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A Linear Regression Study Relating Stray Animal Management with the Importance of Relative Funding. A Case Study in a Small Greek City

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Abstract

Cities all around the world face the constant difficulty of regulating stray animal populations in urban environments. Abandoned or lost dogs and cats find refuge on urban streets, where they face a variety of challenges. This essay dives into the complex subject of managing stray animal populations in metropolitan areas. Stray animals on the streets are malnourished, exposed to harsh weather conditions, and infected, creating a huge public health concern by spreading illnesses such as rabies. Collaboration among communities, local governments, and animal welfare groups is critical in combating this issue efficiently. Implementing large spay and neuter programs, building animal shelters, and encouraging ethical pet ownership are all popular solutions for addressing this issue. To create safer and more compassionate urban settings for both humans and animals, it is critical to invest in vaccination and disease prevention programs, strengthen animal welfare regulations, and encourage community involvement. This study will use data from a municipality in Greece's Attica area to evaluate the link between greater spending and improved stray animal management. The examination of yearly veterinary care costs demonstrates an increase in financing but no commensurate increase in the number of animals seeking veterinary treatment. As a result, state and local authorities must take a more targeted and efficient approach to addressing this disparity. Although the state is willing, the challenge of reducing stray animal numbers persists, requiring ongoing attention and financial support. Cities can strive towards creating inclusive and healthier urban environments for all residents by addressing root causes and implementing viable solutions. This paper proposes a more targeted approach to tackling this complex issue.

Keywords: strays, veterinary services, neutering, stray management, funding

1. Introduction

Cities are a popular approach to the future of urban living. The planning of modern cities is done with the well-being of its inhabitants in mind. However, in cities, people simultaneously stray pets and urban fauna. All living organisms must live free from the stress caused by the lack of housing and all that it entails. Animals pose a significant challenge to urban planning, and their

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presence can negatively impact the well-being of both humans and animals. Depending on the circumstances, there are several ways to manage the animal population. This essay explores the control of stray animal population.

Stray animals are an ongoing issue in cities worldwide. These creatures, primarily dogs and cats, wander the streets for food, shelter, and company. As a result, both the animals and the communities in which they live face several challenges. The complex issue of stray animals in urban areas severely affects public health, economy, and society.

Misplaced and abandoned, disorderly breeders and a lack of legislation are the leading causes of stray animals in cities (Wu et al., 2022). Sometimes, people get pets without realizing how much time and effort is required to own them. As a result, owners regularly abandon their animals when they get tired of caring for them or run into issues, and the population of stray animals in cities grows (Zhang, 2022).

The absence of spaying or neutering programs increases this issue. An overpopulation is triggered by stray animals reproducing uncontrolled, which renders it challenging for animals to obtain sufficient shelter and food as they usually live in struggling circumstances (Seimenis et al., 2014). This process reinforces the problem since their offspring suffer the same fate.

Stray animals face several challenges on the streets. They are frequently infected, exposed to severe weather, and starved. Their agony is aggravated by the little medical care they get. Sick or injured animals commonly go untreated, resulting in a visible decline in health and well-being. Unowned urban stray cats are a significant problem across the world. With a 75-90% kitten mortality rate at six months of age, the safety of urban stray cats is routinely jeopardised. Other welfare issues include disease, mistreatment, and starvation (Changrani-Rastogi et al., 2023).

When stray animals congregate in urban areas, they pose a severe threat to public health. Certain illnesses, such as rabies, can be transmitted to humans through bites or scratches from these animals. Their faeces can also harbour infections and parasites that harm health, especially in congested metropolitan areas (Seimenis et al., 2014). To avoid these risks, cities must generate funding for animal control and vaccine programs. Stray animals may potentially endanger people on the streets. Animals that are aggressive or fearful may endanger pedestrians. The importance of tackling the problem is emphasised since stray animals can cause injury or even death in highway accidents (Balasubramanian et al., 2023).

One of the primary issues is the general care of stray animals. Aside from hunger and thirst, these creatures are always afraid of abuse or aggression. Being homeless may also have an impact on their mental and emotional well-being. They typically experience dread, concern, and loneliness when navigating the urban environment. To tackle the problem of stray animals in cities, local governments, animal welfare organisations, and concerned people typically work together.

