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Original

Dog and Cat population management within the One Welfare framework: A retrospective look Bogotá 2004 to 2021

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ABSTRACT

Objective. To analyze the population management of dogs and cats in Bogota between 2004 and 2021 within the "One Welfare" framework. **Materials and Methods**. This is a retrospective, descriptive study that includes an analysis of public and private interventions related to the sterilization, adoption, and slaughter of companion animals, discriminating by location, species, sex, and sector (public or private). The available information was organized using Excel®, with a descriptive analysis and results expressed in frequencies, proportions, and rates. **Results**. Between 2004 and 2021, 750.949 cats and dogs were sterilized in the public sector and 217.276 in the private sector; 22.126 were adopted through the district adoption program, 101.165 animals were slaughtered, of which 8.8% were cats; after the year 2005 cats were included in the population estimates and after 2014 information was collected from private veterinarians (sterilization) who contributed with the 29% of the total number of interventions. **Conclusions**. The population growth of animals demands health, policies, and environmental attention, and its ethical management must be kept, although it should be complemented with actions from various sources where these animals live. The One Welfare approach is a method that recognizes the interconnections between animal, human, and environmental welfare and facilitates interdisciplinary collaboration to improve their welfare, as well as complements and communicates with One Health. This paper contributes, therefore, by presenting in an organized and compared way the available management statistics, for the decision-makers and the interested community.

Keywords: Animal welfare; population regulation; dogs; cats (*Source MeSH, DeCS*).

RESUMEN

Objetivo. Analizar la gestión poblacional de perros y gatos en Bogotá entre 2004 y 2021 en el marco "One Welfare". **Materiales y Métodos**. Estudio descriptivo retrospectivo que incluye análisis de intervenciones públicas y privadas relacionada con esterilizaciones, adopciones y sacrificio de animales de compañía, discriminando por localidad, especie, sexo y actor (público o privado), la

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información disponible se organizó empleando Excel®, con análisis descriptivo y resultados expresados en frecuencias, proporciones y tasas. **Resultados**. Entre 2004 y 2021 se esterilizaron 750.949 gatos y perros por el sector público y 217.276 privado, se adoptaron 22.126 a través del programa de adopción distrital y se sacrificaron 101.165 de los cuales el 8.8%% fueron gatos; hasta después del año 2005 los gatos se incluyeron en las estimaciones poblacionales y después de 2014 se captó información de veterinarios particulares (esterilización) quienes aportaron el 29% del total de intervenciones. **Conclusiones**. El crecimiento poblacional de animales demanda atención sanitaria, policiva y ambiental, debiendo mantenerse su gestión ética, aunque complementado con acciones sobre diversas fuentes donde se originan los animales; el enfoque One Welfare es derrotero, reconoce interconexiones entre bienestar animal, humano y ambiente y facilita la colaboración interdisciplinaria para mejorar su bienestar, además complementa y dialoga con One Health. Este estudio aporta al presentar de forma organizada y comparada estadísticas de gestión disponibles, siendo insumo para tomadores de decisión y comunidad interesada.

Palabras clave: Bienestar animal; regulación de la población; perros; gatos (*Fuente MeSH, DeCS*).

INTRODUCTION

Human beings, sometimes, do not mitigate the risk of uncontrolled breeding of companion animals; thus, lost, abandoned, or stray dogs and cats are the main source of litters on the streets; According to the World Organization for Animal Health (OMSA formerly OIE), the world population of dogs exceeds seven hundred million, of which 75% are wandering dogs (1).

The high number of non-sterilized stray dogs and cats, in addition to increasing the risk of affecting their well-being, poses a threat to public health because of bites, scratches, or zoonosis (2), and to wildlife due to predation and disease transmission (3,4). Therefore, strengthening population management and increasing vaccination coverage are essential to prevent diseases and persevere human and animal welfare and health (5).

In Bogotá, the population management of companion animals has changed. Before the year 1996, animals were slaughtered using electrocution; although this situation was stopped by means of Resolution 5215 of 1996; "individual elimination" was kept using an overdose of barbiturates. Thus, it was not until 2014 with the entry into force of Resolution 0240 of 2014, that both the circumstances and the procedure to practice euthanasia were defined.

