Characteristics of 24 cases of animal hoarding in Spain

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Abstract

Animal hoarding is considered to be an under-reported problem, which affects the welfare of both people and animals. Few published studies on animal hoarding are available in the scientific literature, particularly outside North America. The present study was designed to obtain data on animal hoarding in Spain, with a particular focus on animal welfare issues. Data were obtained retrospectively from 24 case reports of animal hoarding involving a total of 1,218 dogs and cats and 27 hoarders. All cases were the result of legal inter-vention by a Spanish humane society during the period from 2002 to 2011. Hoarders could be characterised as elderly, socially isolated men and women who tended to hoard only one species (dog or cat). Most cases presented a chronic course of more than five years of animal hoarding. The average number of animals per case was 50, with most animals being dogs. In 75% of cases the animals showed indications of poor welfare, including poor body condition, and the presence of wounds, parasitic and infectious illnesses. Amongst the hoarded animals aggression and social fear were the most commonly reported behaviours. To the authors' knowledge, this is the first report on animal hoarding in Spain and one of the first in Europe. Further studies are needed to fully elucidate the epidemiology, cross-cultural differences and aetiology of this under-recognised public health and welfare problem. More research might help to find efficient protocols to assist in the resolution and prevention of this kind of problem.

Keywords: animal hoarding, animal welfare, cat welfare, dog welfare, object hoarding, pathological altruism

Introduction

The defining features of animal hoarding are the presence of large numbers of animals kept in housing that does not provide the minimum standards expected of responsible pet ownership, and with the keeper being unable to recognise the negative consequences of such conditions on health and behaviour (Edsell-Vetter & Patronek 2011). Thus, collecting a large number of animals becomes a concern when the number overwhelms the ability of the hoarder to provide acceptable care (Patronek 1999).

The typical animal hoarder's profile has been described as a middle-aged or old woman, usually unmarried and socially isolated who hoards cats (the most often collected animal) or dogs (Hoarding of Animals Research Consortium 2002; Patronek & Nathanson 2009; Steketee *et al* 2011).

Animal hoarding has a welfare cost for the animals concerned, and can be considered a form of animal cruelty (Arluke 2006). The environment provided is typically found to be inadequate, inappropriate and overcrowded. Furthermore, animal hoarding has detrimental consequences for the hoarders themselves and also for their communities (Patronek & HARC 2001; Arluke 2006).

The community cost arises from the involvement of multiple government agencies, and demands on city council technicians,

public health officers and health professionals. Moreover, animal shelters are burdened with the responsibility of immediately housing and caring for what may be a sudden and large influx of seized animals. Many of these animals need intensive veterinary care and some need to be euthanised. They often present a behavioural profile that makes adoption particularly complicated, so that they may remain in the shelter for long periods of time. Altogether, this represents a high economic cost for both animal shelters and administrations. Finally, social services and mental health services may be required to treat the psychological problems of the animal hoarder, although this seems as yet uncommon (Patronek *et al* 2006).

Animal hoarding seems to be a common and yet under-reported condition. In the US, the authorities identify between 700 and 2,000 new cases of animal hoarding per year. However, this is probably an underestimate, because only the most severe cases are detected (Frost & Steketee 2011). It seems that animal hoarding, and the intended or unwitting cruelty that accompanies it, is increasing or at least is being detected more often, as one online US database of animal cruelty suggests (www.pet-abuse.com/database) (Patronek & Nathanson 2009; Edsell-Vetter & Patronek 2011). Although awareness has increased over the past few years, it is considered insufficient. Increasing problem recognition is a

necessary step to develop effective intervention protocols (Nathanson 2009; Patronek & Nathanson 2009).

Whenever information about hoarding reaches the media it is sensationalised. However, the true impact of hoarding is rarely presented. Instead, animal hoarders are often presented as animal lovers who devote their lives to the care of animals at their own expense, or as harmless eccentrics who become the target of humour. In many cases, the result is that there is public sympathy for hoarders and they may even gain popular support (Arluke *et al* 2002).

Among human health professionals, animal hoarding is only beginning to gain acknowledgement as a distinct psychiatric condition. It does not appear in the current (10th) revision of the World Health Organisation's International Classification of Diseases (ICD-10), and has only been introduced under the broad category of hoarding disorders in the current (5th) revision of the Diagnostic and Statistical Manual of Mental Disorders (APA 2013) , but not as a distinct diagnostic category (Mataix-Cols *et al* 2010, 2011; Perroud *et al* 2010; Pertusa *et al* 2010; Marchand & Phillips McEnany 2012; APA 2013; Kring & Johnson 2013).

The role of shelter veterinarians and staff is usually restricted to mediation in the seizure of the animals, and their subsequent care (Nathanson 2009). However, it has been pointed out that, without a long-term plan and support for the hoarder, recidivism may approach one hundred per cent (Berry *et al* 2005).

Lack of professional recognition prevents a multidisciplinary approach to the problem and results in a failure to implement standard protocols to deal with cases of animal hoarding. This often delays the identification of cases and makes interventions less effective (Patronek 1999; Berry *et al* 2005).

One of the main reasons for the aforementioned difficulties is that animal hoarding is a problem that few scientists study (Patronek 1999; Berry *et al* 2005). There are only a few peer-reviewed scientific papers on animal hoarding and most of them are case reports conducted in North America. There is no information on the systematic, long-term follow-up of animal hoarding cases (Berry *et al* 2005; Reinisch 2009). Thus, most of the research on animal hoarding has been developed in the USA. Research on animal hoarding in the USA was promoted by a very active group of scientists, the HARC (Hoarding of Animals Research Consortium: www.tufts.edu/vet/hoarding/harc.htm). More recently, groups in other countries, such as Australia (Lawrie 2005) and Brazil (Ramos *et al* 2013) have also started to study animal hoarding. Studies conducted in different countries with a distinctive cultural background could give some insights on the aetiological, cultural and biological factors underlying animal hoarding, as culture can be both a pathogenic and a pathoplastic agent in any psychiatric disorder (Kohn *et al* 2009).