One of the most successful ways to reduce the number of stray animals is to implement large-scale spay and neuter programs. Fewer stray animals will remain because of these efforts to prevent further breeding.

Creating and operating animal shelters and rescue organisations can provide a haven for stray animals. These organisations usually provide adoption, rehabilitation, and medical services.

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Preventing pet abandonment necessitates educating the public about responsible pet ownership. Spaying and neutering, excellent pet care, and adoption from shelters rather than pet sales are all ways to help reduce the number of strays (Wee et al., 2022). Furthermore, guiding active citizens to collaborate with public services with the aim of maximizing outcomes is very important (Konstantinou et al., 2020), (Konstantinou et al. 2022).

Enforcing and strengthening animal welfare regulations can act as a deterrent to animal mistreatment and irresponsible pet ownership. The severity of the consequences for failing to provide sufficient care for pets or abandoning them should dissuade such behaviour. Local Community Participation: Involving the community in animal rescue and welfare efforts may have a significant impact. One way the community may assist in solving the problem is to encourage individuals to report stray animal sightings, volunteer at shelters, or provide short-term foster care.

Coordination between governmental agencies, organisations, and private residents is required to solve the issue of stray animals in metropolitan areas. Even though there has been progress in many places, the problem requires ongoing attention and investment. By addressing the underlying causes of stray animal populations and adopting practical remedies, cities may eventually create safer, healthier, and more compassionate urban environments for human and animal people.

Numerous studies have investigated strategies to address the issue, with a primary focus on neutering programs (Adams, E., 2020; Meli et al., 2024; Tilley et al., 2023; Changrani-Rastogi et al., 2023) and targeted trap-neuter-vaccinate-return (TNVR) initiatives (Spehar et al., 2019; Spehar, D. et al., 2020a; Spehar, D. et al., 2020b; Koch, E., 2023). These studies seek to determine the efficacy of these approaches in lowering stray populations. Our research acknowledges the good benefit of neutering programs on population control; nonetheless, the fundamental difficulty is a lack of resources and focused funding in many countries.

In our research region in Greece, the central government outsourced responsibility for managing the stray animal problem to municipalities; nevertheless, in fact, the required resources have not been supplied. The most basic resource that the state can provide is financial support.

As described below, financing in Greece has grown in the post-COVID-19 period. Previously, financing was limited and geared primarily at giving temporary financial assistance to local governments to fulfil their growing duties, rather than addressing the issue substantively.

Based on relevant studies, it is well-established that sterilization is an effective method for reducing stray animal populations. These studies focus on strategies to capture as many animals as possible and provide veterinary care. However, in Greece, the primary challenge lies in managing the financial aspects associated with stray animal control.

Greece benefits from a strong animal welfare community (Athens Voice, 2020) that assists Municipalities in capturing and transporting animals to veterinarians, often supplementing or even substituting the role of the Municipalities. Additionally, the state provides annual funding to support comprehensive management programs.However, when the Funding is given several months after the related expenses that the Municipality has spent and it does not correspond to

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the number of recipients that each Municipality has to deal with separately, which is one part of the problem.

This problem is worsened by the fact that funding arefunded based on municipal expenditures rather than the actual number of animals requiring sterilization and the community's true requirements. As a result, the financing offered never adequately addresses these critical demands.

In practical terms, if a municipality does not spend enough expenditures for animal sterilization, the funding it receives will be proportionately little. This exacerbates rather than solves the situation, resulting in a loop of insufficient finance and unsolved animal management difficulties.

2. The Global Impact of Stray Animals: Challenges and Considerations

Dogs and cats that roam the streets pose severe concerns in many metropolitan places worldwide. This portion of the article will look at the presence and impact of stray animals, focusing on the problem's worldwide extent, geographical differences, threats to public health, environmental implications, and concerns about animal welfare.

The worldwide stray animal problem affects both developed and underdeveloped countries. Urbanisation, population density, and cultural views toward pet ownership all contribute to regional disparities in the scale of the problem. Stray animal populations are exceptionally high in some locations due to a lack of animal care resources, inadequate animal control tactics, and a high percentage of pet abandonment (Zhang, 2022).

There are various environmental repercussions to stray animals in cities. One of the most severe challenges is waste management. In pursuit of food, stray animals regularly forage through rubbish bins and cans, resulting in litter and waste dispersed in public locations. This not only contributes to unattractive and unclean circumstances, but it can also attract additional bugs and rodents.