Despite the fact that in recent years population management has been supported mainly by sterilization surgeries, it is necessary to restart or intensify information, communication, education, and awareness actions including, among other topics, the responsible ownership and the application of practices to maintain the physical and behavioral health of the animals; the foregoing because the possession of animals creates different paradigms, myths, and realities, raised by human and animal relationships that can be part of "historical, political, economic and cultural processes" (6).

Regarding methods such as mass captures and slaughter, some authors point out that in addition to being expensive, they are ineffective over time; thus confirming the declarations by the World Health Organization (WHO) "slaughter is usually expensive and ineffective"; some studies even warn about how questionable it is from an ethical point of view to kill healthy animals (7).

This paper describes and analyzes the actions carried out between 2004 and 2021, under the premise that within the framework of the 16th Meeting of Directors of the hydrophobia Programs in the Americas (REDIPRA) 2017, it was suggested that given the complexity demanded by the "endemism of hydrophobia", it is necessary to review the prevention and control actions applied.

On the other hand, this paper seeks to draw attention to how managing companion animal populations contributes to welfare (OW), since this approach recognizes the interconnections between animal, and human welfare, and their physical and social environment, by promoting collaboration between science and politics to improve their well-being, in addition to complementing and dialoguing with One Health (OH) (4).

In this sense, population management can contribute to the improvement of the well-being of communities – both humans and animals

- given that the overpopulation of companion animals can cause inconveniences that go from the social sphere due to the conflicts that can be generated, from the economic point of view due to the investments that must be made, and from the sanitary perspective due to diseases and affectations that can be generated or avoided, and of the Animal Welfare considering that stigmatization can cause harmful behaviors and sometimes the death of animals (8).

Given the need to move towards the fulfillment of the Sustainable Development Goals (SDG) established in 2015 by the General Assembly of the United Nations (UN) and by recognizing that five sections are addressed from the OW concept. The relationship between population management, the OW, and the SDGs is illustrated below (Figure 1).

Finally, due to the difficulty for the different actors to gain access to collected and compared information, this paper is presented with the aim of analyzing the behavior of actions regarding population management of dogs and cats in Bogotá through the location, management, compilation, systematization, and analysis of related statistics.

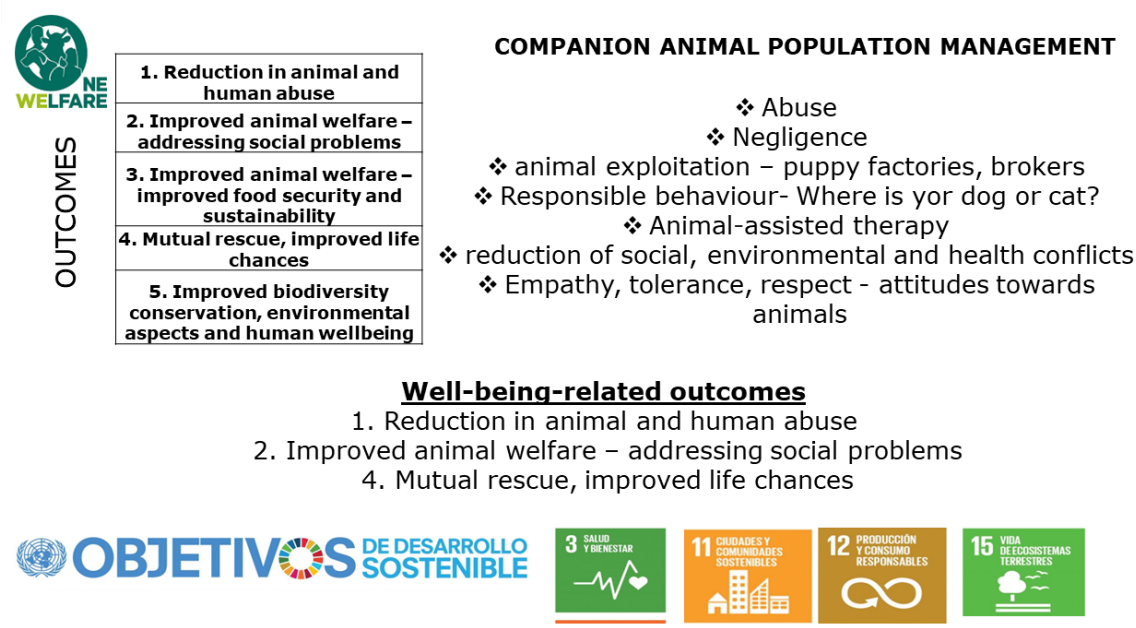

Figure 1. Relationship between population management, One Welfare and the Sustainable Development Goals (SDG). Source: Information from the authors to include the logos of OW and the UN SDGs for purposes of illustration to the reader.

