

COMMUNITY CASE STUDY

Implementation and Evaluation of Nutritional Management Improvements for Elderly Community Cats on a University Campus

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Abstract

Although the nutritional management of domestic pet cats has been widely studied, research on the dietary needs of community cats, especially older individuals, remains limited, mainly due to environmental and biological challenges that prevent many cats from reaching advanced age. This case study examines the nutritional assessment and the implementation of feeding improvement strategies for a group of community cats, mostly elderly (11/13), living at the Faculty of Philosophy and Human Sciences (FAFICH) in the Pampulha campus of the Federal University of Minas Gerais (UFMG), Brazil. Data collection from October 2022 to July 2024 included demographic documentation, photographic records, direct observations, and caregiver interviews. Key strategies implemented: 1) installing feeding stations to protect dry food from stray dogs, 2) nutritional and body condition assessments, 3) creation of a Solidarity Food Bank to ensure food through donations. The diet consisted of *ad libitum* dry kitten food and a daily wet food meal. An innovative positive reinforcement self-weighing system was introduced for regular weight monitoring. During the study, cats' body condition improved significantly, food security was achieved, and caregiver-cat bonds strengthened, showing the importance of targeted interventions to improve community cats' general welfare, especially older ones.

Keywords: *colony cats; animal food security; welfare; feeding stations; animal food bank; human-animal bond*

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Elderly cats are generally 8 years old and older, while 'geriatric' refers to the state of health, not to a specific age.¹ Aging is a natural process of life but when cat owners and veterinarians are able to identify diseases related to aging, proper treatment can be offered to ensure animal welfare.² Fat and protein digestibility decreases with age, and approximately 20% of cats over 14 years will benefit from an energy-dense, highly digestible diet to help with these age-related metabolic changes.³ Nutritional assessments should include body weight and body condition score, type of food offered, and quantities.⁴ Making such evaluations is easy for domestic pet cats. However, some free-roaming community cats' feral or semi-feral behaviors make follow-ups possible only by trapping and anesthesia or long-distance observations.^{5,6}

Although studies about nutrition for community cats exist,⁷ information about older free-roaming animals was not found. This community case report examines the nutritional assessment and the implementation of feeding improvement strategies for a group of community cats, mostly elderly (11/13) with an estimated average age of 10 years old, living at the Faculty of Philosophy and Human Sciences (FAFICH) in the Pampulha campus of the Federal University of Minas Gerais (UFMG), Brazil.

Background

The FAFICH was inaugurated on the UFMG Pampulha campus in 1990. Since then, stray cats have been frequenting its hallways, reflecting the abandonment of those animals in the university. Academic community members

cared for the cats, providing them with food and water, spaying and neutering, vaccinations, and promoting responsible adoptions. A census in the 1990s estimated 40 to 50 cats. In 1999, most of the cats were killed by gas chambers in a joint action between the FAFICH management at the time and the municipal Center for Zoonosis Control, but the abandonment persisted. In 2015, new episodes of violence against animals occurred, with the poisoning and cruel deaths of several cats, most of them kittens (Mendes, M. M. M., Coser, S., Silva, M. C. M., interviews with the author, January 2024).

In 2019, the Federal University of Minas Gerais formalized its Permanent Commission for Animal Policy on Campuses (CPPA), whose main objectives were the ethical population management of dogs and cats residing on campuses and the surveillance of wildlife, in addition to raising awareness among the academic community to reduce possible conflicts and abandonment.⁸ Despite the officialization of the CPPA by the rector's office and veterinary care by the UFMG Veterinary Hospital, no resources are available for many essential supplies and no specialized technical team for managing and caring for domestic and wild fauna. Feeding the community dogs and cats is a significant challenge, with volunteer caretakers responsible for the animals' food without financial help from UFMG.

By 2022, the population of FAFICH's resident cats had significantly decreased since 2015, but a set number was unknown, since most animals had black fur and were unsociable. In October 2022, the study's author discovered that, since their former caretakers' retirement, the unit's cats were not fed on weekends or holidays. Cats are the only domestic species living at FAFICH, but stray dogs roaming the campus would eat the food when available. A lack of proper feeding practices was also identified.

