of the 186 owners who were interviewed, 163 provided information about the length of ownership. Based on these data, a mean length of ownership was estimated by the Kaplan–Meier method.

Owners were classified into two groups: Group 1 was composed of owners who did not keep their adopted animals, regardless of the length of animal ownership (such animals were released in the street, donated, or returned to the shelter); Group 2 was composed of owners who kept their adopted animals for at least 6 months and were still with the animal, or the animal died after being in the adopted home for at least 6 months. Our intention with this classification was to determine any association between each of the variables from the questionnaire and owner group. This classification was not used in the survival analysis, in which all owners who provided information about length of ownership were included.

Some owners were not classified into either group: owners whose animals died sooner than 6 months after adoption and also those who adopted the animal less than 6 months before and were still with the animal when the survey was carried out. These owners were not considered in the analysis. We followed this procedure to avoid misclassification.

We calculated 95% confidence intervals (CIs) for proportions using the exact binomial method, without corrections for finite population. The analyses were carried out using Minitab (Version 14.1, Minitab Inc.), SPSS (Version 9.0), and Epi Info 6 (Centers for Disease Control and Prevention).

## RESULTS

From 1998 through 2002, 741 dogs were adopted, a number equivalent to 9.48% of the total number of dogs (7,814) entering the shelter during this period. Figure 1 shows the number of dogs surrendered and adopted each year. It is worth mentioning that most of the surrendered dogs euthanized during this period were female (59%). Of these 741 adopted animals, 313 were female, which corresponds to 42.2% (95% CI = 38.6% to 45.8%). This proportion of females statistically is different from 50% ( $p < .001$ ), which means—despite efforts to have the same proportion of males and females adopted—less than 50% of the dogs adopted were female,

Despite the efforts of the interviewers to locate all owners, most owners (330 or 64%) who adopted dogs (462 animals) were not located. The results we obtained refer to 186 owners who were located and the respective adopted dogs (279 animals). The average number of adopted dogs per owner was 1.44 (equivalent to 741 dogs divided by 516 owners).

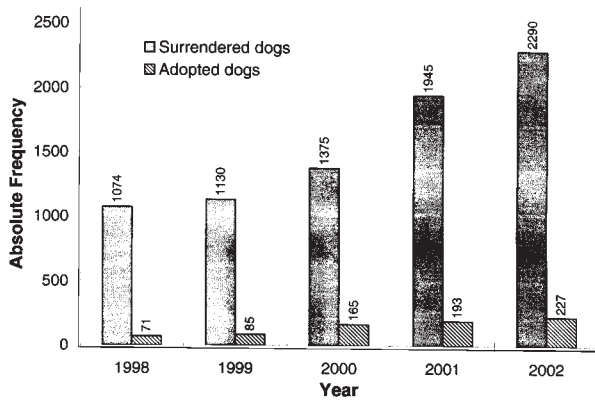


FIGURE 1 Number of dogs surrendered and adopted in Ibiúna, Brasil, from 1998 to 2002.

Using the Kaplan–Meier method, the mean estimated length of ownership since adoption was 14.8 months (95% CI = 12.4 to 17.2 months). The median time, on the other hand, was 9 months (95% CI = 6.8 to 11.2 months). Figure 2 shows the proportion of owners who remained with the adopted animal as a function of time since adoption date. We have to mention that to estimate these values all dogs were considered, even though some died soon after being adopted, probably due to poor health conditions associated with living on the streets. If we exclude from the sample 32 dogs who died less than 3 months after adoption, we estimate a mean length of ownership of 17.9 months (95% CI = 15.2 to 20.7 months) and a median time of 12.0 months (95% CI = 10.4 to 13.6 months). Regarding the adopted animals, 40.9% were with their owners at the time the survey was carried out; 34.9% had died; 15.0% had been donated by owners to someone else; 4.3% had run away; and 3.2% were returned to the city shelter (Table 1). The majority of interviewed owners (57.0%) argued no difficulties with the adopted dog; 23.1% said the main difficulty regarding the animal was illness followed by death (Table 1). Factors such as dog behavior and maintenance costs represented 4.8% and 4.3%, respectively, of the complaints.