A retrospective study was designed to start gathering information on animal hoarding in Spain, with a special attention to animal welfare. The methodology of previous studies was partially adopted to allow cross-cultural comparisons (Patronek 1999). The present study is included in an overall project aimed at implementing a protocol of intervention in cases of animal hoarding in the Spanish community.

Materials and methods

A study was designed to extract and analyse data retrospectively on animal hoarding from humane societies and animal shelters.

The following working definition of animal hoarder was adopted:

> ...someone who accumulates a large number of animals; fails to provide minimal standards of nutrition, sanitation and veterinary care; fails to act on the deteriorating condition of the animals (including disease, starvation and even death) or the environment (severe overcrowding, extremely unsanitary conditions) or the negative effect of the collection on their own health and well-being and on that of other members in the household; and persists, despite this failure, in accumulating and controlling animals. (Patronek 1999; Patronek *et al* 2006).

A standardised online case report form was produced to collect the required data for the study, based on previous published studies on animal hoarding (Patronek 1999; Hoarding of Animals Research Consortium 2002; Berry *et al* 2005). A preliminary version of the form was distributed to 24 national and international public health and animal welfare experts with a request for feedback. After refinement, the final version of the case report form included 42 multiple-choice questions and finished with an open-ended commentary box to collect additional comments.

The questionnaire collected information on four aspects: i) the general characteristics of the case; ii) the hoarder's profile; iii) the condition of the animals; and iv) the characteristics of the physical environment. Included in the information collected about the characteristics of the case were the source of detection (origin of the initial report), the date and the place of intervention and the reason for the complaint. Regarding the hoarder, we asked about gender, age, health condition, personal care, financial situation, motivation for hoarding, duration of hoarding, level of insight into the situation, family environment and interactions with social and health services, as well as with humane societies. Regarding the condition of the animals, we asked about species, number, identification, location, origin and general health and behavioural condition. The welfare and health condition of the animals were assessed through a pre-defined list of parameters.

For each case, the personnel involved in the intervention were asked to estimate the percentage of animals that were found either dead at the time of the intervention, euthanised shortly after the intervention, living but in bad condition at the moment of intervention, or living and in good condition at the moment of intervention, choosing between four pre-established categories: 'less than 25%' of the total number of animals in the location had that condition; 'from 25 to 50%' of the total number of animals in the location had that condition; 'from 51 to 75%' of the total number of animals in the location had that condition; or 'from 76 to 100%' of the total number of animals in the location had that condition. The estimation of the percentage of infant animals (eg kittens or puppies) was obtained following the same approach.

In each case we recorded whether certain criteria (presence of parasites, injuries, lameness, cachexia (very poor body

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condition), obesity, sickness, death, aggressiveness, fear, cannibalism) were met by at least one of the animals found at the time of intervention.

To further assess the welfare status of the animals, the prominence of certain characteristics was rated from zero to five (malnutrition, injuries, sickness, dirtiness, aggressiveness, fear) with respect to the animal found in the worst condition. Zero meant no presence of that characteristic and five meant maximum level of that characteristic. So, for example, an animal rated zero for fear meant it did not show fear at all, while an animal rated five was very fearful.

Regarding the animal's environment, for each case the perceived availability of food and water was subjectively rated from zero to five, where zero meant no availability and five meant optimal availability. Therefore, if a case was rated zero for water availability that would mean that no water was present. And if a case was rated five for food availability that would mean all animals had the adequate amount of food, under the subjective opinion of the technicians who completed the questionnaire.

Information was collected about the type of area, type of location, kind of neighbourhood, presence of special spaces dedicated to animals, general sanitary conditions and accessibility to different areas of the location of residence. The diverse range of locations in which the animals in the study population were kept, such as camping site equipment and apartment, does not lend itself easily to a single descriptive term, so for the purposes of clarity we use the terms 'location of residence' and 'location' to mean the place where the animals were being hoarded. In addition, we asked whether the hoarder lived within the location where the animals were kept.

Information was also collected about the characteristics of any concurrent object hoarding: what parts of the location were used to accumulate objects (eg all over the location or in specific rooms), and what kind of objects were hoarded (garbage, furniture, money or others).

All cases included in the present study were supplied by the Asociación Nacional de Amigos de los Animales (ANAA), a Spanish humane society that takes care of more than 2,000 abandoned animals each year, and which is developing educational programmmes to prevent animal abandonment. ANAA veterinarians and technicians completed the standardised case report form using data obtained from databased reports of any interventions that met the criteria of the above working definition of animal hoarding. In addition to the information included in the database, for each case dealt with by the ANAA organisation there were complementary sources of information, including press articles, photos and videos.

Data were collected using Survey Monkey, and analysed using MS Excel for Mac 2011 and Prism 6 (GraphPad Software Inc). The threshold level of probability for significance of the statistical tests (Shapiro-Wilk normality test; Mann-Whitney U test) was set at $P \leq 0.05$.

Table 1 Method by which cases of animal hoarding were reported to ANAA (n = 24).

