

Physical assessment of free roaming dogs from Campo Magro – Paraná, Brazil

Avaliação física de cães em situação de rua do município de Campo Magro – Paraná, Brasil

Evaluación física de los perros errantes de Campo Magro - Paraná, Brasil

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Abstract

There are three categories of free roaming dogs: those with an owner, community dogs and abandoned dogs. These free-roaming dogs are vulnerable to animal cruelty and can cause traffic accidents and affect human health through transmission of zoonoses and bite injuries. The physical and ownership status of these dogs is unknown in most cities. The objective of this study was to report findings of physical evaluation and determine the ownership status of free roaming dogs in the municipality of Campo Magro, Paraná, Brazil. Whilst surveying stay dog populations to estimate numbers, observational physical assessment and interviews with passersby about the ownership of the animals were conducted. Of the 240 dogs counted, 46.7% (112/240) were classified as “dog with owner, 29.2% (70/240) as “community dog” and 24.2% (58/240) as “abandoned dog”; 63.8% (153/240) were male, 22.9% (35/153) were neutered. Most animals (75.4%; 181/240) had an ideal body score, but lower body condition scores were found in community and abandoned dogs ($p < 0.05$). Abandoned animals had significantly more skin nodules ($p < 0.05$) and higher prevalence of pruritus was observed in community dogs ($p < 0.05$). These results demonstrate the need for a population management program for dogs which includes strategies for reproductive control, animal health care and promotion of responsible guardianship.

Keywords: Unowned dogs; Community dogs; Dog abandonment; Dog population management; Animal welfare.

Resumo

Há três categorias de cães em situação de rua: os que têm tutor, os cães comunitários e os cães abandonados. Esses cães estão vulneráveis aos maus-tratos, podem causar acidentes de trânsito e afetar a saúde humana por meio da transmissão de zoonoses e lesões provocadas por mordeduras. A condição física e de tutela destes cães são desconhecidas na maioria das cidades. Objetivou-se realizar a avaliação física e determinar a situação de tutela de cães errantes no município de Campo Magro, Paraná, Brasil. Durante estimativa populacional de cães errantes, realizou-se avaliação física e entrevistas aos transeuntes sobre a tutela desses animais. Dos 240 cães contados, 46,7% (112/240) foram classificados como "cão com tutor", 29,2% (70/240) como "cão comunitário" e 24,2% (58/240) como "cão abandonado"; 63,8% (153/240) eram machos, sendo 22,9% (35/153) castrados. A maioria dos animais (75,4%; 181/240) tinha uma condição corporal ideal, mas houve diferença estatística significativa com a condição corporal baixa nos grupos de cães comunitários e abandonados ($p < 0,05$). Os animais abandonados apresentaram significativamente mais nódulos na pele ($p < 0,05$) e maior prevalência de prurido foi observada em cães comunitários ($p < 0,05$). Há necessidade da promoção da guarda responsável dos cães que resulte em mudança de atitude dos tutores que deixam seus animais sem restrição de movimentos, políticas públicas para os cães comunitários e para a prevenção do abandono.

Palavras-chave: Cães sem dono; Cães comunitários; Abandono de cães; Manejo populacional canina; Bem-estar animal.

Resumen

Hay tres categorías de perros sueltos: con dueño, comunitarios y vagabundos. Estos perros vagabundos son vulnerables a la crueldad animal y pueden causar accidentes de tráfico y afectar a la salud humana mediante la transmisión de enfermedades zoonóticas y lesiones por mordedura. En la mayoría de las ciudades se desconoce el estado físico y la tutela de estos perros. Este estudio tuvo como objetivo realizar la evaluación física y determinar el estado de tutela de los perros vagabundos en el municipio de Campo Magro, Paraná, Brasil. Durante la estimación de la población de perros vagabundos, se llevó a cabo una evaluación física y entrevistas a los transeúntes sobre la tutela de estos animales. De los 240 perros contabilizados, el 46,7% (112/240) se clasificaron como "perro con dueño", el 29,2% (70/240) como "perro comunitario" y el 24,2% (58/240) como "perro abandonado"; el 63,8% (153/240) eran machos y el 22,9% (35/153) estaban castrados. La mayoría de los animales (75,4%; 181/240) tenían una puntuación corporal ideal, pero se encontraron puntuaciones de condición corporal más bajas en los perros comunitarios y abandonados ($p < 0,05$). Los animales abandonados mostraron un número significativamente mayor de nódulos cutáneos ($p < 0,05$) y se observó una mayor prevalencia de prurito en los perros comunitarios ($p < 0,05$). Estos resultados demuestran la necesidad de un programa de gestión de la población canina que incluya estrategias de control reproductivo, atención sanitaria de los animales y fomento de la tutela responsable.