MATERIALS AND METHODS

Type of study. This is a cross-sectional, descriptive, retrospective study; we used the technique of documentary collection from primary source information, the product of official documents in epidemiological bulletins, newspapers, execution and management reports, contact documents, public presentations, accountability, and communications with professionals.

Data collection. The data collected correspond to statistics of actions carried out between 2004 and 2021 by the District Health Secretariat (SDS) and the District Institute for Animal Protection and Welfare (IDPYBA) in terms of population management (control) of dogs and cats available for the 20 locations in Bogotá D.C (Colombia).

Statistical analysis. The information was organized using the Excel® spreadsheet software program, including the variables: number of companion animals, number of sterilizations, number of adoptions, number of animals sacrificed and number of euthanasia procedures, which were discriminated by location, species, sex, and sector (public or private); the statistical analysis used was the descriptive analysis, expressing the results in frequencies, proportions and rates, using tables and graphs for illustration.

RESULTS

In Bogotá, between 2004 and 2021, a total of 112,220 companion animals were taken to the public facility to house dogs and cats - administered by the District Health Secretariat (SDS) until 2018 and thereafter by the District Institute for Animal Protection and Welfare. (IDPYBA)-, the highest proportion corresponded to dogs 90% (n: 100,813) and 10% (n: 11,407) to cats.

Regarding the fate of the animals, they were sacrificed or given up for adoption. Between 2004 and 2011, 94,798 animals were slaughtered, of which 8.8% were cats (9); Although the proportion compared to dogs is low, the variation is due to the fact that it was not until after 2005 that cats were included in the city's population estimates.

Figure 2 shows the decrease in the slaughter over the years, while adoption, despite increasing, remained stable, highlighting the inversion of the adoption and killing curves; from 2004 to 2015 the latter was always above, and from 2016 they were inverted; it also illustrates that the adoption did not exceed 1,000 animals per year during the last five years, except in 2019 (n:1147).

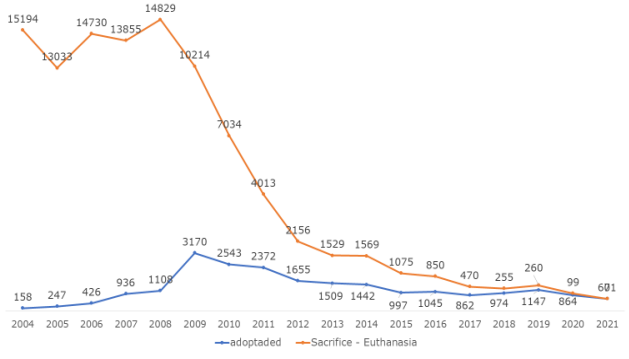

Figure 2. The total number of companion animals (dogs and cats) euthanized compared to animals given up for adoption by the District. Bogota 2004 to 2021.
Source: Information from the authors based on information from the Health Secretariat, from 2004 to 2017 and from the District Institute for Animal Protection and Welfare – IDPYBA (By its Spanish acronym), from 2018 to2021.

Slaughter rates were higher especially in years in which the sterilization rate was low, the former decreased from 1,641 x 100,000 animals in 2004 to 6 x 100,000 animals in 2021 (Figure 3), confirming that euthanasia rates increase where there are no sterilization programs.