The well-being of stray animals is a top ethical priority. These animals usually suffer from malnutrition, sickness, and injury and have limited veterinary treatment and shelter access. They are subjected to harsh weather, accidents, and human or animal cruelty. Stray animals suffer similar reproductive challenges, with unregulated breeding leading to an exponential growth in population. A lack of neutering programs and human engagement exacerbates their discomfort (Davey et al., 2020), leading to behavioural difficulties and a lesser possibility of a successful adoption.

A detailed study of its occurrence, effect, and underlying causes is required to address the issue of stray animals. If we realise the global scale and regional variances, we may customise solutions to each area's needs and difficulties. Recognising possible dangers to public health, such as disease transmission, and proactively preserving both human and animal well-being is vital (Grandin, 2020). Furthermore, long-term solutions that balance ecosystem preservation and urban expansion are essential because of the environmental impact of stray animals on waste management and biodiversity. Finally, animal welfare considerations should guide efforts to offer compassionate treatment, promote responsible pet ownership, and adopt effective population management measures (Pan, 2022).

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3. Impact Factors on the Stray Animal Population

The issue of stray animals is multifaceted, and many causes contribute. The homeless animal population is influenced by three key factors: irresponsible pet ownership and abandonment, a lack of monitoring systems, and inefficient animal control legislation and enforcement (Zhang, 2022).

Irresponsible pet ownership contributes significantly to the stray animal population. Some adopt pets without fully understanding the responsibility and time commitment of caring for them. As a result, whether faced with financial restrictions, lifestyle changes, or behavioural concerns, these people are more likely to forsake their pets rather than seek suitable alternatives. Pets that have been abandoned commonly wind up on the streets, where they join the ranks of stray animals. There is also neglect and a lack of primary care, such as insufficient food, water, shelter, and veterinary treatment, which are examples of irresponsible pet ownership (Pan, 2022).

The dearth of conveniently accessible and cheap spay/neuter programs considerably adds to the stray animal population. If pets are not spayed/neutered, uncontrolled breeding leads to exponentially increasing stray animals. Female animals that have not been spayed can produce many kittens yearly, a rapidly increasing population that outnumbers available resources. If nothing is done, this cycle will continue, exacerbating the stray animal problem. Spaying and neutering programs are crucial for lowering the homeless animal population by restricting reproduction and preventing strays from becoming more prevalent (Seimenis et al., 2014).

Animal control regulations' efficacy and enforcement are crucial in regulating the stray animal population. Animal control regulations that are comprehensive and well-implemented are needed to strengthen attempts to address the issue in many regions. Animal control organisations and municipal governments may need additional money, infrastructure, and trained staff to handle stray animals efficiently. Inadequate financing for animal control operations can lead to fewer sterilisation efforts, fewer shelters, and fewer education and outreach initiatives. Inconsistent implementation of current rules, such as leash laws and pet licensing requirements, also contributes to the spread of stray animals (Abdulkarim et al., 2021).

To address the causes of the stray animal population, a multidimensional approach that involves education, law, and community engagement is required. Responsible pet ownership may be encouraged through public awareness campaigns and educational initiatives that help address abandonment and neglect. Subsidies, incentives, or required spay/neuter programs for pet owners can drastically reduce the number of unwanted litters and halt population growth. Animal welfare groups and governments must collaborate to develop and implement successful animal control policies prioritisingsterilisation, stray animal management, and adoption programs. Enforcing current restrictions and implementing fines for irresponsible pet ownership can also act as a deterrent and encourage responsible behaviour (Pan, 2022).

Briefly, irresponsible pet ownership and abandonment, a lack of spay/neuter programs, and poor animal control legislation and enforcement contribute significantly to the stray animal population. Addressing these elements via education, regulation, and community engagement makes it feasible to lessen the problem and move toward a more humane and responsible approach to pet ownership.