Methods

This study was approved by the UFMG Research Ethics Committee (number 3.356.456) and the Ethics Committee on the Use of Animals (protocol 60/2022).

The following temporal division was used for the activities:

Demographic survey – October (2022) to July (2024)

The demographic survey was conducted through interviews with the primary caregiver in 2022, photographic records and wildlife cameras (Moniss Waterproof Digital Hunting Trail Camera 1080P, 12MP and Karlak Waterproof camera with TFT 2.0 internal color display, 16MP, 1080P), observation of the animals, monitoring of the care routine, and usage of camera traps to record the cats. The Alley Cats Allies' 'Visual Identification Guide' (2018)⁹ and the 'Uniform Color Descriptions and Glossary of Terms' from The International Cat Association (TICA) (2020)¹⁰ were used to catalog and describe the FAFICH cats based on coat length, color, and pattern.

During the visits for observation, they were asked about each animal (e.g. if the cat had a name, sex, and age estimate). The ages were established from the estimates informed by the caregivers and their photographic records. All the cats were already spayed and neutered years before the beginning of the visits, but since the majority were short-haired black cats, the primary caregiver had trouble telling them apart, with only four of them having names. Also, some cats avoided human interaction and only showed up when the FAFICH building was empty (weekends and late-night hours).

Welfare assessment concerning food management – October to December (2022)

Four methodologies were combined:

1) Body score assessment

The Purina Institute Body Condition System (2020)¹¹ was used in this stage. Due to their low level of socialization, the cats could not be handled or physically examined. The parameters ribs, abdominal tuck, lumbar vertebrae, wings of ilia, and abdominal fat pad were used as visual markers. The body score assessment was determined through direct observation or via the wildlife cameras.

2) Weighing through conditioning with positive reinforcement and gentle handling

Due to their unsocialized behaviors, the cats were taught to weigh themselves through positive conditioning with wet food. The weighing started in January 2023 after purchasing a digital scale through donations. The animals were attracted to the scale in a restricted area, without people nearby, and their weights were photographed, excluding the food bowl weight (Fig. 1). The animal's four paws had to touch the surface of the scale. After a few weeks, the use of barriers was no longer necessary. Weight was recorded every month until July 2023 and then in intervals of 3 months.

3) Nutritional assessment

The World Small Animal Veterinary Association (WSAVA) Nutritional Assessment Guidelines by Freeman et al.,¹² incorporating animal-specific, diet-specific and feeding management and environmental factors, was used for the methodology applied to the FAFICH cats (Table 1).

4) Concepts of food security and insecurity modified for community cats

For this study, the concepts of food security and insecurity from the Brazilian Ministry of Health¹³ were modified for free-roaming cats, considering information such as food quality and quantity, access to food sources, and the animals' body score:

Food Safety – Regular and permanent access to food in adequate quantities and quality to meet the animal's needs, according to its physical size, activity level, and stage of life.