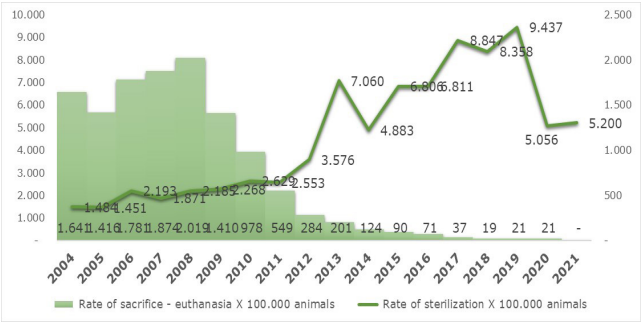

Figure 3. Slaughter Rates vs. Sterilization Rates in Bogotá from 2004 to 2021.
Source: Information from the authors based on information from SDS and IDPYBA.

In veterinary medicine, the most used technique for the reproductive control of dogs and cats is the surgical technique; Orchiectomy in males and ovariohysterectomy (OVH) in females are the main ones to prevent the growth of the animal population in a given region (10).

In this regard, although Bogotá included the offer of surgical sterilization from the public sector at the end of the nineties, in its beginnings it was aimed at dogs and particularly females, an evident situation when reviewing statistics between the years 2001 and 2011 (Table 1), which relates the number of sterilized animals to public resources.

Table 1. The number of companion animals sterilized in the public sector per specie and sex. Bogotá, from 2001 to 2011.

	Canine			Feline			Total
	M	F	Total	M	F	Total	
2001		7.693	7.693			-	7.693
2002		6.183	6.183			-	6.183
2003		6.255	6.255			-	6.255
2004	-	13.739	13.739	-	-	-	13.739
2005	-	13.356	13.356	-	-	-	13.356
2006	-	18.133	18.133	-	-	-	18.133
2007	-	12.455	12.455	-	1.384	1.384	13.839
2008	-	14.445	14.445	-	1.605	1.605	16.050
2009	-	14.782	14.782	-	1.642	1.642	16.424
2010	-	17.014	17.014	-	1.890	1.890	18.904
2011	892	15.195	16.087	338	12.313	12.651	28.738

M: Male; F: Female; Source: Table made by the authors using information from the District Secretariat of Health of Bogotá.

We can see that only after 2007, the sterilization of cats was introduced; This mention is not anecdotal since the population estimate of this species was made in the city for the first time in 2005.

Then, after 2011, the program included the sterilization of both species (dogs and cats) and both genders (males and females), which added to the strategic progress of collecting information from the private sector (starting in 2014) and resulted in an increase in coverage.

Dogs coverage reached its highest level in 2019 with 4.9% and although in 2020 as a result of the declaration of a health emergency due to covid-19 it fell to 2.7%, it recovered by 2021 and was even higher reaching 5.1%; translated into public and private intervention of 54,823 dogs out of 1,084,214 estimated for the same year.

In cats, coverage reached a maximum of 48% in 2019, and as in dogs, in 2021 it had a historic rebound and reached the highest level of 53.5%, with the sterilization of 67,769 cats out of an estimated 126,606 animals. It should be noted that reproductive control in this species is important because some keepers allow them to leave the house, and since they are not sterilized, they come into contact with others, reproducing, with the aggravating circumstance that they are considered up to 45 times more prolific than humans, a situation that deserves to intensify its population management (Figure 4).

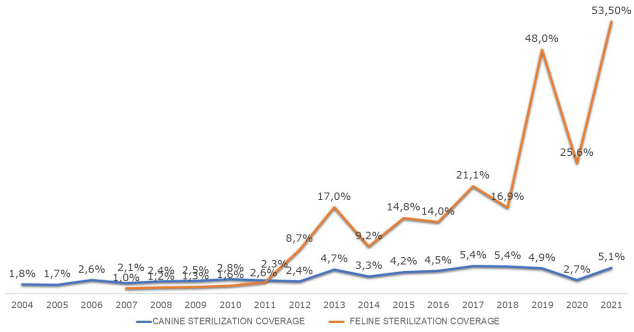

Figure 4. Sterilization coverage of dogs and cats. Bogotá 2004 to 2021.
Source: A graphic made by the authors from the population estimates from the District Secretariat of Health.

With the issuance of Resolution 0240 of 2014, the District Health Secretariat captures non-existent information; Until then, only private reports were taken into account to estimate rabies vaccination coverage in dogs and cats.