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4. Stray animal management and legislation in Greece

Sadly, Greece has a profound and enduring problem of stray animals. The country is home to many stray dogs and cats that cause problems for the communities they live in and the animals themselves. These animals can roam the streets of cities, towns, and even isolated villages. Greece's stray animal problem is complicated, with broad social, economic, and health ramifications. The number of stray dogs and cats in the nation is estimated to be almost three million, according to a study by the Aristotle University of Thessaloniki in 2022, which leads to an imbalance in the populations of humans and animals. According to the Ministry of Rural Development and Food, most stray dogs are in the Region of Attica and Central Macedonia (22.711 and 20.986, respectively). Most stray canines are found in the Regional Units of Thessaloniki (8.234) and Eastern Attica (7.701) (Papavasili et al., 2023). However, the studies undertaken in Greece and two large cities only offer estimates of the general stray animal population, not particular statistics for each municipality. This lack of precise information prohibits towns from recognizing the true number of stray animals in their communities and adopting focused care measures appropriately. Several causes contribute to the overpopulation, including irresponsible pet ownership, abandonment, and uncontrolled reproduction.However, these studies about Grecce and two big cities estimates the stray animals in general without each municipality separately knowing the actual number of animals it has and taking care of them accordingly. Furthermore stray animal populations are particularly high in certain locations due to inadequate animal care resources, ineffective animal control methods, and a high incidence of pet abandonment.

Greece's stray animal "epidemic" has several underlying reasons. One significant contributing cause is the pervasive culture of pet abandonment, when owners routinely give up their animals when they become burdensome or inconvenient. The issue has been made worse by the fact that many Greek citizens are struggling financially and are thus unable to provide their pets the attention they need.

Greece's vast stray animal population has far-reaching effects on several fronts. Stray animals negatively impact public health because they can spread illnesses like rabies to people and other animals. Animal bite injuries are another issue. In addition, an oversupply of stray animals ruins urban environments and risks community welfare in general.

The well-being of stray animals is a crucial facet of this issue. It is common for strays to experience malnourishment, illness, violence, and disregard. They have a somewhat shorter life expectancy and are exposed to severe weather. Intervention is required due to the ethical considerations raised by the predicament of these creatures (Grandin, (2020).

The Greek government delegated the management of stray animals to municipalities before providing the agencies with staff, sufficient funds, and legal flexibility. The new stray companion animal law obligated the towns to take several steps to help homeless animals. However, they needed to prepare to handle the stray animal problem with planning, funding, personnel, and expertise.

Governments cannot draft veterinary care contracts without having voted on the budget for the prior fiscal year. Additionally, the funds available for contracts are always limited. Since municipalities are tasked with providing veterinary care for stray animals on a 12-month basis, it

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is impossible to predict when they will need it (for instance, one can never predict how many animal accidents or herds of animals will pass through a given area). As a result, the funds from these contracts expire before they do, and they cannot continue training new employees during the same fiscal year because the law does not provide for this duality.

The same legislation governs contracts concerning stray animals and corresponding studies from which they derive, whether it concerns the purchase of products or the provision of veterinary services. As the legislator gave the authority to the municipalities, he should also give the corresponding ways so that they can cope. Above all, living beings cannot be treated by the law in the same way as consumer goods or objects.

The collection of stray animals also belongs to the responsibilities of the municipalities. The law itself states that specially trained people must do it. For training certification in this field, there should also be a corresponding body that provides it. The Ministry of the Interior wants to create Public Vocational Training Institutes, but for there to be graduates of these schools, more than 2.5 years will have to pass and to hire personnel for the collection of stray animals, recruitment notices should be created through the Supreme Personnel Selection Council (ASEP) to recruit personnel to the Municipalities after their recruitment has first been approved by the Ministry of the Interior all the above require a long period to be fulfilled. However, hiring employees to help the Municipalities fulfil their obligations (e.g., collection, establishing a municipal veterinary clinic) is once more impossible because it is subject to national recruitment laws. In this instance, the legislator encouraged the municipalities to handle the stray animal issue without having the necessary tools or resources.

One of the key issues in handling stray animals in Greece is a lack of research about the exact number of stray animals by region or municipality. Such studies would be useful in ensuring that financial allocations reflect the real extent of the problem. Currently, funding is given depending on the number of animals being treated by contracted vets. Furthermore, money is paid after expenditures have been spent, based on the number of animals who got medical care.As a result, each municipality allocates a set amount for veterinary services each year, usually based on its financial capabilities rather than the real needs indicated by the stray animal population. This strategy bases funding on the economic resources of particular towns rather than the size of the stray animal problem.