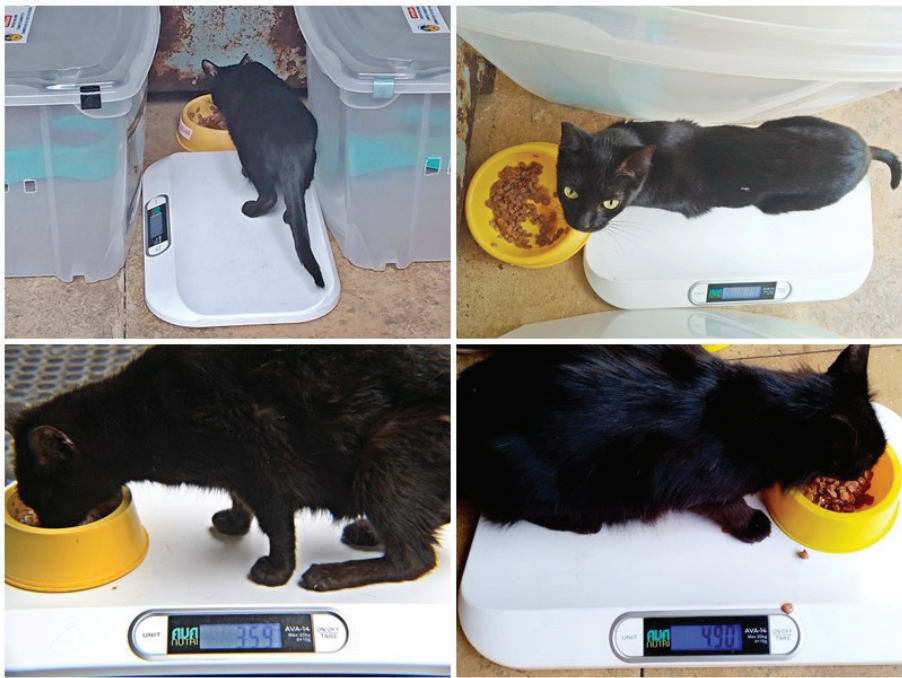


Fig. 1. FAFICH cats self-weighing.

Table 1. Methodology applied to the FAFICH cats, based on the Nutritional Assessment Guidelines of the World Small Animal Veterinary Association (WSAVA)¹²

	Recommendations from the WSAVA Nutritional Assessment Guidelines	Applied methodology to the FAFICH cats
ANIMAL-SPECIFIC FACTORS	Age, physiological status, and activity level. Eating disorders (e.g. intolerances, allergies, diseases of specific organs, etc.).	Visits and observation of animals, interviews with caretakers, and photographic records. No standard questions were used.
DIET-SPECIFIC FACTORS	Safety and compatibility of the food offered to the animal. Problems related to the diet such as nutrient imbalance, deterioration, contamination, and adulteration.	Visits and observation of animals, interviews with caretakers, checking the type of food offered. No standard questions were used.
FACTORS RELATED TO FOOD MANAGEMENT AND THE ENVIRONMENT	Factors related to food management include the frequency, time, location, and how food is offered. Environmental factors include the space and quality of the animal's surrounding environment. Overfeeding or underfeeding, excessive use of treats, inadequate health management, competition, and lack of appropriate environmental stimulation are some of the problems.	Visits and observation of the animals, interviews with caretakers, and photographic records. No standard questions were used. The following variables were analyzed: Daily and weekly feeding routine, amount of food provided, location of the feeding point, form of provision (Food exposed to rain? Consumption by other species? The presence of insects? Is water suitable for consumption? Appropriate utensils and cleaned regularly?)

Slight Food Insecurity – Compromise in the quality of food due to external factors (e.g. rain) to the detriment of maintaining the quantity perceived as adequate for feeding animals up to 3 days a week (e.g. absence of caregivers on weekends, holidays, or consumption by other species). However, cats can move and feed in nearby areas, remaining at a body weight score of 4 or 5 (ideal).

Moderate Food Insecurity – Compromise in the quality of food due to external factors (e.g. rain) to the detriment of maintaining the quantity perceived as adequate for feeding the animals for more than 3 days a week (e.g. absence of caretakers on weekends, holidays, or consumption by other species). Cats show a noticeable change in body score (which can reach a score of 3) due to the lack of easily available food nearby.

Severe Food Insecurity – Interruption of the usual feeding pattern with compromised quality and quantity, in addition to external factors (e.g. inadequate food storage or provision). Animals with a very thin body score (1 or 2) may also experience hunger due to a total lack of food for one or more days. No other food sources are available nearby and the animals may have restrictions on movement (e.g. elderly animals).

Creation of a solidarity food bank – October (2022)

The Solidarity Food Bank was created to ensure daily and quality nutrition for the cats, with the following strategies: 1) accepting monthly donations of any financial amount, 2) sharing photos of purchases, videos of animals feeding, and frequent updates for donors via Instagram (cedbrasil), 3) monthly financial statements and 4) purchasing products that balance quality and price, prioritizing foods on sale.