Palabras clave: Perros sin dueño; Perros comunitarios; Abandono de perros; Gestión de la población canina; Bienestar animal.

1. Introduction

A free roaming dog is one that roams in public spaces without supervision. These dogs can be divided into three categories: dogs with a guardian, but with free access to the street; community dogs, cared for by one or more people in the community (Rüncos, 2014; OIE, 2019) and abandoned dogs (ICAM, 2008). The persistence of free roaming dogs in a specific region is mainly influenced by the maintenance capacity, determined by the availability of food, water and shelter (ICAM, 2008; WSPA, 2008; WHO, 1990; FAO, 2014). Free-roaming animals can cause traffic accidents, attack people and other animals, create environmental mess with their toileting, and may be involved in transmission of zoonoses. They are more susceptible to malnutrition, disease and physical injuries (as a result of fights with other dogs and traffic accidents, or from animal cruelty (ICAM, 2008), which can all have significant negative impact on their welfare (Broom and Molento, 2004).

The implementation of dog population management programs in urban areas reduces the number of free roaming animals, thus minimizing risks to human health and improving the level of welfare of these animals (Garcia et al., 2012). The monitoring of free roaming dogs provides an indicator to evaluate the impact of these programs (ICAM, 2015), and the quantification of the subpopulations helps identify the most useful strategies for population control (ICAM, 2019). The International Companion Animal Management Coalition (ICAM) has established a series of indicators for stray dog welfare, including body condition score, skin conditions and the presence of specific disease-related injuries, as part of monitoring programs for population management of dogs (ICAM, 2015). Research involving free roaming animals in urban areas is still

scarce.

The present study aimed to classify the guardianship level (owned, community or abandoned) and the physical condition of free-roaming dogs in Campo Magro/PR, to aid development of proposals for dog population management programs in urban areas.

2. Methodology

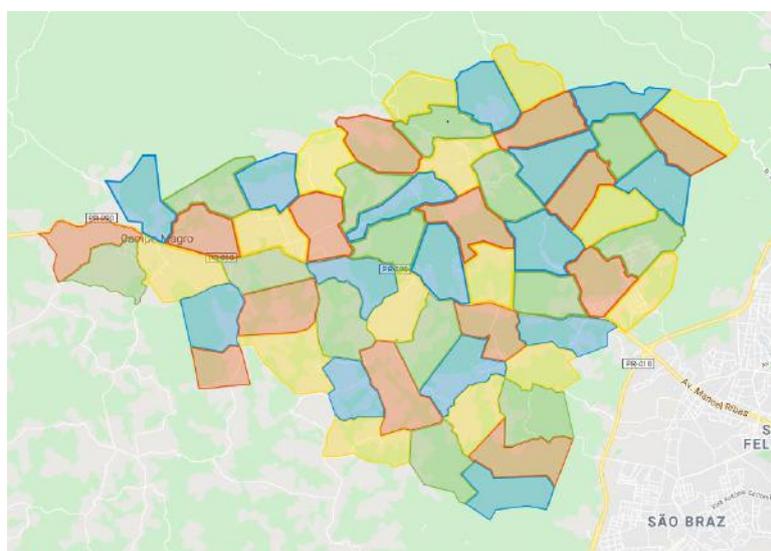
Study area

The municipality of Campo Magro is located in the metropolitan region of Curitiba, Paraná, Brazil. The city has 28,885 inhabitants and covers 263 km², of which 28 km² of urban area and 230 km² rural (IBGE, 2018; CAMPO MAGRO, n.d.). There are currently no dog population management programs or canine population estimations for this area.