5. Case study: Municipality belonging to the Northern sector of Attica with a population of 39,628 (according to the 2021 population census).

According to Law 4830/2021, municipalities are obliged to take care of the collection and management of stray pets. For this essay, we collaborated with a local self-government body of the northern sector of Attica to collect data from archival material, volunteers, and animal welfare associations to have as realistic a picture as possible of the existing situation.

The veterinary services in this municipality started in 2015, and this essay will provide data until 31 October 2023. Detailed tables with veterinary services follow below. The services and the activities provided were carried out with the aim of stray pets' well-being. However, the activation of volunteers - citizens - associations of the city and the future change in dealing with

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stray animals, with the aim of responsible management of stray and controlled animals as the occupied are the primary source of creating new strays and always by what is defined by law.

In the year 2015, one (1) cat was taken to the vet marked and neutered.

In 2016, three (3) cats were taken to the vet, marked, and neutered.

In 2017, fifty-three (53) cats were taken to the vet, marked, and neutered.

In 2018, two hundred and twenty-three (223) cats were taken to the vet, marked, and neutered.

In the year 2019, two hundred and forty-four (244) cats were taken to the vet, two hundred and thirty-eight (238) were marked, and eighty-five (85) were neutered.

In the year 2020, (293) cats were taken to the vet, (204) were marked and (178) were neutered.

In the year 2021, (350) cats were taken to the vet, (278) were marked, (218) were neutered, and (75) were treated in a clinic.

In the year 2022, (198) cats were taken to the vet (171) were marked, (115) were neutered, and (37) were treated in a clinic.

From 1 January 2023 until 31 October 2023, (285) cats were taken to the vet, (262) were marked, (171) were neutered, and (44) were treated in a clinic.

Below are tables of veterinary services and the corresponding amounts spent each year from 2015 to October 2023 for veterinary care and accommodation in animal shelters.

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Services per year (The Contracts about a private shelter because there are no places for an animal shelter to be constructed)	Amount spent by the Municipality	Government Funding
2015 Veterinary Services and shelter for stray animals	11.500,00€	No funding available for veterinary services The government provides funding only for construction
2015 Veterinary Services and shelter for stray animals	5.000,00€	No fundingavailable
2015 Shelter forstrayanimals	3.500,00€	The government provides funding only for construction
2016 Veterinary Services of Stray Animals	18.450,00€	No fundingavailable
2016 Shelter forstrayanimals	10.024,50€	The government provides funding only for construction
2017 Veterinary Services of Stray Animals	24.800,00€	No fundingavailable
2017 Shelter forstrayanimals	12.000,00€	The government provides funding only for construction
2018 Veterinary Services of Stray Animals	24.800,00€	2.251,74 €
2018 Shelter forstrayanimals	12.000,00€	The government provides funding only for construction
2019 Veterinary Services of Stray Animals	24.800,00€	1.933,16€
2019 Shelter forstrayanimals	12.000,00€	The government provides funding only for construction
2020 Veterinary services for collection and management of stray animals	24.800,00€	9.068,05€

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2020 Shelter forstrayanimals	28.500€	The government provides funding only for construction
2021 Veterinary services for collection and management of stray animals	37.200€	13.200,00€
2021Shelter forstrayanimals	24.800,00€	The government provides funding only for construction
2022 Veterinary services for collection and management of stray animals	37.200€	13.200,00€
2022 Shelter forstrayanimals	24.800,00€	The government provides funding only for construction
2023 Veterinary services for collection and management of stray animals	37.200€	13.200,00€
2023 Shelter forstrayanimals	24.800,00€	The government provides funding only for construction

Since 2021 and after the new law 4038/2021, municipalities have been obliged to ensure the sterilisation of stray animals and their hospital treatment when needed, with the necessary condition of the continuous provision of veterinary services throughout the year.

Below are tables with detailed veterinary services and the corresponding animals treated from 2021 to October 2023 and refer to services referred to in the new law.

However, according to the above data, the number of sterilisations, the most effective measure for reducing populations, does not increase correspondingly with the available amounts. The most considerable sums are spent on animal care.

Of course, treating sick and injured animals is an essential addition to the obligations of the municipalities. However, the amounts available for veterinary care are limited as they are based on the financial strength of the municipalities and not on the existing needs.