With no specific literature about the dietary management of elderly free-roaming cats, a feeding plan was created based on information about pet cats in the same age group, considering financial constraints and the number of animals. Dry and wet food (sachets and cans) from the Super Premium and Special Premium lines were chosen, following the guaranteed quality levels stipulated by Normative Instruction 30/2009 of the Brazilian Ministry of Agriculture, Livestock, and Food Supply.¹⁴

Installation of feeding stations and long-lasting feeders – November (2022)

The feeding stations were made from 78-liter transparent plastic storage boxes with removable lids and openings for the cats. A heated blade was used to cut the openings, preventing cracks. They measured 65 cm long, 44.5

centimeters (cm) wide, 38.5 cm high, and weighed 1.650 kilograms (kg). The stations were acquired through donations obtained by the author of the study. The feeders chosen from the Plast Pet brand Flex Gourmet model had a capacity of just over 1 kg of dry food and measured 31 cm long, 20 cm wide, and 32 cm high. Each feeder was also donated, and enough food was stored for up to four cats over the weekend, with a reserve for Monday. The stations received informative stickers, and a layer of non-toxic anti-ant paste (Formifuu Brazilian brand) was applied around their lower areas to prevent insect infestation.

Results

Demographic survey

Thirteen animals (Table 2) were identified in the unit, 54% (7/13) males and 46% (6/13) females, most of them elderly (11/13). It was the largest population focus of the Pampulha Campus colony in December 2022, which maintained 87 community cats on its premises, with FAFICH cats representing 15% of this total number (13/87). Regarding behavior, 61% (8/13) of the cats were semi-feral, 31% (4/13) were feral, and 8% (1/13) were docile. Concerning physical characteristics, 77% (10/13) had black fur, and 77% (10/13) of the animals were short-haired. Names were established for all cats to help with their identification.

Welfare assessment concerning food management

1) Body score assessment

At the beginning of the study, 86% (10/13) of the animals were at body score 4, 5% (1/13) at body score 3, and 9%

Table 2. FAFICH cats' demographic data

Animal	Estimated age in 2022	Behaviour	Physical characteristics
Female #1 – 'Pluma'	15 years old	Docile	Chocolate Point Tortoiseshell, long fur
Female #2 – 'Estrela'	10 years old	Semi-feral	Black, short-haired White spot on the neck
Female #3 – 'Linguinha'	10 years old	Semi-feral	Black, short-haired Had no front teeth
Female #4 – 'Mãezinha'	10 years old	Semi-feral	Cinnamon tortoiseshell, short-haired
Female #5 – 'Pretinha'	3 years old	Semi-feral	Black, short-haired
Female #6 – 'Oncinha'	5 years old	Feral	Solid brown tabby, short-haired
Male #1 – 'Queridinho'	10 years old	Semi-feral	Black, short-haired
Male #2 – 'Vesgo'	10 years old	Semi-feral	Black, short-haired
Male #3 – 'Pretão'	10 years old	Semi-feral	Black, semi-long fur
Male #4 – 'Pirata'	10 years old	Semi-feral	Black short-haired Left eye affected by glaucoma
Male #5 – 'Gordão'	10 years old	Feral	Black long fur
Male #6 – 'Vesgo's brother'	10 years old	Feral	Black, short-haired
Male #7 – 'Estranho'	10 years old	Feral	Black, short-haired

(2/13) with body score 2, with Male #2 at score 3, and Male #2 and Female #1 at score 2 (Fig. 2).

2) Weighing through conditioning with positive reinforcement and gentle handling

At the end of the study, it was possible to weigh 70% (7/13) of the FAFICH cats. The other 30% (6/13) were not regularly seen at wet food mealtimes. The change in weight during the study period is shown in Fig. 3.

3) Nutritional Assessment

Animal-Specific Factors – The feeding was incompatible with the animals' age and energy requirement level in quantity and quality.

Diet-Specific Factors – The processed foods had guaranteed levels following those recommended by Normative Instruction 30/2009 of MAPA.¹³ However, the wetting of the dry food and cooked liver offered to the animals led to the rapid deterioration of the food and the accelerated growth of fungi.

Factors related to food management and the environment

– Food shortage was detected. Improper management of dry food by water wetting caused deterioration. Canned wet food was placed on the floor in different areas of the unit, and small amounts of food were placed in plastic bags, generating conflicts with managers (Fig. 4). Stray dogs and possums were also feeding on cat food.