Source of detection	Number	Percent
Neighbour	14	58.3
Social services	1	4.1
Police	1	4.1
Local authority	1	4.1
Humane society	10	41.6
Non-resident family member	0	
Resident family member	0	
Veterinarian	0	
Fire brigade	0	
Anonymous complaint	0	
Friend or acquaintance	0	
Homeowner	0	
Service staff visiting the household	0	

Percentages do not total 100 because more than one source of detection could be reported in the same case.

Results

A series of 24 cases of animal hoarding attended by ANAA from 2002 to 2011 were obtained. Cases came from different areas in Spain, mainly from the area of Madrid. They involved 27 individual hoarders and 1,218 animals, mostly dogs and cats.

General case characteristics

In the majority of cases, the initial report came from a humane society (10/24) or a neighbour (14/24). Some cases were also reported by other sources such as social services (1/24), local authorities (1/24) or police department (1/24) (Table 1). Most commonly, complaints arose from concerns related to the welfare of the animals, such as the presence of an excessive number of animals (10/24), malnourished or mistreated animals (10/24), and animals in need of medical care (11/24). Other complaints related to animal hoarding case reports were: smell (4/24); unhealthy environment (6/24) (Table 2).

In 13 out of the 23 (13/23) cases for which information was available, the animals and the hoarder shared living space in the same location. In the remaining 10 (10/23) cases, the hoarder did not live with their animals in the same location.

In half of the cases (12/24) the duration of hoarding exceeded five years. Three (3/24) cases were described as recidivist. Signs of object hoarding were present in 44% (8/18) of cases where information about such hoarder behaviour was available (n = 18).

Table 2   Reasons for complaints about cases of animal hoarding reported to ANAA (n = 24).

Reason for complaint	Number	Percent
Smell	4	16.6
Unhealthy environment	6	25
Excessive number of animals	10	41.6
Malnourished or mistreated animals	10	41.6
Animals in need of medical care	11	45.8
No formal complaint	2	8.3
Noise	0	
Free-roaming animals	0	
Detected parasites (eg, rats, insects, etc)	0	
Building damages	0	
Garbage accumulation	0	
Unusual human behaviour	0	

Percentages do not total 100 because more than one complaint could be reported in the same case.

Table 3   Characteristics of the baseline population of a hoarding case village or town.

Village/town	Inhabitants (n) (2011)	Population density (2011)
San Sebastián de los Reyes	79,825	1,345.03
Sevilla	703,021	4,993.05
Nuevo Baztán	6,295	311.63
Madrid	3,265,038	5,389.9
Valdetorres del Jarama	4,008	119.57
Cadalso de los Vídrios	2,906	61
Chinchón	5,389	46.5
Fuentelsaz	6,673	192.08
San Sebastián de los Reyes	79,825	1,345.03
Quijorna	3,010	117.08
Pozuelo del Rey	987	31.91
Madrid	3,265,038	5,389.9
Talavera de la Reina	88,674	477.18
Madrid	3,265,038	5,389.9
Polán	4,032	25.41
Puerto de Santa María	88,917	558.03
Pelayos de la Presa	2,512	331.4
Madrid	3,265,038	5,389.9
Cádiz	124,892	10,321.61
Sant Josep	23,688	148.63
Portillo	2,250	112.5
Brihuega	2,818	9.52
Torre Val de San Pedro	193	4.36
Venurada	1,860	189.99

* Data are from year 2011 (year of the detection of the last case of animal hoarding included in the study).

Hoarders' characteristics

Of the 27 individual hoarders included in the study, 14 were women (14/27) and 13 were men (13/27). Age information was available for 19 out of 27 individuals. Sixty-three percent (12/19) of the hoarders were older than 65. Only one (1/19) case was described as younger than 41 and the rest (6/19) were middle-aged, from 41 to 65.

In 67% of cases (16/24), no official support intervention (social services or human health service) had been provided to the hoarder. In only 17% of cases (4/24), the hoarders had received support for the care of their animals. Technicians had direct access to the hoarder in 20 (20/24) cases and in 70% of cases (14/20) the hoarders were reluctant to permit the removal of the animals.

In 83% of cases (15/18) where information was available (n = 18), the hoarders were found to live alone.

In 14 cases there was also information about the hoarder's financial situation. Only four options for the subjective evaluation of the hoarder's financial situation were given to the technicians who completed the questionnaire: i) bad financial situation; ii) borderline financial situation; iii) good financial situation; and iv) undetermined financial situation. Three (3/14) cases were described as having a bad financial situation and 11 (11/14) were described as having a borderline financial situation. In all cases, the situation was precarious.

In only three cases (3/24), the hoarder admitted that they were living in compromised conditions and in only one case the hoarders (two women) recognised that the welfare of the animals was impaired.

A table (3) with compared characteristics between the hoarders and the baseline population of their area has been included.

Animals

A total of 1,218 animals were involved in the 24 cases, including 986 dogs and 232 cats. There was only one case in which farm animals were found in addition to dogs.

The mean number of animals per case was 50 (range 12 to 159 animals). The range for dogs was from nine to 159. The range for cats was from one to 75. Fourteen (14/24) cases involved dogs alone; five (5/24) cases involved only cats and the other five (5/24) cases involved the two species. The proportion of dogs and cats varied in the five (5/24) cases, but in four (4/24) cases the proportion of dogs was higher than cats, ranging from 60 (15/25) to 92% (11/12) of dogs and only in one case the proportion of cats (16/25) was higher than dogs. Data were tested for normality using Shapiro-Wilk test. In all cases data were not normally distributed and so the Mann-Whitney U test for unpaired samples was used. This test showed a significant difference ($P = 0.0012$) between the number of dogs per case (mean = 41; range = nine to 159) and the number of cats per case (mean = 10; range = one to 75). Nine (9/13) of the men hoarded only dogs, only one man (1/13) hoarded cats alone and two men (2/13) hoarded both dogs and cats. Six women (6/14) hoarded only dogs, five women (5/14) hoarded only cats and three women (3/14) hoarded both dogs and cats.