The municipality receives 450 to 500 requests for veterinary services each year, but the money can only cover a certain number of animal incidents until the contractually allocated amount is used up.

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NUMBER	VETERINARY SERVICES 2021 (350 ANIMALS)	TOTAL
1	SPAYING OF A FEMALE CAT	144
2	CASTRATION OF A MALE CAT	68
3	SPAYING OF A FEMALE DOG	3
4	STERILISATION OF A MALE DOG	1
5	VACCINES	136
6	BLOOD-LEISHMANIASIS	17
8	MICROCHIP PLACEMENT	239
9	X-RAYS	9
10	GENERAL BLOOD TEST/ BASIC VETERINARY EXAMINATION	35
11	DEWORMING (IN/OUT)	129
12	SIMPLE STAY (199 CATS +23 DOGS)	222
13	BIOCHEMICAL TESTS	137
15	SURGICAL PROCEDURES	24
16	ERHLICHATION EXAMINATION	3
19	MANAGEMENT OF POISONING	17
20	INTENSIVE STAY (86 CATS +8 DOGS)	94
21	SURGICAL PROCEDURES	2
22	COLLECTION	21
23	CULTIVATION	3
24	CYTOLOGY	8
25	TREATMENT	17
26	FELV-FIV-FIP	8

6. Regression Analysis

Initially we conduct Linear Regression between number of cats neutered (dependent) and total amount spent (independent). Below are the results:

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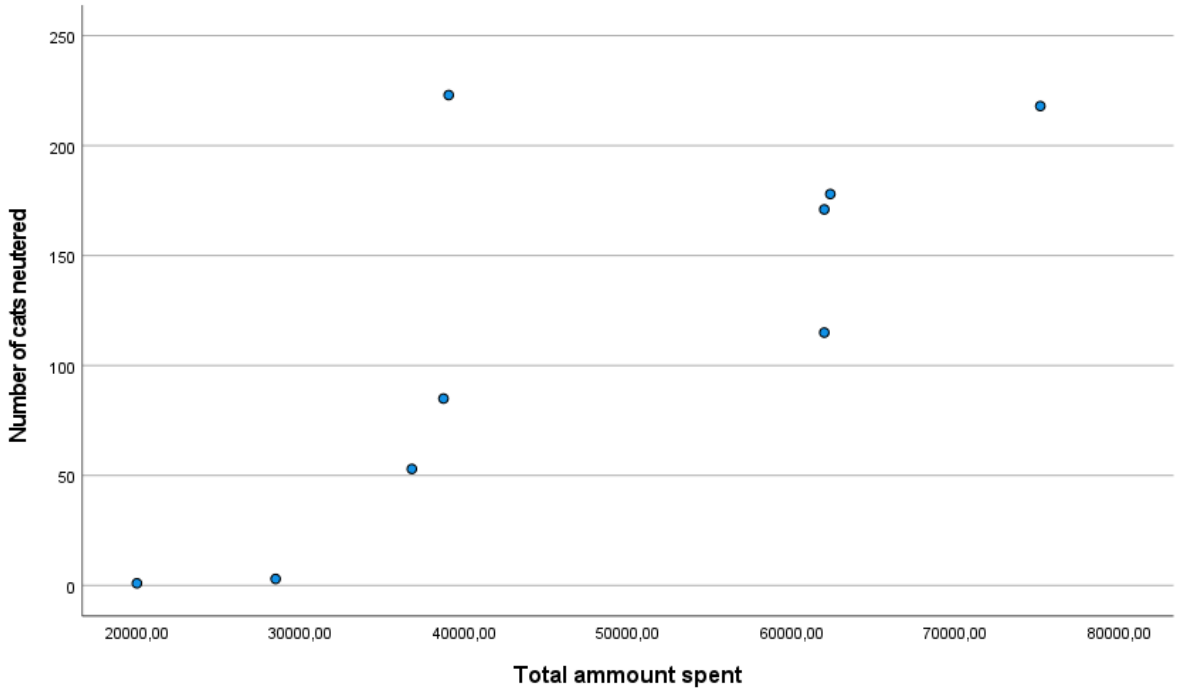

ModelSummary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	ChangeStatistics R SquareChange	F Change	df1	df2	Sig. F Change
1	,766[a]	,587	,529	59,288	,587	9,968	1	7	,016

a. Predictors: (Constant), Total amount spent

ANOVA[a]