Level of Food Security – The cats were in moderate to severe food insecurity. There were breaks in the usual feeding pattern, compromised quality and quantity, and external factors (consumption by other animals). There were cats with very thin body condition scores (1 or 2), including the experience of starvation due to a total lack of food for one or more days. No other food

sources were available nearby, and the elderly animals rarely left FAFICH premises.

Feeding stations and long-lasting feeders

Five stations were installed at FAFICH. After 2 weeks of daily monitoring, it was confirmed that the cats accepted the stations, and stray dogs were successfully prevented from consuming the food (Fig. 5).

Solidarity food bank FAFICH's cats' monthly consumption was 40 kilos of dry food and approximately 250 sachets of wet food. From October 2022 to July 2024, 596 kilos of dry food, 373 wet food cans, and 2.267 sachets were purchased, totaling R\$20.549,97 (U.S. \$3,538) in donations. By accepting financial help of any amount and from various regions of the country, the Solidarity

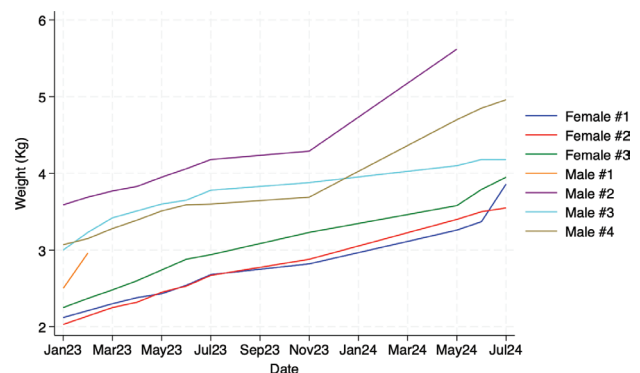


Fig. 3. Weight records of seven elderly FAFICH cats. Several cats were censored during the study period. Female #1 was adopted in July 2024, Male #1 was euthanized due to mandibular squamous cell carcinoma in February 2023, and Male #2 was euthanized for mandibular squamous cell carcinoma in May 2024.



Fig. 2. First body score assessment and photo records of FAFICH CATS (October 2022).



Fig. 4. FAFICH cats' food by October 2022: 1) Wetted dry food, 2) Molded dry food, and 3) Canned wet food placed on the floor.



Fig. 5. Use of feeding stations and long-lasting feeders by FAFICH community cats.

Food Bank expanded the concept of community animals, allowing people from outside the immediate campus community to contribute to their well-being.

Program updates

The FAFICH feline population decreased in 2023 with the death of 2 elderly males: Male #1 in February due to mandibular squamous cell carcinoma, requiring euthanasia, and Male #6 in September after a dog attack outside the building, so the year ended with 11 animals. In April 2024, wildlife cameras discovered a neutered male with feral behavior (Male #6). The first semester of 2024 ended with 10 resident cats after the euthanasia of Male #2 in May, also due to mandibular carcinoma, and the adoption of the oldest female, Female #1, presumed to be 17 years old, in July (Fig. 6).

In June 2023, the FAFICH management designated a new group of caregivers consisting of two internal administrative assistants and three college students. The new

caretakers continued the nutritional management and gentle handling implemented by the study's author, collaborating to improve the semi-feral's tolerance toward humans. Even without allowing touch, 80% of them showed up regularly when hearing their caretakers' voices and would stay nearby, not only during wet meal feeding times.

Discussion

The presence of cats on FAFICH premises and throughout the UFMG campus reflects the history of animal abandonment in Brazilian educational institutions. University campuses have a structure that favors the abandonment and permanence of stray dogs and cats, resulting in many issues arising from this overpopulation. Other problems frequently experienced include conflicts with the academic community, noise, environmental pollution (feces, urine), the transmission of diseases, accidents and bites, vehicular collisions, and conflicts with wildlife.¹⁵



Fig. 6. FAFICH cats in July 2024: 1) Female #1, 2) Female #4, 3) Male #5, 4) Female #5, 5) Male #3, 6) Female #3, 7) Male #4, 8) Male #7, 9) Female #2 and 10) Female #6.

Due to the large size of most university campuses, their territories and dynamics can be compared to those of a city, as they also have places of shelter, food, and other resources suitable for installing and maintaining a feline colony. Mello¹⁶ conceptualizes the subdivision of a colony into smaller and distinct territories as foci, thus characterizing the group of cats at FAFICH as a focus within the colony on the Pampulha campus.