Sampling

Animal selection was based on the World Animal Protection guide (WSPA, 2008). The urban and peri-urban area of the city was divided into 58 quadrants of about one square kilometer (km²) each. The quadrants were colored with four different colors, evenly distributed (Figure 1). For probabilistic sampling, the areas colored blue and yellow were selected by a random raffling to create a sample of 30 quadrants.

Figure 1 – Territory of Campo Magro, Paraná, Brazil, divided into quadrants of 1 km².



Source: Authors.

Volunteer training

The team comprised eight volunteers, trained to identify the indicators, complete the physical evaluation form and interview passers-by to define the category of the animal.

Data collection

The team was divided into groups of two people, each pair had a car available. The routes were drawn using Google maps, so that the quadrants were traveled with vehicles at a maximum speed of 20 km/h and in one direction, avoiding repeated animal counting. Data were collected from February 13 to 15, 2019, between 7:00 am and 9:00 am, which is when

most dogs were on the streets (Silva et al. 2019). In the three days, the ambient temperature remained between 15 and 20°C, with periods of rainfall.

Animal's register

Photos and coordinates of the animal's position (GPS) were recorded using the Strays ID[®] application, from the international platform Animal ID[®]-net. The classification of the animal into: “owned”, “community dog” and “abandoned dog” was determined by interviewing two residents close to the place where the dog was sighted and using the researcher's opinion. The researcher carried out this evaluation empirically, considering a set of factors: whether or not a collar was visible, the ease or difficulty of approach to the animal, the environment where the animal was, the presence of houses or bowls containing community dog food, or if there was a dwelling that the animal approached or entered. If in agreement, the answers of two passers-by were used to classify the dog. In cases of disagreement, the researcher's opinion was used as a tiebreaker criterion.

Physical assessment form

The following data were collected, without physical restraint:

1. Sex: male or female and unknown, if it was not possible to see the animal's gender;
2. Body Condition Score (BCS): determined by assessing the visible coverage of body fat to indicate the nutritional status of the dog, on a scale of 1 to 5, with 1 very thin, 2 underweight, 3 ideal, 4 overweight and 5 obese (ICAM, 2008);
3. Condition of the animal's skin: determined by the evaluation of the presence of lesions/wounds, alopecia, nodules, pruritus and/or dirty hair;
4. Locomotor apparatus: determined by assessing the presence of lameness, signs of limb dysfunction and/or other changes, such as plegia or paresis;
5. Secretions: determined by assessing the presence of nasal, ocular, genital and/or other secretions.

Statistical analysis

The proportion of the different variables was compared between groups (“owned dogs”, “community dogs” and “abandoned dogs”) using Pearson's Chi-square test with Yates' correction in each group containing fewer than 5 dogs. Statistical significance was set at 0.05 (error probability of 5%).

Ethical considerations

The research project was approved by the Ethics Committee on the Use of Animals (ECUA) of the Agricultural Sciences Sector (ASC), of the Federal University of Paraná (UFPR), under protocol 063_2018.

3. Results

Of the 240 dogs counted, 46.7% (112/240) were classified as owned, 29.2% (70/240) as community dogs and 24.2% (58/240) as abandoned dogs. In all categories, most dogs were male (Table 1). It was not possible to identify the sex in 9.1% (22/240) of the animals due to the observers being unable to get sufficiently close to the animals. There was no statistically significant difference between the proportion of females and males between groups ($p > 0.05$). Of the 153 males, 22.9% (35/153) were neutered, and of the 65 females, 3.1% (2/65) were pregnant and 3.1% (2/65) were lactating.

Most of the population had an ideal body condition score (3/5) (Table 1). None of the dog groups were categorized as obese (5/5). None of the owned or community dogs were cachectic. There was a statistically significant difference between the proportion of body condition scores between groups ($p < 0.05$), with “very thin” (EC = 1) and “underweight” (EC = 2) being more common in abandoned dogs.