Model		Sum of Squares	df	MeanSquare	F	Sig.
1	Regression	35040,129	1	35040,129	9,968	,016[b]
	Residual	24605,871	7	3515,124		
	Total	59646,000	8			

a. Dependent Variable: Number of cats neutered

b. Predictors: (Constant), Total amount spent

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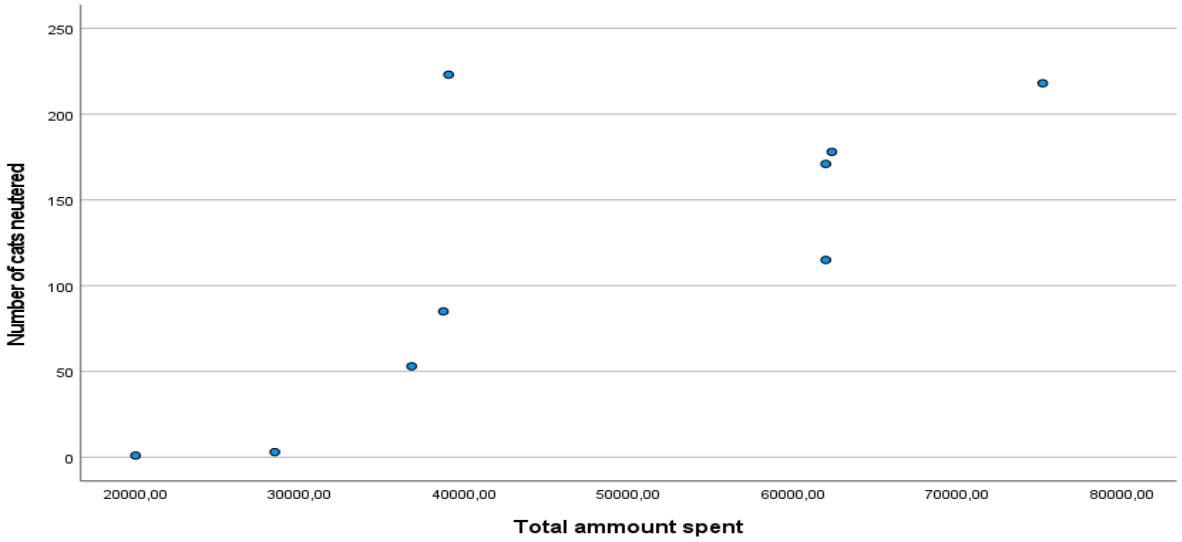
Coefficients[a]

Model		UnstandardizedCoefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	-50,904	56,536		-,900	,398
	Totalammountspent	,004	,001	,766	3,157	,016

a. Dependent Variable: Number of cats neutered

Then we conducted a regression analysis between number of cats taken to the vet (dependent) and total amount spent (independent). Below are the results:



ModelSummary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	ChangeStatistics R SquareChange	F Change	df1	df2	Sig. F Change
1	,861[a]	,741	,704	71,584	,741	20,001	1	7	,003

a. Predictors: (Constant), Total amount spent

ANOVA[a]

Model		Sum of Squares	df	MeanSquare	F	Sig.
1	Regression	102492,094	1	102492,094	20,001	,003[b]
	Residual	35869,906	7	5124,272		
	Total	138362,000	8			

a. Dependent Variable: Number of cats taken to the vet

b. Predictors: (Constant), Total amount spent

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Coefficients[a]

Model		UnstandardizedCoefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-102,687	68,260		-1,504	,176
	Totalammountspent	,006	,001	,861	4,472	,003

a. Dependent Variable: Number of cats taken to the vet

4. Discussion

The linear regression analysis between number of cats neutered and total amount spent reveals a moderate positive relationship between the independent variable "total amount spent" and the dependent variable "number of cats neutered". The correlation coefficient (R) of 0.766 indicates a moderate linear association between the two variables. Although statistically significant, the coefficient of determination (R square) of 0.587 suggests that approximately 58.7% of the variance in the number of cats neutered can be explained by the total amount spent, indicating a moderate explanatory power of the model. While there is a discernible relationship between the total amount spent and the number of cats neutered, it is not as strong as one might expect. Thus, it can be concluded that while increases in the total amount spent tend to correspond with increases in the number of cats neutered, the relationship is moderate and subject to variability. It's important to recognize that factors beyond the scope of this analysis may also influence the number of cats neutered.