Table 4   Proportion of animals found with certain characteristics: number of animal hoarding cases (n = 24).

	Less than 25%	From 25–50%	From 51–75%	From 76–100%	Total number of cases
Animals found dead during intervention	3/24	0	0	0	3/24
Animals found alive during intervention but euthanised for medical or behavioural reasons	7/24	0	0	0	7/24
Animals found alive but in bad condition, but no need to euthanise	0	0	3/24	17/24	20/24
Animals found alive and in good condition	2/24	0	1/24	1/24	4/24
Number of infant animals	7/24	4/24	1/24		12/24

Where information was available about the process of accumulating the animals (n = 23), this mainly resulted either from the collection of stray animals (16/23) or uncontrolled breeding (18/23). In only four (4/23) cases deliberate breeding was reported. In eleven (11/23) cases the collection of stray animals was combined with uncontrolled breeding. There were five (5/23) cases in which only uncontrolled breeding was reported as the source of animals and three (3/23) cases in which the unique origin of animals seemed to be the collection of strays. In only one case (1/23), a combination of the three methods of hoarding animals was reported. In one (1/23) case, deliberate breeding and picking up stray animals were reported together. In another single case (1/23), a combination of deliberate and uncontrolled breeding was found. There was only one (1/23) case in which the sole origin of animals seemed to be deliberate breeding.

The perceived availability of food and water were rated on a scale from zero to five, where zero meant no availability at all and five meant optimal availability. For those 23 cases where food availability was recorded, the mean score for food availability was 1.82: four cases scored as zero (which meant no food was present) and none obtained a score of five. In 22 cases water availability was scored and the water availability mean score was 2.18; two (2/22) cases were scored zero (which meant no water was present for the animals) and none (0/22) scored five.

Dead animals were found in three out of 24 cases (3/24), with dead animals representing less than 25% of the total number of animals found in the location of each case. In seven (7/24) cases animals were found in such poor health that they had to be euthanised soon after they were seized; these represented less than 25% of the total number of animals found in the location of each case. In 20 cases (20/24), animals were found alive but in bad condition; in 3 (3/24) cases, the animals with this condition represented 'from 51 to 75%' of the total number of animals found in the location of each case and in 17 (17/24) cases represented 'from 76 to 100%' of the total number of animals found in the location of each case. In only four (4/24) cases were any of the animals found in good condition, and in only one of these cases the majority of animals were in good condition (ranked 'from 76 to 100%'). Infant animals were found in 50% (12/24) of cases (Table 4).

Table 5   Characteristics of the animals.

Characteristic/conditions	Presence (n)	Absence (n)
Lack of hygiene	22	1
Parasites	22	1
Injuries	21	3
Limpness	14	10
Alopecia	17	6
Mutilation	4	17
Cannibalism	3	19
Dead animals	4	18
Prostrated animals?	11	11
Aggressiveness	9	12
Fear	23	0

Lack of hygiene was rated on a scale from 1 to 5, with the highest score indicating the poorest hygiene. Poor hygiene was reported in 22 cases (22/24) with the average score for the lack of hygiene of the most affected animal being 3.79. Internal or external parasites were reported in 22 (22/24) of the cases investigated. Injuries were reported in 21 (21/24) cases and the average score for injuries for the most injured animal was 2.37 (range: zero to five, where zero meant no presence of injuries and five meant very serious injuries), which means it was a moderate score. Sickness was reported in 21 (21/27) cases and the average score for the sickest animal was 3.37 (range: zero to five, where zero meant no presence of sickness and five meant very serious sickness condition). Alopecia was reported in 17 (17/24) cases. Lameness was reported in 14 (14/24) cases. Animals were found collapsed in 14 (14/24) cases. Cachexia was reported in 11 (11/24) cases, obesity was reported in three (3/24) cases and the average score of the worst nourished animal was 2.95 (range: zero to five). Mutilation was apparent in four (4/24) cases (Table 5).

Focusing on the behaviour of the rescued animals it was found that fearfulness was the most reported problem of behaviour in 23 out of 24 (23/24) cases and the average score for the most frightened animal was 3.12 (range: zero to five, where

zero meant no presence of fear and five meant the maximum level of fear). Aggression was scored by technicians in 21 cases and it was seen in nine out of 21 (9/21) cases and the average of the most aggressive animal was 1.45 (range: zero to five, where zero meant no presence of aggressive behaviour and five meant the maximum level of aggressive behaviour). Signs of cannibalism appeared in three (3/22) cases.

Location of residence characteristics

Where the type of location was reported (n = 16), most locations (10/16) were located in the city centre; six (6/16) were detached houses, four (4/16) were apartments or flats, four (4/16) were plots of land, and three (3/16) were semi-detached houses. There was only one case of each of other types of location: field (1/16), first floor of a house (1/16), haystack (1/16), industrial premises (1/16), camping site equipment (tents or caravans) (1/16).

Five (5/10) of the city-centre cases were in a middle-class neighbourhood and four (4/10) were in a working-class neighbourhood. In those cases outside cities (n = 6), three (3/6) were in a small village (less than 20,000 inhabitants), two (2/6) cases were in a middle-sized village (from 20,000 to 200,000 inhabitants) and one (1/6) case was in an area that was unfit for, and not legally permitted for, inhabitation.