Analyzing the surgical interventions performed in the private sector between 2014 and 2021, we can see that the number increased year after year denoting a higher level of adherence of the establishments to the report; based on the information available, on average during the period studied, the contribution was of 29%; that is, 29 out of every 100 sterilizations were performed by private veterinarians (Table 2).

Table 2. The number of sterilization surgical procedures in cats and dogs reported by the private sector in Bogotá from 2014 to 2021.

	Canine			Feline			Total animals
	M	F	Total	M	F	Total	
2014	297	352	649	282	261	543	1.192
2015	3.406	4.150	7.556	4.055	6.967	11.022	18.578
2016	4.217	4.815	9.032	4.692	4.526	9.218	18.250
2017	5.880	6.512	12.392	6.677	6.794	13.471	25.863
2018	7.138	7.869	15.007	8.466	8.904	17.370	32.377
2019	8.138	9.329	17.467	9.046	9.898	18.944	36.411
2020	5.791	6.185	11.976	6.355	6.645	13.000	24.976
2021	14.067	15.767	29.834	14.770	15.025	29.795	59.629

M: Male; F: Female; Source: Table made by the authors from the District Secretariat of Health information

In addition to calculating the coverage, the proportion of sterilized animals by locality was estimated; for this purpose, the total number of sterilizations carried out in the public and private sectors between 2011 and 2021 (n: 857.780) was taken as the denominator; This analysis was carried out since 2011, the year from which it was possible to obtain information disaggregated per locality (Table 3).

The analysis per localities indicates that the largest number of procedures performed between 2011 and 2021 was concentrated in Suba 10% and Kennedy 9.7% (n: 85.670 and n: 83.004 respectively), Ciudad Bolívar 8.4% (n: 72.306), Bosa 8.1% (n: 69.683) and in Usme 7.4% (n: 63.153); Likewise, it can be seen that sterilizations carried out in the Zoonosis Center and Animal Care Unit corresponded to 3% of the total (n: 25.645).

Table 3. The proportion of sterilized animals per locality (including public and private sectors) per species in Bogotá 2011 to 2021.

Localities	Canine		Feline		Total	Proportion
	Male	Female	Male	Female		
Antonio Nariño	2.702	6.051	3.185	6.019	17.957	2.1%
Barrios Unidos	3.290	6.071	3.817	9.955	23.133	2.7%
Bosa	7.540	25.110	11.180	25.853	69.683	8.1%
Candelaria	657	1.757	1.032	2.085	5.531	0.6%
Chapinero	3.443	7.082	3.448	5.856	19.829	2.3%
Ciudad Bolivar	6.977	29.633	9.912	25.784	72.306	8.4%
Engativa	11.109	20.111	13.981	20.824	66.025	7.7%
Fontibon	6.011	11.560	6.838	11.377	35.786	4.2%
Kenedy	10.292	28.177	14.148	30.387	83.004	9.7%
Los Martires	1.787	5.491	2.376	5.503	15.157	1.8%
Puente Aranda	2.556	8.108	3.002	8.362	22.028	2.6%
Rafael Uribe	6.476	22.284	9.133	22.347	60.240	7.0%
San Cristobal	7.096	23.731	10.169	23.951	64.947	7.6%
Santa Fe	1.395	5.537	3.052	4.625	14.609	1.7%
Suba	14.055	29.561	17.341	24.713	85.670	10.0%
Teusaquillo	3.622	5.386	6.144	8.886	24.038	2.8%
Tunjuelito	3.200	10.917	4.293	11.140	29.550	3.4%
Usaquen	11.843	17.759	11.977	16.407	57.986	6.8%
Usme	6.660	24.679	9.405	22.409	63.153	7.4%
Sumapaz	118	946	80	359	1.503	0.2%
Centro De Zoonosis / Uca	5426	7.957	5.401	6.861	25.645	3.0%
Total	116.255	297.908	149.914	293.703	857.780	100%

Source: Table made by the authors from information furnished by the SDS and the IDPYBA (by their Spanish acronyms).