The modification of concepts of food security and different levels of food insecurity from Brazil's Ministry of Health proved to be an important tool to assess the nutritional conditions of community cats, with solid markers (food quantity and quality and hunger experience),¹³ making it possible to synthesize information about their relationship with their territories and other species, the quality of food and human care provided, along with the body score assessment.

The ages of the FAFICH cats were unusually old compared with other studies of managed free-roaming cats. Available data on colony cats' ages show that the animals are mainly between 8 and 10 months (Western Australia),¹⁷ 3 years old (Japan),¹⁸ and 1–1.8 years old (Italy).¹⁹

The need for a greater intake of highly digestible food with high-calorie content, rich in fat and protein was met by allowing the FAFICH elderly cats free access to kitten food. Kitten food can be a good option for achieving healthy weight and lean muscle mass in senior cats unless such a diet is medically contraindicated.^{20–22} The daily wet food meals helped with the cats' low natural thirst instinct since cats mainly obtain the necessary moisture from the tissues of their prey, contributing to their unique adaptation to the wild environment.²³ Proper water consumption also increases physical activity, which can help maintain lean mass. Thus, increasing feeding frequency and incentives for greater hydration benefit older cats.²⁴

Feeding stations are an important tool for free-roaming cat management. The University of Central Florida described the utilization of feeding stations on a university campus. Twelve feeding stations were used in total, spaced 100 meters apart. Based on feeding times at these locations, caregivers could assess health problems, the presence or absence of new cats, and disruptions to routine patterns. Feeding stations were placed in low-visibility locations, allowing cats to move around out of the public eye, which is important for reducing abandonment on campus.²⁵

Food banks are a way for families facing temporary financial difficulties in caring for their animals. It should not be a permanent or long-term solution, but it should prevent the decision to give up the animals due to the inability to feed them.²⁶ A pet food bank receives food donations, whether dry or wet, from various sources (companies, pet shops, distributors, the general public, etc.) and will distribute these donations to those in need, whether financially vulnerable guardians or shelters.²⁷ Food banks are present in several cities worldwide, but no studies have been conducted on these initiatives in Brazil. However, some city governments already have programs for dogs and cats of vulnerable owners and animal rescuers, with different prerequisites for registration and access, such as Curitiba (PR),²⁸ Laguna (SC),²⁹ Mirassol (SP),³⁰ and Votorantim (SP).³¹

The use of cameras to monitor cats in university environments has already been cited for a feral cat colony at the University of Florida, where eight camera traps were distributed in four locations to identify individuals.³² In the case of the cats at FAFICH, where most animals had black fur, frequent monitoring and visits at the beginning of this work were essential for creating an efficient database on the cats' characteristics and personalities for

individualizing management. No two cats are the same, even with similar coat patterns and colors.

The improvements in the nutritional management of the FAFICH cats are in line with Domain 1 (Nutrition) of the Five Domain Model, where the animals can drink adequate amounts of water, consume adequate food, consume a balanced and varied diet, and correct quantities of food and Domain 5 (Mental State) with people who end periods of deprivation, inhibition, or harm (offering water, food, companionship, freedom from confinement).³³

The care of community animals and the quality of this care were related to the caregivers' individual perceptions. If a university environment already has a group responsible for animal welfare, monitoring should be regular to avoid situations of food insecurity and unhealthiness.

Important limitations: At the beginning of the study, it was not possible to take the cats to a complete veterinary check-up and handle them to a more complete assessment, mainly due to their unsociable behavior.

Conclusion

Cat welfare was improved by measures of nutritional adequacy and food security because of this community intervention. Ideal weight was attained, coat health was improved, in the short- and medium-term. Feeding stations were an effective, economical, and simple solution to ensure adequate feeding spaces for the cats and guarantee their food quality. Kitten dry food and wet food were affordable and efficient options, and the Solidarity Food Bank implemented in this study successfully ensured food of proper quality for the animals and food security by mobilizing people beyond the university environment. The experience with the FAFICH cats can serve as a reference to ensure a dignified and healthy life for other community cats as they age.

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