Regarding skin condition, 35.41% (85/240) had some cutaneous involvement, of which 31.76% (27/85) were owned, 38.82% (33/85) were community and 29.41% (25/85) were abandoned dogs. Of the total animals, 12.5% (30/240) had skin wounds, of which 40% (12/30) were community dogs, 33.3% owned dogs and 26.6% abandoned dogs. Alopecia was present in 5.42% (13/240) of dogs, which abandoned and community dogs each represented 38.5% (5/13) of these and the remainder were classified as owned. Of the 9.5% (23/240) of animals with dirty coat, 43.5% (10/23) were dogs with guardian and 56.5% (13/23) abandoned or community dogs. There was no significant difference between the proportion of lesions, dry and wet wounds, alopecia and dirty coat between the groups (Table 1). The abandoned animals had significantly more nodules on the skin ($p < 0.05$) and a higher prevalence of pruritus was seen in community dogs ($p < 0.05$) (Table 1).

Of the 5% (12/240) of dogs with locomotor alterations, 50% (6/12) were owned. Lameness was seen in 83.3% (10/12) of these, with owned dogs comprising 50% (5/10) of the lame dogs. Only two dogs showed abnormal limb function, one owned dog and the other abandoned. No paresis or plegia was observed. There was no statistically significant difference between the presence of locomotor changes and the different groups of dogs.

Secretions were detected in 6.2% (15/240) of the animals, more frequently in owned dogs (53.3%; 8/15). Eye secretions were the most common (5.4%; 13/240), the majority of which were in owned dogs (53.8%; 7/13). A single owned dog had vaginal discharge. No animal had nasal discharge. There was no statistical difference between the presence of secretions and the different groups of dogs.

Table 1. Frequency distribution of the parameters evaluated in the different categories of free-roaming dogs in the municipality of Campo Magro, Paraná, Brazil.

INDICATOR	GUARDIANSHIP STATUS						p-value	TOTAL	
	Owned dog		Community dog		Abandoned dog			N	%
	N	%	N	%	N	%			
Gender									
Male	71	63.4	41	58.6	41	70.7	153	63.7	
Female	30	26.8	24	34.3	11	18.9	65	27.1	
Unknown	11	9.8	5	7.1	6	10.3	22	9.1	
Total	112	100	70	100	58	100	240	100	
Body Condition Score									
Very thin (1/5)	0	0	0	0	1	1.7	1	0.4	
Underweight (2/5)	10	8.9	12	17.1	13	22.4	35	14.6	
Ideal (3/5)	94	83.9	49	70.0	38	65.5	181	75.4	
Overweight (4/5)	8	7.1	9	12.8	6	10.3	23	9.6	
Obese (5/5)	0	0	0	0	0	0	0	0	
Total	112	100	70	100	58	100	240	100	
Skin Condition									
Wounds	10	8.9	12	17.1	8	13.8	30	12.5	
Alopecia	3	2.7	5	7.1	5	8.6	13	5.4	
Nodules	0	0	1	1.4	4	6.9	5	2.0	
Pruritus	4	3.6	9	12.9	1	1.7	14	5.8	
Dirty coat	10	8.9	6	8.6	7	12.0	23	9.5	
No changes	85	75.9	37	52.9	33	56.9	155	64.6	
Total	112	100	70	100	58	100.0	240	100	
Locomotor apparatus									
Lameness	5	4.5	3	4.3	2	3.4	10	4.2	
Functional limb abnormality	1	0.9	0	0	1	1.7	2	0.8	
No abnormalities	106	94.6	67	95.7	55	94.9	228	95.0	
Total	112	100	70	100	58	100	240	100	
Secretions									
Ocular	7	6.2	2	2.9	4	7.0	13	5.4	
Genital	1	0.9	0	0	0	0	1	0.4	
Other	0	0	1	1.4	0	0	1	0.4	
No secretions	104	92.9	67	95.7	54	93.7	225	93.8	
Total	112	100	70	100	58	100	240	100	

Source: Authors (2022).