To estimate the impact per locality, the population variation in percentage terms was calculated from the population projections of both animals and people as well for 2015 and 2021, based on demographic information available at the District Health Secretariat and the National Administrative Department of Statistics. (DANE) (Table 4) for which the following formula was used:

Final Value (2021)/Initial Value (2015)

Continuing the analysis per locality, we can infer from those that had the largest number of animals (product of estimates made and reported by SDS), that the "positive" result was obtained in Kennedy, Usme and Suba by showing a negative variation in population growth. animals -30%; -27% and -26% respectively (Table 4).

From the above, it can be inferred that the high proportion of sterilized animals in the indicated localities (Suba, Kennedy and Usme), shown in Table 3, could have had an impact on the population variation.

Table 4. Percentage variation of the human and the companion animal populations per locality, years 2015 and 2021 in Bogotá D.C.

Population 2021			Population 2015		Population Variation 2015 Y 2021	
Localities	**Pets**	**Humans**	**Pets**	**Humans**	**Humans**	**Pets**
Usaquén	76.392	571.268	73.245	444.924	28%	4%
Chapinero	25.550	173.353	27.752	126.274	37%	-8%
Santa Fe	27.474	107.784	19.116	109.463	-2%	44%
San Cristobal	77.402	401.060	49.503	409.653	-2%	56%
Usme	71.088	393.366	97.746	299.621	31%	-27%
Tunjuelito	27.620	180.158	36.864	202.342	-11%	-25%
Bosa	88.445	722.893	38.682	495.283	46%	129%
Kennedy	146.906	1.034.838	209.307	944.777	10%	-30%
Fontibón	99.455	393.532	24.372	297.933	32%	308%
Engativá	120.303	814.100	142.815	793.944	3%	-16%
Suba	127.180	1.252.811	172.633	918.580	36%	-26%
Barrios Unidos	34.612	146.876	15.050	224.216	-34%	130%
Teusaquillo	20.068	167.879	26.379	138.993	21%	-24%
Los Mártires	15.379	83.426	12.562	95.866	-13%	22%
Antonio Nariño	15.133	82.201	25.030	106.648	-23%	-40%
Puente Aranda	47.999	253.367	31.288	257.090	-1%	53%
La Candelaria	5.353	17.877	4.783	23.985	-25%	12%
Rafael Uribe	61.758	383.960	71.231	376.711	2%	-13%
Ciudad Bolívar	122.076	649.834	114.336	567.861	14%	7%
Sumapaz	627	3.584	841	5.952	-40%	-25%
Total	1.210.820	7.834.167	1.193.534	6.840.116	15%	1%

Source: Table made by the authors based on information from the Bogotá Health Observatory and the National Administrative Department of Statistics. 2015 and 2021.

However, Bosa and Ciudad Bolívar, whose proportion of surgical interventions, was also among the highest in relation to other localities (8.1% and 8.4% respectively), presented results in terms of "negative" population growth, because between 2015 and 2021 their animal population increased 129% in Bosa (from 38,682 in 2015 to 88,445 in 2021) and 7% in Ciudad Bolívar (from 114,336 in 2015 to 122,076 in 2021); however, these two localities suffered positive variation in their human population growth of 46% and 14% respectively, as illustrated in Table 4.

DISCUSSION

Based on the results, we can see how in the city of Bogotá, collecting, confining, and euthanizing companion animals had a marked activity until the first decade of the 21st century, a situation that has diminished because it is known the inefficiency that these methods have on the population control and on the control of zoonosis, particularly hydrophobia (11), in addition to the recommendations issued by the International Coalition for the Management of Companion Animals (ICAM), which established as non-humane to sacrifice dogs and cats by considering it unethical, cruel and ineffective (12).

Likewise, the World Organization for Animal Health, the leading entity in animal health worldwide, within the Health Code for Terrestrial Animals, allocates one of its chapters to "control of stray dogs", and it has recently reconsidered said title, renaming it "Management of dog populations". "; It should be noted that the control of cats is not included and has been addressed from other instances, this being one of the issues to improve since it is known that cats can be involved in the transmission of rabies (11); With this, the work carried out in Bogotá is supported, at least with public resources, because when reviewing the sterilizations carried

out per four-year period -government period- they have grown in Bogotá by about 81%, going from 59,067 during the four-year period 2004 to 2007 to 308,623 between 2016. and 2019.