In eleven cases, information was available about the sanitary conditions of the location. In most of these cases (7/11), the location was described as very untidy, with accumulated garbage, generally unsanitary conditions (including in cooking areas), and the presence of animal faeces and/or urine in areas occupied by people.

When information about the type of space occupied by the animals was reported (n = 18), it was found that in seven (7/18) cases both indoor and outdoor areas were completely occupied by animals. In three (3/18) cases animals were kept exclusively outdoors, in three (3/18) cases were exclusively indoors, and in the rest of cases (7/18) the animals had indoor and outdoor access. In six cases of the 24 (6/24) animals were kept in designated areas, such as cages or rooms.

With respect to the sanitary conditions of the places where the animals were kept, when information was reported (n = 21), in 16 (16/21) cases the occupied place was described as very dirty and with animal faeces and urine present. In five (5/21) cases the location was described as untidy and mildly dirty.

In only one (1/11) out of the eleven cases for which information about the ambient temperature and humidity were available, were conditions adequate. In six (6/11) cases the environment was reported to be cold and damp (even though only one intervention was in winter and two interventions in autumn). In four (4/11) cases the conditions were reported to be excessively hot and dry (despite only two interventions being in summer).

The smell within the location was documented in eleven cases; in nine (9/11) cases the smell was described as much stronger than would normally be expected in any location occupied by a large number of animals. Signs of eye irritation and difficulty in breathing were reported by the people attending the case. In two (2/11) other cases the smell was described as typical of a location that is usually occupied by a large number of animals.

Discussion

Whilst animal hoarding is under-described, object hoarding, a psychiatric condition potentially related to animal hoarding, is widespread throughout human populations in different countries and cultures, including westernised societies and is well represented in the literature (Frost *et al* 2000; Pertusa *et al* 2010; Frost & Steketee 2011). So, it would be expected that animal hoarding would exhibit a similar pattern of distribution throughout nations and cultures. In the present study, the signs of object hoarding were present in 44% (8/18) of cases where information about such hoarder behaviour was available. This is aligned with percentages reported in other studies in the USA, where the range of animal and object hoarding simultaneous presence was from 30 to 85% of the studied cases, depending on the study (Frost *et al* 2011).

General case characteristics

The animal hoarding cases in this study were mainly from the area of Madrid. This could suggest that this part of Spain is more affected by animal hoarding, but it is equally likely that the location of the humane society ANAA (Madrid) created a bias in reporting. Further studies involving humane societies from the whole country are needed to clarify this point.

In the present study, a large number of animals (1,218 animals in total; from 12 to 159 animals per case) were accumulated by a small number of people, but there is no simple threshold value for number of animals kept at a given location that can distinguish normal pet ownership from hoarding it. In fact, some studies are trying to define the boundary between normal pet-keeping with a high number of animals and an animal hoarding case (Ramos *et al* 2013).

In the present study, only 27 hoarders were able to accumulate 1,218 animals, with a mean of 50 animals per case. This average of animals kept is similar to that found in previous studies, even though different studies had different strategies of recruitment of cases or came from different areas of the world, such as the USA or Australia (Patronek 1999; Berry *et al* 2005; Lawrie 2005; Reinisch 2009). The accumulation of a large number of animals appears to be a common feature of reported cases of animal hoarding, which probably indicates that, as previous studies have concluded, a situation must reach a certain level of severity in order to be detected as a problem (Frost & Steketee 2011). It seems that the threshold for detection of cases is similar between the present Spanish study and those in the USA.

In the present study, most cases had a long course (one to five years) from the time of first report to the humane society, to the seizure of the animals. Again, this is similar to previous studies (Patronek 1999; HARC 2002). This could mean that only extreme cases are detected and/or that detection is delayed until the situation is so serious that it is impossible to ignore.

The cases in the present study were provided by a single humane society, which could be considered a source of bias.

However, cases were mostly reported to the humane society by either other humane societies or the hoarders' neighbours, and the main reason for intervention seems to be concerns about animal welfare. This is in accordance with the accepted view, which suggests that there is low level of concern about animal hoarding within state authorities and the human health system. In fact, in our study, there was not any intervention focused on the person and human health and this fact could really mean that there is low concern about human and community health implications of animal hoarding, and low recognition of animal hoarding as having a human cost as previous research has pointed out (Patronek 1999; HARC 2002). Hence, there is no public recognition of animal hoarding and it is likely to be an under-reported problem. This study represents data from a single humane society in Spain (ANAA). Given that there are hundreds of similar humane societies in Spain, we can infer that animal hoarding is an important public issue with high societal costs.

Hoarders' characteristics

According to previous research, most animal hoarders are middle-aged or older and 75% or more are single women (including widowed or divorced) (Patronek 1999; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011). In the present study, hoarders were also middle-aged or older people who usually live alone which implies a cross-cultural similarity in hoarder characteristics.

However, compared to previous studies in North America in which animal hoarders were mainly women, in the present study, men and women were almost equally involved, with women only marginally more represented. This could reflect either a cross-cultural difference or just the effect of a small sample (Patronek 1999; Berry et al 2005; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011).

In our population, most of the animal hoarders were elderly, lived alone and showed signs of concurrent inanimate object hoarding. This finding is consistent with previous studies, which have also suggested a potential underlying effect of dementia and/or other medical and psychiatric conditions (Patronek 1999; HARC 2002; Berry et al 2005; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011). The animal hoarders in this study also often faced financial problems and received little help to overcome their situation. This suggests a level of social exclusion that has also been recognised by other authors (HARC 2002; Arluke 2006; Patronek & Nathanson 2009; Steketee et al 2011). The nature of the relationship between social exclusion and animal hoarding remains unanswered (Pertusa et al 2010; Frost & Steketee 2011). In any case, it should be remembered that object hoarding, which is a closely related problem, is also linked to social isolation.