Of the responses to a question about repeat adoption ( $N=186$ ), 115 (61.8%) stated they would adopt a dog again (Table 1). Those who would not adopt a dog again (71 respondents or 38.2%) gave a variety of reasons for not doing so. Some (45.1%), said they already had dogs; some (25.5%) said taking care of a pet is time consuming; others (12.6%) cited the cost of pet maintenance; a few (7.0%) said dogs adopted from the city shelter are sick; and a few (2.8%) said dogs are dangerous to children.

When asked about their dogs' reproduction, 68.9% of the interviewees said they intended to breed their dogs (Table 2). Those who wanted to their dogs to

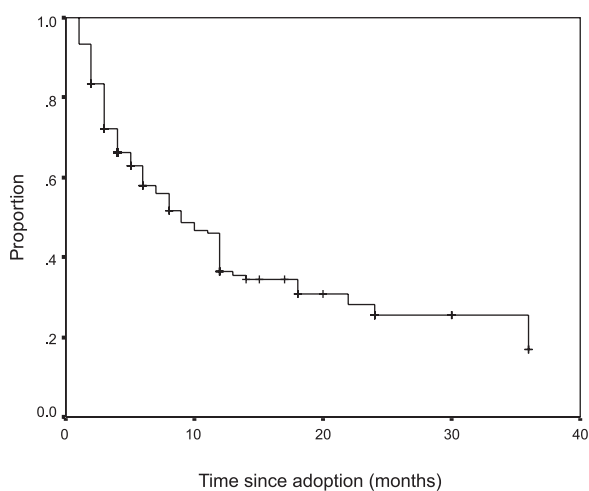


FIGURE 2 Proportion of owners who remained with the adopted dog as a function of time since adoption (length of ownership).

TABLE 1  
Information About Adopted Dogs in Ibiúna and Responses About Difficulties With the Animal and Repeat Adoption

Question/Answer	<i>n</i>	%	95% <i>CI</i>
Where is the adopted dog now?			
Is still with the owner	76	40.9	33.7 to 48.3
Died	65	34.9	28.1 to 42.3
Was donated to someone else	28	15.0	10.2 to 21.0
Ran away	8	4.3	1.9 to 8.3
Was returned to the city shelter	6	3.2	1.2 to 6.9
Other	3	1.6	0.3 to 4.6
Have you had any difficulties with the adopted dog?			
No difficulties	106	57.0	49.5 to 64.2
Illness followed by death	43	23.1	17.3 to 29.8
Dog behavior	9	4.8	2.2 to 9.0
Maintenance costs	8	4.3	1.9 to 8.3
Other	20	10.8	6.7 to 16.1
Would you adopt a dog again?			
Yes	115	61.8	54.4 to 68.8
No	71	38.2	31.2 to 45.6

Note. CI = confidence interval.

breed (31.1% of the total) gave the following reasons: 35.1% stated that they loved their dog; 28.1% said that the reason was related to the dog's beauty; 14.0% wanted to have puppies at home; 8.8% cited the animal breed; 7.0% wanted to sell or donate the puppies; and 3.5% cited safety reasons. Regarding dog contraception, 87 owners (46.7%) stated they would prefer to keep the animal on a chain, without contact with other animals (Table 2). The use of contraceptive drugs was the second most frequently mentioned method (64 respondents, 34.4%). Neutering was mentioned by 17 respondents (9.1%).

A different question referred specifically to neutering, and 43.5% of those who responded to this question were in favor of neutering their dogs. Most of the owners (56.5%) were against neutering their animals. The reasons for being against neutering were compassion for the animal (58.1%), unnecessary procedure (11.4%), surgery cost (9.5%), and change of behavior (4.8%).

Table 3 contains information about veterinary medical care. Most of the interviewees do not take their animals to a veterinarian (55.4%), although vaccines and vermifuges were administered once a year or according to a commonly prescribed schedule for 38.7% and 26.3% of the respondents, respectively. According to the owners, 72.6% of the dogs were reported to be indoor dogs, remaining most of the time at home; 14.5% were often kept on chains; 11.8% had sporadic access to the streets; and 81.2% of these were without owner supervision (Table 4). About 1.0% of the interviewees said their dogs always had free access to the streets. Residences with a backyard or a place to which the animal had access were very common (98.9%). We compared Groups 1 and 2 (described in the Materials and Method section) to assess whether these groups differed in their answers to the questionnaire. This comparison was carried out by means of a chi-square analysis (Table