At the territorial level, it is important to have slaughter statistics since those statistics are considered to assess the impact of "improving Dog welfare", proposed by the International Coalition for Companion Animal Management (ICAM) in its guide to monitor and evaluate dog population management interventions (12).

For example, when comparing the number of animals slaughtered with the statistics from Mexico, we can see that in that country in the municipalities of Guadalajara, Zapopan, Tlaquepaque, and Tlajomulco between the years 2012 and 2019 more than 52,000 dogs and cats were slaughtered, in Bogotá during the same period of time, 8,164 were slaughtered, a situation that suggests progress and allows us to infer how expanding the offer was the key since the rate of slaughtered animals decreased.

Regarding sterilization coverage, although there is evidence of an increase in both cats and dogs, it is clear that the cat population, according to the District Health Secretariat, has shown marked fluctuations, going from 150,000 in 2004 to 335,000 in 2013 and then in 2020 to 126,606; Therefore, it is advisable to design and implement methodologies that allow their updating.

Although it was found that between 2001 and 2021, 771,080 procedures were carried out with public resources, this activity must integrate the review and the approach of the different sources of animals, since a population management program must combine alternatives or strategies based on issues ranging from the promotion of health, possession and responsible consumption and the favoring of human and animal welfare in harmony with the environment (13).

The average sterilization coverage during the period of time studied was 3.1% for dogs and 15.8% for cats, added up to 19%; from which it can be concluded that it is similar to that presented in Taiwan, a country that has 20% coverage, and higher than that of Japan where it reaches 12% (14).

Estimating that the cost of a sterilization (surgical procedure only) in an expanded program ranges from fifty to eighty thousand Colombian pesos ($10.21 to $16.34 USD dollars), to sterilize 10% of animals (n: 121,082) in one year, between $1,236,719.38 to $1,978,751.00 dollars (USD) must be allocated respectively.

Taking a 25% contribution from the private sector (private veterinarians), the public resources necessary to achieve coverage of 10% of animals would amount to $927,539.53 or $1,484,063.25 dollars (USD), meaning savings that can be used for other processes, which it may be higher to the extent that there is greater participation of the private sector. The values in dollars were estimated with a reference to the Market Representative Rate (TRM) on October 27, 2022 equivalent to $4,8985.29 COP.

Although there is evidence of a strengthening in terms of sterilizations, it is important to move towards the generation of a comprehensive population management policy in order to contemplate and align actions with what is proposed by the World Organization for Animal Health, an entity that suggests that we should take into account: legislation , education, identification, registration, adoption, reproductive surveillance and management of trade; Comprehensiveness is achieved to the extent that different sectors and actors help to promote the responsibility that hosting a pet at home implies and what benefits it has for health and -human, animal and environmental welfare- of sterilizing the pet and establishing health plans, in addition to promoting education (13) and providing adequate socialization (15).

The programs aimed at low and middle social classes, and vulnerable animals, according to the results presented, present high pressure since the demand may be greater than the response, so it is not easy to achieve "universal" coverage; For this, it is suggested to generate alliances between the public and the private sector so that the latter, for example, includes "pro bono" actions to boost population management in the city, and most importantly, that they report it to the veterinary authority.

The "pro bono" proposal is not the least, since according to the National Administrative Department of Statistics (DANE) at the national level in 2020 monetary poverty was 6.8 percentage points higher than that registered in 2019 when it was 35.7%, a situation that affects lower-income households and represents a situation of similar risk of eventual abandonment of animals to that documented in Spain by Affinity (16).

Regarding the ownership of cats, it is important to report the particularities that enhance their reproductive capacity, since in tropical countries such as Colombia, females, being seasonally polyestrous, show recurring heat when exposed to periods of at least 14 hours of light/day. Another aspect is the induced ovulation, which makes its pregnancy almost effective, having between 1 and 5 kittens per litter (17).

In addition to the impact that sterilizations can potentially have on population management, it has been investigated whether they are related to the roaming phenomenon; on this, a conceptual framework of causality was formulated for the roaming of dogs and cats (18), within the framework the effects of sex, age and sterilization were assessed, establishing that roaming is greater in male dogs and that cats especially males have a greater home range compared to females (19).