The scatter plot illustrates the relationship between the total amount spent and the number of cats neutered. Each data point represents a combination of these variables for a particular observation. Upon visual inspection, the plot reveals a generally upward trend, indicating a positive association between the two variables. However, the spread of the points suggests some variability in the relationship, as the data points do not perfectly align along a straight line. This variability is consistent with the moderate strength of the correlation coefficient observed in the regression analysis. While there is a discernible pattern indicating that higher amounts spent are generally associated with a greater number of cats neutered, it's important to note that there are instances where this relationship does not hold true, leading to some dispersion in the data points. This scatter plot underscores the importance of considering both the direction and strength of the relationship between variables, as well as the extent of variability, when interpreting regression results.

The analysis between the independent variable "total amount spent" and the dependent variable "number of cats taken to the vet" reveals an even stronger correlation. The correlation coefficient (R) of 0.861 and the coefficient of determination (R square) of 0.741 indicate that approximately 74.1% of the variability in the number of cats taken to the vet can be explained by the total

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amount spent. This suggests that an increase in the total amount spent is consistently associated with a corresponding increase in the number of cats taken to the vet. This result reinforces the previous observation and indicates that spending money on veterinary care is closely linked to the number of visits cats make to the vet.

The corresponding scatter plot reveals a more concentrated correlation between the total amount spent and the number of cats taken to the vet. The data points are almost systematically aligned along an upward-sloping line, indicating a consistent increase in the number of cats taken to the vet as the total amount spent increases. Although there is some dispersion around the fitted line, the overall trend is clear. This observed pattern confirms the strong correlation observed in the analysis and underscores the importance of spending on veterinary care in promoting feline health.

These results suggest that investing in veterinary care plays a crucial role in promoting feline health and encouraging visits to the vet.

However, it's crucial to acknowledge that the relationship observed in this study is not absolute. Factors beyond the scope of this analysis, such as community engagement, cultural attitudes towards animal welfare, and the effectiveness of local animal welfare programs, may also influence the number of cats neutered and taken to the vet. Therefore, while increased spending appears to correlate with greater outcomes in terms of feline welfare, a comprehensive approach involving various stakeholders and strategies is essential to address the complex issue of stray animal management effectively.

The numbers above show that both the state and municipalities allocate growing amounts of funds for stray animal control each year. However, the quantity of animals requiring veterinary treatment does not correspond to rising costs. This tendency continues since the allocated monies are not only used for sterilization but also for the animals' medical treatment in the event of sickness or accidents.

A more efficient funding method would be to set clear goals for each municipality at the start of the fiscal year, providing a certain sum specifically for animal sterilization. After the year, each municipality's performance would be judged based on its ability to meet these objectives. This policy would encourage communities to prioritize and expand the number of animals who receive veterinarian neutering services. A targeted funding strategy might produce better results since governments would aim to fulfil their objectives while covering sterilizing expenses with given monies.

Undoubtedly, the issue is quite complicated, considering the disparities in animal abandonment rates and environmental conditions that favour reproduction across various locations or towns. However, if each municipality had precise data on its stray animal population and was funded based on particular performance targets, the stray animal problem might be significantly reduced.

All stray animals require veterinary care to address the challenges they face while living outdoors. However, municipal financing should prioritize sterilization efforts, as it is one of the most effective methods for reducing their population. Funding allocations should be tied to municipalities' goals of conducting as many sterilizations as possible. By reducing the number of animals through sterilization, the incidence of accidents and diseases can also be minimized.

This approach ensures that costs and funding are directed towards the core issue of animal population reduction.

In conclusion, while this study highlights the importance of financial resources in supporting initiatives aimed at controlling stray cat populations and promoting their well-being, it underscores the need for a multifaceted approach that considers broader socio-cultural contexts and engages local communities in the effort towards sustainable and humane stray animal management practices. By addressing these complexities and collaborating across sectors, we can work towards creating healthier and safer environments for both humans and animals alike.

This study intends to address the existing issue and set the path for future research into strategies for lowering the number of stray animals. Informational campaigns advocating foster adoption and giving incentives may help to reduce the number of abandoned animals on the streets.

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