TABLE 2  
Responses to Questions About Reproduction or Contraception

<i>Question/Answer</i>	<i>n</i>	<i>%</i>	<i>95% CI</i>
Do you want your animal to reproduce?			
Yes	126	68.9	61.6 to 75.5
No	57	31.1	24.5 to 38.4
About dog contraception, indicate which method you approve			
Keep the animal on a chain	87	46.7	39.4 to 54.2
Contraceptive drug	64	34.4	27.6 to 41.7
Sterilization	17	9.1	5.4 to 14.2
No opinion about this question	18	9.7	5.8 to 14.9
Would you neuter your dog?			
Yes	81	43.5	36.3 to 51.0
No	105	56.5	49.0 to 63.7

*Note.* CI = confidence interval.



TABLE 3  
Responses to Questions About Veterinary Medical Care

<i>Question/Answer</i>	<i>n</i>	<i>%</i>	<i>95% CI</i>
Have you already given any medicine to your dog?			
Yes	119	64.7	57.3 to 71.6
No	65	35.3	28.4 to 42.7
Vaccines and vermifuges are administered to your dog:			
Once a year	72	38.7	31.7 to 46.1
According to a prescribed schedule	49	26.3	20.2 to 33.3
Only if the animal is sick	37	19.9	14.4 to 26.4
No opinion about this question	28	15.1	10.2 to 21.0
How often do you take your dog to a veterinarian?			
Never	103	55.4	47.9 to 62.7
Sporadically	71	38.2	31.2 to 45.6
Always	8	4.3	1.9 to 8.3
No answer	4	2.1	0.6 to 5.4

*Note.* CI = confidence interval.

TABLE 4  
Questions About Places Where the Animals Live

<i>Question/Answer</i>	<i>n</i>	<i>%</i>	<i>95% CI</i>
Is the dog an indoor or outdoor dog?			
Indoor	135	72.6	65.6 to 78.9
Always kept on a chain	27	14.5	9.8 to 20.4
Sporadic access to the streets	22	11.8	7.6 to 17.4
Free access to the streets	2	1.1	0.1 to 3.8
Do you have a backyard or a place in your home where the animal can stay?			
Yes	183	98.9	96.1 to 99.9
No	2	1.1	0.1 to 3.8
Does the animal stay alone at home?			
Yes	39	21.4	15.7 to 28.1
No	143	78.6	71.9 to 84.3

*Note.* CI = confidence interval.

5). The variables have been recategorized for this analysis. We note that we observed a statistically significant association ( $p < .05$ ) in only one variable (regarding difficulties) with owner group. Fifty-three percent of Group 1 owners and 25% of Group 2 owners mentioned having had difficulties in dealing with the animal; the analysis showed that these are statistically different proportions.

TABLE 5  
Responses From Group 1 and Group 2 Owners About Several Issues and Corresponding  
Results for the Univariate Statistical Analysis

<i>Variables</i>	<i>Group 1</i>	<i>Group 2</i>	$\chi^2$	<i>p Value</i>
Did you have difficulties with your dog?				
No	21	36	7.86	.005
Yes	24	12		
Indoor or outdoor dog				
Indoor	31	32	1.23	.54
Always kept on a chain	10	9		
Outdoor	4	8		
In favor of dog reproduction				
No	33	32	0.71	.40
Yes	12	17		
Would you adopt a dog again?				
No	21	21	0.14	.71
Yes	24	28		
Contraceptive method				
Contraceptive drug	18	14	4.44	.11*
Neutering	2	8		
Chaining the animal	23	19		
In favor of neutering				
No	26	27	0.068	.79
Yes	19	22		
Medicines				
No	14	15	0.003	.96
Yes	31	34		
Vaccines and vermifuges				
Only if animal is sick	10	12	3.53	.17
Once a year	22	19		
Following schedule	6	15		
Veterinary care				
Never	23	23	1.18	.55
Sporadically	13	20		
Always	6	5		
Backyard				
No	0	2	1.91	.50*
Yes	44	45		
Type of household				
Small property in the country	7	3	4.34	.09*
House	36	44		
Apartment	2	0		
Does the animal stay alone at home?				
No	35	38	0.027	.87
Yes	10	10		

\*Fisher's exact test.