4. Discussion

In this study, the population of free roaming dogs in the municipality of Campo Magro, Paraná, Brazil was mainly composed of free-roaming owned dogs. Similar results have been reported in communities in South Africa and Indonesia, in Tanzania and in the municipality of Serra Azul, São Paulo, Brazil (Matos et al., 2002; Gsell et al., 2012; Morters et al., 2014). However, Argenton et.al. (2022) found a higher number of free-roaming dogs without guardian, more specifically community dogs, in the same municipality Campo Magro and Pinhais, Paraná, Brazil in 2017. Free-roaming dogs on public streets contribute to transmission of zoonotic diseases, such as rabies, as well as being responsible for injuries such as bites and for

traffic accidents (ICAM, 2015). The promotion of responsible guardianship and the consequent reduction in the semi-residential portion of the roaming canine population, should be one of the objectives when a dog population management program is implemented (Garcia et al., 2012).

The concept of responsible guardianship implies that guardians must provide all necessary care to their animals, and minimize the potential risk that their dogs pose to the population (ICAM, 2008). This includes caring for and supervising them. Domingues et al. (2015) showed that responsible care increases with the level of education of the head of the family and Monsalve et al. (2018) found that it is 2.73 times more likely that an animal will be mistreated in a family with low education levels. Education about values and responsible pet ownership is fundamental to changing human attitudes and behavior towards animals.

In the Philippines, a study was carried out to establish the effects of a 4 weeks guardianship education program. The program generated a significant improvement in people's level of awareness of dogs, in the quality of care and in demystifying beliefs or myths. There was no statistical difference between individuals of different ages or levels of income and education (Edo and Estrada, 2016), thus demonstrating the effectiveness of education for any community. In Azerbaijan, a group that participated in a rabies awareness campaign, was compared with a control group, those participating in the program showed an increase in the levels of knowledge about the disease, there was a concomitant 1.4-fold increase in the chance of a dog owned by someone in that group being vaccinated against rabies, compared to those who did not participate (Hasanov, 2018), again demonstrating the effects of education.

Abandoned dogs may be present in the city due to the lack of public policy for population management of these animals. Population management should include strategies for reproductive control, registration and identification, inspection, clinical care, legislation, trade control, handling complaints and most importantly, health education (Garcia et al., 2012). Aggression, illnesses, behavioral problems, economic issues and unexpected litters have been reported to be the main factors that trigger abandonment (Haupt et al., 2007; Baquero et al., 2015; Fatjo et al., 2015; Oliveira, 2019). In an Italian study, 65% (254/397) of the interviewees stated that 'loss of interest' in the dog was a decision factor for abandonment, while for 23% (91/397) the poor conditions of the guardian were the decisive factor (Slater et al., 2008).

Dog abandonment should be considered a health hazard, due to the risks it poses to people, other animals and the environment (Garcia et al. 2012). Understanding the epidemiology of abandonment allows us to profile the animals at risk and those who abandon them, and is fundamental for the design of the best strategies to prevent abandonment (Garcia et al., 2012; Oliveira, 2019).

Male dogs were most common in the studied population, corroborating findings from a study carried out in Mexico (Cortez-Aguirre et al., 2018), and with the studies by Gsell et al. (2012), Mortes et al. (2014) and Baquero et al. (2018). Higher numbers of males were seen in the abandoned dog group. Less than half of the male population was neutered. In addition, pregnant and lactating females were identified, indicating reproductive activity among the roaming population. Reduction in reproductive activity and birth rate has been achieved in regions that have implemented reproductive control strategies (Catapanetal., 2014; Baquero et al., 2018; Garcia et al., 2018).

A Brazilian study of owned dogs and cats showed that only 19.1% (418/2185) of the animals were neutered (Domingues et al., 2015), while another study with a similar population reported 17% of neutered dogs (Baquero et al., 2015). In a census conducted in an area of São Paulo, Brazil, in 2008, it was found that 15.4% (228/1480) of male dogs and 30.9% (347/1123) of females were neutered (Garcia et al., 2018), similar to the results observed in a population estimate carried out in the municipality of Pinhas, Paraná, Brazil, between 2016 and 2017, in which only 19% (120/644) of male dogs and 32% (191/606) of females were neutered (Baquero et al., 2018). A study of 47 municipalities in the state of Rio de Janeiro, Brazil,

reported that only 21.3% (10/47) offered free sterilization programs to the population, despite the availability of safe, low-cost neutering surgery (Moutinho et al., 2018). The low frequency of neutered animals in Brazil may be a cultural issue. Government funded education in responsible guardianship and sterilization programs with economic and geographical access might increase neutering take-up. The benefits of neutering, which include behavioral improvement, population control and disease prevention, mean that most North American dogs are neutered (Hauptet al., 2007).