The sterilization of cats and dogs in Bogotá dates from the end of the 20th century as a result of some conclusions delivered by CODEISA Ltda. to the District Health Department in 1999; among the most relevant were that the sterilization of animals was not practiced due to: "Lack of economic resources and the economic interest represented by their possession, especially of pure breeds"; From the above, it can be inferred that marketing existed as a problem and, in addition to being current, it contributes to population growth, abandonment, and street animals, since some of the problems arise from the birth of unwanted litters (20), which makes it necessary to address population management from different areas and contemplating different sources that potentially give rise to roaming animals (12).

The concept of one health (OH) is part of the global strategy proposed by the World Organization for Animal Health (WHO), which starts from recognizing the existing interactions between animal welfare, human welfare and environmental sustainability; Likewise, it is supported by the One Welfare framework, where population management together with other tasks carried out allows to mitigate affectations and maximize the benefits of a harmonious relationship between humans and animals (21).

This can be confirmed because, according to studies carried out since the 1970s, it has been found that: "In 6 years a bitch and its pups have the capacity, through their offspring, to produce 67,000 new puppies"; This statement becomes relevant because the lack of management instruments from the public administration can contribute to their proliferation, eventually having social and economic implications (20), resulting in the affectation of both animal and human welfare and health. From the above, it can be deduced that the number of sterilized female dogs in Bogotá (n: 179,387) between 2016 and 2021 -the last six years- has potentially prevented the birth of more than 12 million puppies.

Regarding litters and new specimens resulting from unwanted or unavoidable births, it must be indicated that they may potentially end up being subjected to acts of cruelty or mistreatment; abandonment, neglect, negligence, exploitation and deprivation of food or water (23), can be considered elements that affect the "five needs or freedoms" considered pillars in terms of Animal Welfare, and that although taken from the "five freedoms" included in the classic Brambell Report (1965), currently in Colombia they are taken up again in Law 1774 of 2016.

Although "stray" animals survive because of the compassion of people, they receive limited veterinary care and can transmit zoonotic diseases, posing a risk to the health and welfare of both the animal and human populations (23).

Regarding why those places where there was a greater human population growth such as the one identified in Ciudad Bolívar and Bosa, for example, did not have a "positive" impact regarding the decrease in their number of animals, it can be mentioned that the presence of food sources, the establishment of food sales and areas with unordered garbage disposal may provide favorable conditions for the settlement of canine specimens (24).

The generation of administrative acts such as Laws or Decrees where sterilization is addressed has permeated different countries. For example, in Europe, said intervention is proposed as an approach to "stabilize" the population of dogs and cats (25); When comparing it with Bogota, different standards have been generated in the city over time, allowing progress, as can be seen in the results, by reducing the sacrifice of healthy animals and increasing sterilization coverage.

The results indicate that the number of companion animals grew by 1% between 2015 and 2021 (from 1,193,534 to 1,210,820

respectively), maintaining an animal: human ratio of approximately 1:6 (one animal for every six people), a situation similar to that observed at the international level since PAHO mentions in its Report on the results of the national rabies programs for the years 2015 and 2016, that the human-dog ratio can vary between 1:4 to more than 1:8, placing Colombia next to Peru, Suriname and Venezuela in the second scenario proposed (26).

Finally, it is concluded that it is not pertinent to fragment the health and well-being implications that also include spheres of an economic and social nature when it comes to the reproduction of companion animals, and therefore, the One Health framework is complemented by One Well-being (One Welfare) are useful, especially when the Inter-American Society of Veterinary Public Health expressed at the I International Meeting, held in Bonito, Mato Grosso do Soul, Brazil (2009) "there can be no human health if there is no animal health, and both they cannot exist if the environment is not healthy if it has deteriorated and, if it is not sustainable" (27).

In reality, the complexity of the problems that affect human, animal, and environmental well-being gain relevance and positioning in this globalized society, for this reason, it is essential to think and recognize that every cause has an effect and that the decisions and actions of the human being have implications on the other elements and creatures with which we cohabit this space.

Ethical aspects and conflict of interest

During the making of this paper, no animals were used; No confidential or sensitive information that could cause harm was used. Likewise, the authors of this study declare that there is no conflict of interest with the publication of this paper.

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