## DISCUSSION AND CONCLUSIONS

Adoption of shelter dogs is an issue of increasing concern to society and animal welfare organizations around the world. Despite the efforts to have the same proportion of males and females adopted, males were preferred. Although 59% of the surrendered dogs who were euthanized were female (Soto et al., in press), the majority of the adopted dogs (almost 58%) were male. In another study conducted in Ibiúna (Soto, 2000), possible reasons for the preference for males were assessed. Reasons such as “female dogs come into heat and give birth to unwanted litters” and “it is easier to deal with male dogs” were mentioned by the interviewees.

Length of ownership was an important variable in this study; the mean estimated length of ownership of 14.8 months can be related to the level of responsible ownership and also to postadoption difficulties.

In a study conducted in Botucatu, another city in the state of São Paulo, Souza et al. (2002) found that only a few owners were concerned about their animals' health and well-being. The owners in general were not adequately prepared to take care of a dog, for example, not able to provide vaccines, vermifuges, and ectoparasiticides.

When this survey was conducted, a high mortality rate (34.9%) was observed among the adopted dogs. This is a reason for concern. It led us to question how effective adoption programs of surrendered and stray dogs can be in some localities if an animal offered for adoption is incubating and ill with an infectious disease.

Disease followed by death, dog behavior (including aggression toward people and other animals), and cost of pet maintenance were the main difficulties mentioned by the interviewees regarding their animals. As we mentioned earlier, these factors also have been reported as reasons for relinquishment of dogs in a study conducted in the United States (NCPSP, 2004; Salman et al., 1998).

Approximately 70% of the interviewees wanted their animals to breed. Chaining the animal to prevent contact with other animals was the most accepted contraceptive method (46.7%), followed by the use of contraceptive drugs (34.4%). Only 9% of the respondents indicated neutering as a contraceptive method they would approve. It reveals some resistance against neutering, perhaps related to lack of information about this method. Despite its limitation as a contraceptive method, the choice for chaining the animal can be related to a possible belief that this method—when compared to other methods—will not cause the animal to suffer.

Those who wanted their animals to reproduce mentioned, “love and affection” and “beauty of animal” as reasons. Leslie, Meek, Kawash, and McKeown (1994) observed that “companionship” and “love and affection” scored highest on reasons for ownership.

As mentioned by Patronek et al. (1995), a systematic collection of information about relinquished dogs and reasons for euthanasia will help in understanding better the complex interaction between people, pets, and animal shelters.

Despite efforts developed by the Zoonosis Department of Ibiúna to disseminate information about this issue, results show a resistance against using neutering methods. The use of other educational tools can help to achieve this goal.

Most of the interviewed owners (55.4%) have never taken their animals to a veterinarian, and 38.2% have done so only sporadically. This means that most of the dogs do not have access to veterinary assistance, which can be related to cost or even to cultural factors.

If we assume that Group 1 owners, as defined in the Materials and Method section, are more prone to surrender or relinquish an adopted dog than are Group 2 owners, we should note that the decision to relinquish a dog might have been related to transient difficulties the owners had in dealing with the animal. According to the analysis depicted in Table 5, Group 1 and Group 2 opinions are similar on breeding, neutering, vaccination, veterinary care, and even on adopting a dog again.

This work has enabled us to assess several characteristics related to owners who have adopted shelter animals. Unfortunately, as most of the owners who have adopted were not located, it was not possible to assess accurately the effectiveness of the adoption campaigns.

Probably some owners who were not located have moved to other places without relinquishing or donating their adopted dogs before moving, whereas others have relinquished or donated their dogs. However, we cannot be sure that the proportions of owners who have not relinquished dogs are similar in the group of owners who were not located and in the group of owners interviewed. Nevertheless, to increase the response rate in future studies, owners who adopt dogs nowadays are contacted periodically by the shelter staff.

The results obtained in this study have motivated the design of a new procedure for adoption of shelter dogs in Ibiúna. Under this design, new owners interested in adopting a dog have to go directly to the city shelter. As we have mentioned, adopters are contacted periodically by the shelter staff. To avoid adoptions on impulse, one of the main changes is that adoption campaigns that formerly took place in different parts of the city no longer occur. These measures have been taken to reduce the relinquishment rate of adopted dogs and, therefore, to improve the proportion of successful adoptions.

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