A particularly remarkable characteristic of the hoarders of this study was their apparent lack of awareness of either the highly compromised welfare of their animals or their own compromised living conditions. Thus, the animal hoarder's lack of insight reported in previous studies (HARC 2000) was also found in our collection of cases. This denial of the reality of the situation is characteristic of animal hoarding,

and animal hoarders will employ a range of justifications and excuses to try to normalise their behaviour (Patronek 1999; Vaca-Guzman & Arluke 2005; Nathanson & Patronek 2012). In fact, most of the hoarders were reluctant to surrender their animals to local authorities or shelters although they were in a critical condition. In only one case in our study (two women who had accumulated 53 dogs), did the hoarders show any recognition of the inadequateness of their situation. This reported insight could be understood as a true indication of a partial awareness of the situation or as a strategy to deal with external criticism, as it has been reported in other studies (Arluke 2006; Arluke & Killeen 2009). Interestingly, this case was also one of only three cases in our study in which more than one resident person was involved in the act of hoarding. This could reflect a less severe degree of social isolation and distorted perception.

Men tended to hoard only dogs, whilst women did not show a clear species preference, indicating that there are potential gender differences in the pattern of animal hoarding. A tendency to hoard dogs by men has been reported in one study (Lockwood 2005) and a tendency to hoard cats by women has been reported in several studies (Edsell-Vetter & Patronek 2011). The elucidation of potential cross-cultural similarities in gender-related patterns of hoarding requires further investigation.

In the present study, the source of hoarded animals was mostly the collection of stray animals and uncontrolled breeding. These results, again, are similar to those of previous studies (Patronek 1999; HARC 2002; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011). These patterns of animal accumulation are consistent with the two proposed most common types of animal hoarders: the overwhelmed caregiver, who start as responsible pet owners who passively increases their amount of pets, maybe through uncontrolled breeding; and the rescuer, who actively acquires animals, by picking them up from the street (Patronek et al 2006; Edsell-Vetter & Patronek 2011).

Animals' characteristics

In our population, people tended to hoard either dogs or cats (separately) and dogs were hoarded in larger numbers than cats. Dog cases were reported more often in the present study, which is different from findings in some of the previous studies; these found that cats were the predominant species in animal hoarding cases (HARC 2002; Lawrie 2005; Reinisch 2009). This difference could be due to a bias in reporting, the easier detection of dog cases (due to the noise and disruption they cause in neighbourhoods), but it could also indicate that there is greater public, and official, concern for the welfare of dogs in the regions of Spain covered by the present study. It is also possible that the increased representation of dog hoarding cases in this study does reflect a genuine species preference among the hoarders that may be related to underlying differences in attachment behaviour and attachment disorders in those that hoard dogs (Topal et al 1998; Arluke & Killeen 2009; Nathanson 2009; Edsell-Vetter & Patronek 2011). However, there is some previous research

which presented dogs as the predominantly hoarded species (Berry *et al* 2005). Thus, further research is required to elucidate whether there are cross-cultural differences in the type of species hoarded.

In most cases in the present study, the welfare of animals had been seriously impaired; in almost all reported cases a high proportion of animals were sick. The physical conditions of the animals were very poor, with mutilation or cannibalism being present. However, dead animals were only present in four cases. This contrasts with previous research in which dead animals were found in most cases. For example, in one study, Patronek found dead animals in 80% of cases (Patronek 1999). As seen in previous studies (Arluke & Killeen 2009) the environment was totally inadequate and unhealthy for the animals, with water and food unavailable in most cases.

The animals showed serious behavioural problems, mainly fearfulness and aggression, which reflects a chronic lack of contact with people, a subsequent lack of socialisation and the effect of chronic stress.

The concept of the Five Freedoms can be used as a guide for the evaluation of animal welfare, and is applied in many situations in which animals are subject to human management (Brambell 1965). It has also been adapted to evaluate the welfare of companion animals in cases of hoarding (http://vet.tufts.edu/hoarding/picts/fivefreedoms.jpg). In most of the cases included within the present study, none of the Five Freedoms was met for the animals. From the present study and the current published literature, animal hoarding appears inextricably linked with neglect in taking care of the animals, even though the hoarder's perception is that they keep the animals to protect them. The denial of the serious impairment in the welfare of the animals seems again a key feature of the condition of animal hoarding not only as a mental condition but also as an accepted form of animal abuse (Patronek 1999; Arluke 2006; Mataix-Cols *et al* 2010; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011).

Location of residence characteristics

There was no characteristic type of location associated with hoarding, and there was a high degree of diversity in area and location types.

However, the impact of having so many hoarded animals in a confined space made the environment filthy, unhygienic, malodorous and humid. In all cases where information about the conditions of the location was available, a sub-optimal environment was reported, which is consistent with previous studies (Patronek 1999; Edsell-Vetter & Patronek 2011; Frost & Steketee 2011).

In contrast to previous studies, the present study featured a type of location that has not been recorded previously; an apartment in the city centre. In previous studies, single-family houses in urban areas predominated (Patronek 1999). This could be related to a number of factors. Firstly, most of the Spanish city population live in apartments. Secondly, in an urban area, it is more difficult to hide the accumulation of animals and the disruption created from neighbours.