Most categories of free-roaming dogs had an ideal body condition score (BCS = 3), which concurs with findings of a study in Mexico (Cortez-Aguirre et al., 2018), but contrasts with the results of a study in India, where the majority of the dogs were considered very thin (BCS = 1) (Totton et al., 2011). The predominance of good nutritional status in the animals may be related to the fact that the maintenance capacity, in particular uncollected garbage, which provides a food source, is an important factor that fixes these animals in a given location (Kachani et al., 2014). In areas where abandonment is higher in São Paulo, Guilloux et al. (2018) observed the presence of leftovers or feed, in addition to uncollected garbage and open garbage bags. However, more dogs had body condition score (BCS = 2), “underweight”, in the abandoned and community groups ($p < 0.05$), indicating that animals without guardians are more likely to be underweight.

Owned dogs had fewer skin lesions (24.1%; 27/112) when compared to community dogs (47.1%; 33/70) and abandoned dogs (43.1%; 25/58), demonstrating that guardianship was a determining factor for skin alterations. Dermatologic and locomotor injuries can be related to infectious skin diseases, accidents or animal cruelty, to which stray dogs are more prone (ICAM, 2008). A smaller proportion of dogs had lesions related to the presence of nodules (2%; 5/240), alopecia (5.4%; 13/240) and pruritus (5.8%; 14/240). The frequency of pruritus may be related to the presence of ectoparasites (Ayodhya, 2014). In a study carried out in India in which the animals were examined while they were anesthetized, 69% of the dogs had skin changes, with keratosis of the elbow being most common, followed by mange and alopecia (Totton et al., 2011). In South Korea, 45.6% (47/103) of free roaming dogs had ectoparasites, with *Otodectes cynotis* (the cause of otodectic mange) being most common, followed by the mite that causes sarcoptic mange (Chee et al., 2008). The low rate of dermatologic problems (35.41%; 25/240) detected in the present study may be due to the fact that the researchers did not get close to the animals.

Some form of locomotor alteration was seen in 5% of dogs (12/240), most of which were in owned animals (60%; 6/12), community dogs and abandoned dogs each represented 25% (3/12). Of the animals were lame (4.2%; 10/240), 50% (5/10) of which were owned dogs, 30% (3/10) community dogs and 20% (2/10) abandoned. Only two dogs showed functional limb abnormalities, one owned dog and the other abandoned. No paresis or plegia was observed. There was no statistically significant difference for the presence of locomotor changes between groups. Secretions were seen in 6.2% (15/240) of the animals, more commonly in the owned dogs (8/15); 5.4% (13/240) of dogs had ocular secretion, of which 53.8% (7/13) were owned, 30.8% (4/13) abandoned and 15.4% (2/13) from the community. A single owned dog had vaginal secretion. No animal had nasal secretion.

The present study was limited by the fact that there is no population estimate or census of dogs in the literature for the municipality of Campo Magro. We cannot therefore be sure what percentage of each population was evaluated. Another limitation is the fact that it rained during the study period, and temperatures dropped below 20°C, which may have resulted in more dogs sheltering and possibly reducing their numbers on the streets.

5. Conclusion

The population of free roaming dogs in the municipality of Campo Magro, Paraná, Brazil, is composed by male dogs with guardian, free access to the streets and normal body condition score. Abandoned animals had lower body conditions and were more likely to have skin nodules than community dogs and those with guardians. A Dog Population Management

Program is required that includes educational activities, animal health care, registration and identification, pertinent legislation and reproductive control, to reduce the population of free-roaming dogs in the municipality and improve animal welfare.

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