Ammonia levels are of concern in hoarding cases, both for human and animal health. The National Institute for Occupational Safety and Health (NIOSH) in the USA lists 300 parts per million as a concentration immediately dangerous to life or health, and 25 parts per million as the maximum average occupational exposure during the workday (NIOSH 2007). In one hoarding case, the air ammonia level reached 152 parts per million, which was very high (Arluke & Killeen 2009). Ammonia levels can be related to the urine odour present in the location. In the present study, in nine cases, the smell was described as much stronger than in any location usually occupied by a large number of animals, and signs of eye irritation and breathing difficulty were reported. This could be an indication that ammonia levels had reached a toxic level, potentially becoming a cause of health problems.

The limitations of this study are similar to those of previous studies. Due to the unco-operative nature of hoarders it is very difficult to collect detailed, accurate information about cases. This obstructiveness is a common feature between animal hoarders (Patronek 1999) and object hoarders (Frost & Steketee 2011), with animal hoarders being even more difficult to manage than object hoarders (Frost *et al* 2000). Other limitations are related to the retrospective nature of the study, the lack of public awareness of this kind of problem and the lack of a standardised reporting system (Patronek 1999; Berry *et al* 2005). This means that the only accessible information was the non-standardised information that was already available on the ANAA database. Another source of bias was lack of recall: the technicians who completed the online standardised form did so using the information in the database and from their own memories.

Animal welfare implications

Our study supports the idea that animal hoarding should be considered and recognised as a genuine form of animal abuse and incompetent pet ownership.

Animals coming from cases of animal hoarding sometimes must be euthanised, due to their severely affected state. The remaining animals rescued in hoarding cases usually need a lot of veterinary care and exhibit difficult-to-solve behaviour problems. This means they will not turn easily or ever into an adoptable animal. Therefore, animal hoarding becomes a significant economical and emotional problem for those working with the seized animals, such as humane societies or city council officers and, as a consequence, for the community.

To conclude, further research into animal hoarding is necessary to assist in the effective avoidance, detection and assistance in resolving this important and under-recognised form of animal cruelty.

Conclusion

To our knowledge, the present study is the first analysis of cases of animal hoarding in Spain and in Europe and that could help to increase awareness about this condition. The need to increase recognition of animal hoarding to develop multidisciplinary protocols for detection and intervention has been already stressed by different authors (Nathanson 2009; Edsell-Vetter & Patronek 2011).

Our study supports the view that animal hoarding is a multi-dimensional problem with implications for public health, animal welfare and human health.

Despite some differences, our results agree with studies in other countries and suggest some cross-cultural similarities in animal hoarding cases, leading to a similar hoarding profile even among different countries and cultures.

Hence, further research on animal hoarding in Spain and in other countries should be expanded in several aspects. First, increasing the number of analysed case reports from several sources (other humane societies and public health agencies) could help to obtain a broader geographical and demographic picture. Second, it may be useful to focus research on studying the hoarder's psychological profile, as this could help to improve detection and prevention of animal hoarding cases. Third, very different approaches of resolution appear when a new animal hoarding case is detected, because several organisations (public health, humane societies and social services) are implicated and in many countries and regions there is not any standard protocol to proceed in these situations. So, getting more data on the actions that are performed when an animal hoarding case arises could help to understand which are the most effective. Finally, more research to elucidate the boundary between animal hoarding and other forms of pet ownership could also be useful, particularly for early detection and prevention.

We must also consider the serious consequences of keeping animals in such compromised conditions, preventing them from being adopted and becoming a high cost for the community.

Acknowledgements

References

APA (American Psychiatric Association) 2013 *Diagnostic and Statistical Manual of Mental Disorders. Fifth Edition (DSM-5).* American Psychiatric Publishing: Arlington, USA

Arluke A 2006 Hoarders: shoring up self. In: Arluke A (ed) *Just a Dog. Understanding Animal Cruelty and Ourselves* pp 85-114. Temple University Press: Philadelphia, USA

Arluke A, Frost R, Steketee G, Patronek G, Luke C, Messner E, Nathanson J and Papazian M 2002 Press reports of animal hoarding. *Society and Animals 10(2)*: 113-135. http://dx.doi.org/10.1163/156853002320292282

Arluke A and Killeen C 2009 *Inside Animal Hoarding: The Case of Barbara Erickson and Her 552 Dogs.* Purdue University Press: West Lafayette, USA

Berry C, Patronek G and Lockwood R 2005 Long-term outcomes in animal hoarding cases. *Animal Law 11*: 167-193

Brambell FWR 1965 *Report on the Technical Committee to Enquire into the Welfare of Livestock Kept Under Intensive Husbandry Systems.* HMSO: London, UK

Edsell-Vetter J and Patronek G 2011 Hoarding of animals. In: Bratiotis C, Sorrentino Schmalisch C and Steketee G (eds) *The Hoarding Handbook: A Guide for Human Service Professionals* pp 109-124. Oxford University Press: New York, USA

Frost R, Patronek G and Rosenfield E 2011 A comparison of object and animal hoarding. *Depression and Anxiety 28(10)*: 885-891. http://dx.doi.org/10.1002/da.20826

Frost R and Steketee G 2011 Rescue: saving animals from a life on the streets. In: Frost R and Steketee G (eds) *Stuff: Compulsive Hoarding and The Meaning of Things* pp 118-133. Houghton Mifflin Harcourt Publishing Company: New York, USA

Frost R, Steketee G and Williams L 2000 Hoarding: a community health problem. *Health and Social Care in the Community 8(4)*: 229-234. http://dx.doi.org/10.1046/j.1365-2524.2000.00245.x

Hoarding of Animals Research Consortium (HARC) 2000 People who hoard animals. *Psychiatric Times 17*: 25-29.

Hoarding of Animals Research Consortium (HARC) 2002 Health implications of animal hoarding. *Health and Social Work 27(2)*: 125-131. http://dx.doi.org/10.1093/hsw/27.2.125

Kohn R, Wintrob RM and Alarcón RD 2009 Transcultural psychiatry. In: Sadock BJ, Sadock VA and Ruíz P (eds) *Kaplan & Sadock's Comprehensive Textbook of Psychiatry, Ninth Edition* pp 734-753. Lippincott Williams & Wilkins: Philadelphia, USA

Kring AM and Johnson SL 2013 Obsessive-compulsive-related and trauma-related disorders. In: Kring AM and Johnson SL (eds) *Abnormal Psychology, Twelfth Edition* pp 203-225 John Wiley & Sons: Hoboken, USA

Lawrie M 2005 Animal hoarders in Australia: shining light through dark shades. *15th Urban Animal Management Conference* pp 77-82. 19-21 October 2005, Canberra, Australia

Lockwood R 2005 Cruelty towards cats: changing perspectives. In: Salem DJ and Rowan AN (eds) *The State of Animals III: 2005* pp 15-26. Humane Society Press: Washington DC, USA

Marchand S and Phillips McEnany G 2012 Hoarding's place in the DSM-5: another symptom, or a newly listed disorder? *Issues in Mental Health Nursing 33*: 591-597. http://dx.doi.org/10.3109/01612840.2012.704134

Mataix-Cols D, Fernández de la Cruz L, Nakao T and Pertusa A 2011 Testing the validity and acceptability of the diagnostic criteria for hoarding disorder: a DSM-5 survey. *Psychological Medicine 41*: 2475-2484. http://dx.doi.org/10.1017/S0033291711000754

Mataix-Cols D, Frost R, Pertusa A, Clark LA, Saxena S, Leckman JF, Stein DJ, Matsunaga H and Wilhelm S 2010 Hoarding disorder: a new diagnosis for DSM-V? *Depression and Anxiety 27*: 556-572. http://dx.doi.org/10.1002/da.20693

Nathanson JN 2009 Animal hoarding: slipping into the darkness of co-morbid animal and self-neglect. *Journal of Elder Abuse and Neglect 21(4)*: 307-324. http://dx.doi.org/10.1080/08946560903004839

Nathanson JN and Patronek GJ 2012 Animal hoarding: how the semblance of a benevolent mission becomes actualized as egoism and cruelty. In: Oakley B, Knafo A, Madhavan G and Wilson DS (eds) *Pathological Altruism* pp 107-115. Oxford University Press: New York, USA

NIOSH (National Institute for Occupational Safety and Health) 2007 *NIOSH Pocket Guide to Chemical Hazards* p 15. NIOSH Publications: Cincinnati, USA

Patronek G 1999 Hoarding of animals: an under-recognized public health problem in a difficult-to-study population. *Public Health Reports 11*: 81-88. http://dx.doi.org/10.1093/phr/114.1.81

Patronek G and Hoarding of Animals Research Consortium (HARC) 2001 The problem of animal hoarding. *Municipal Lawyer 19*: 6-9

Patronek G, Loar L and Nathanson J 2006 *Animal hoarding: structuring interdisciplinary responses to help people, animals and communities at risk*. Hoarding of Animals Research Consortium: Tufts University, Boston, USA

Patronek G and Nathanson J 2009 A theoretical perspective to inform assessment and treatment strategies for animal hoarders. *Clinical Psychology Review 29*: 274-281. http://dx.doi.org/10.1016/j.cpr.2009.01.006

Perroud N, Guipponi M, Pertusa A, Fullana MA, Iervolino AC, Cherkas L, Spector T, Collier D and Mataix-Cols D 2010 Genome-wide association study of hoarding traits. *American Journal of Medical Genetics 9999B*: 1-3

Pertusa A, Frost RO, Fullana MA, Samuels J, Steketee G, Tolin D, Saxena S, Leckman JF and Mataix-Cols D 2010 Refining the diagnostic boundaries of compulsive hoarding: a critical review. *Clinical Psychology Review 30(4)*: 371-386. http://dx.doi.org/10.1016/j.cpr.2010.01.007

Ramos D, da Cruz NO, Ellis SLH, Hernandez JAE and Reche-Junior A 2013 Early stage animal hoarders: are these owners of large numbers of adequately cared for cats? *Bulletin of Human-Animal Bond Interaction 1(1)*: 55-69

Reinisch AI 2009 Characteristics of six recent animal hoarding cases in Manitoba. *The Canadian Veterinary Journal 50*: 1069-1073

Steketee G, Gibson A, Frost RO, Alabiso J, Arluke A and Patronek G 2011 Characteristics and antecedents of people who hoard animals: an exploratory comparative interview study. *Review of General Psychology 15(2)*: 114-124. http://dx.doi.org/10.1037/a0023484

Topal J, Miklosi A, Csanyi V and Doka A 1998 Attachment behaviour in dogs (*Canis familiaris*): a new application of Ainsworth (1969) Strange Situation Test. *Journal of Comparative Psychology 112(3)*: 219-229. http://dx.doi.org/10.1037/0735-7036.112.3.219

Vaca-Guzman M and Arluke A 2005 Normalizing passive cruelty: the excuses and justifications of animal hoarders. *Anthrozoös 18(4)*: 338-357. http://dx.doi.org/10.2752/089279305785593947