

The First Study on Classification of Iranian Domestic Cats' Behavior Problems and Their Associated Risk Factors

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Abstract: Not only behavioral disorders, but also normal behaviors are important causes of euthanasia and abandonment of healthy cats. The aim of this study was to evaluate prevalence and risk factors of behavior problems in cats presented to the Small Animal Clinic at Islamic Azad University through the observation of some variables. The data was collected from 140 successfully completed questionnaires via face to face interview with owners. The relationship between independent variables such as age, sex, breed, mating status, number of family members, multicasts households, outdoor access, owner's education and marital status with some important behavioral problems including inappropriate elimination, aggression, compulsive behavior, destructive scratching, overactivity, fear of noises, fear of people and other animals and separation anxiety prevalence in domestic Iranian cats was analyzed. The main behavior problems reported by owners were inappropriate urine elimination (42%) and aggression (24.3%). Inappropriate faeces elimination, destructive scratching, overactivity, separation anxiety, fear of noises, compulsive behavior and fear of people and other animals were the next behavior problems with the prevalence of 18.6, 13.6, 10, 7.1, 6.4, 4.3 and 3.6%, respectively. Male cats were more likely to exhibit inappropriate elimination of faeces, aggression and inappropriate elimination of urine than their female counterparts. Geriatric cats were more likely to exhibit aggression than kittens or adults. Additionally, European Shorthair cats were more likely to display aggression than Persian cats. In conclusion, the prevalence of behavior problems in domestic Iranian cats was influenced by the age, sex, breed, multicasts household and outdoor access of the animals.

Key words: Behavior problem • Cat • Iran • Risk factor • Prevalence

INTRODUCTION

The growth of domestic cat population and cats' popularity as a companion animal is a worldwide phenomenon [1]. The number of cats has increased and even surpassed the number of dogs in some countries [2-4]. In Iran, cat population is still about one third of dog population, however, an official census of cat population in our area was not available and these data related to our clients at Tehran pet clinic. Nevertheless, a recent study concluded that because of easier supervision and more independency of cats the majority of people prefer cats as pets compared to the dogs [5-7]. Additionally, cats have a recognized role in the maintenance of human

health and mental balance [8]. The increase of cat numbers can partly explain why the number of cats referred for behavior problems has increased over the past few years [9, 10].

The term "behavior problem" is used to describe any behavior shown by an animal (in the context of this paper, a cat) that is unacceptable to the owner. Some behavior problems such as sexual marking are normal behaviors, that is, they belong to the normal feline behavior repertoire and yet, when shown in a domestic environment, became objectionable [10]. Behavior problems are important for several reasons. First, they are one of the most common reasons for relinquishment of cats [11]. A 2004 report concluded that half of the

adopted kittens had at least one behavior problem after the first month [12] and other authors have found that behavior problems account for more than one third of all the unsuccessful rehoming of abandoned cats [13].

Second, behavior problems are important from a public health point of view because although the percentage of aggression problems is higher towards other cats than towards people, a high number of aggressive episodes are still directed towards people. Physical and psychological consequences of cat attacks should not be underestimated, mainly when the target of the attacks are elderly people, children or people with compromised immunity [14, 15].

Finally, but not less important, behavior problems may negatively affect the welfare of the animals, mainly when they are a consequence of stress or anxiety [9]. To date, there are no data in Iran about domestic cat's behavior problems. Additionally, prevention and early diagnosis of behavior disorders are much more efficient than trying to correct an established problem in an adult cat. Therefore, epidemiological studies are important to understand the prevalence and risk factors of behavior problems and thus the best preventive measures. However, results can vary depending on the geographical area and the source of data. For example, previous studies have shown that data obtained through a questionnaire to the general practitioners are different from those obtained through a consultation in a referral service [16]. To the best of our knowledge, this is the first epidemiological study on behavior problems in cats carried out in Iran and our objectives were to describe the most common behavior problems in a feline population attended in a referral behavior service and to identify the risk factors on which preventive measures should be based.

MATERIALS AND METHODS

The cases described here were presented to the Tehran Small Animal Clinic at Islamic Azad University, Science and Research branch between Sep 2009 and Feb 2011. The owners or guardians who referred to this clinic with their cats for physical or behavioral problems were invited to complete a questionnaire about their observations of their animal's behavior [17, 18]. The study validated questionnaire was taken from Overall [19, 20] but some of its questions were modified and adapted to the Iranian culture. The face to face interview initially involved the completion of an extensive history form which was included the animal's signalment and information on the behavior problem, the animal's

environment, training and medical history and social behavior. The questionnaire also contained questions regarding age, sex, breed, mating status, owner's education and marital status, number of cat(s) in the household prior to the adoption and number of owner's family members.

To analyze age of the cats, the following three subsets were considered: cats between 1 to 12 months old (kittens); cats between 1 to 5 years old (adults) and cats greater than 5 years old (geriatrics). Mating status was divided into three categories: mated cats, cats have no mating, neutered cats. To evaluate environmental conditions the questions were about outdoor access, members of owner's family and presence of other cat/s at the home. The relation between education and marital status of the owners and behavior problems, were evaluated. The owners' education was considered at this study, as 40.7% (57/140) had diploma or under it (D), 6.4% (9/140) had associate degree (AD), 44.3% (62/140) had bachelor science (BSc) and 8.5% (12/140) had master science or over it (MSc).

Questions were set in a series of multiple choices and embedded open-ended questions. From this information and ancillary questions, the behavior problems were identified. The probable causes for the initiation and maintenance of the problem were determined when possible. All cats included in the study were undergone a thorough physical examination. Following the initial part of the interview, the nature of the problem and possible causes for the behavior were discussed with the owner.

This research proposal has received ethical approval by Islamic Azad University Research Office.

Statistical Analysis: The significance of the relationship between the occurrence of behavior problems and cat independent variables was analyzed with a χ^2 -test [21]. All statistical analyses were performed using SPSS 16.0 for Windows.

Chi-square tests of association were used to determine if significant relation existed between pairs of categorical variables. When the number in individual cells was less than five, exact Chi-square methods were used. For all analyses a value of $p < 0.05$ was considered significant.

RESULTS

A total of 140 cases presented from 2009 to 2011 were included in this study. Sixty five (46.4%) were females (7.1% of which were castrated) and 75 (53.6%) were males (11.4% of which were castrated).

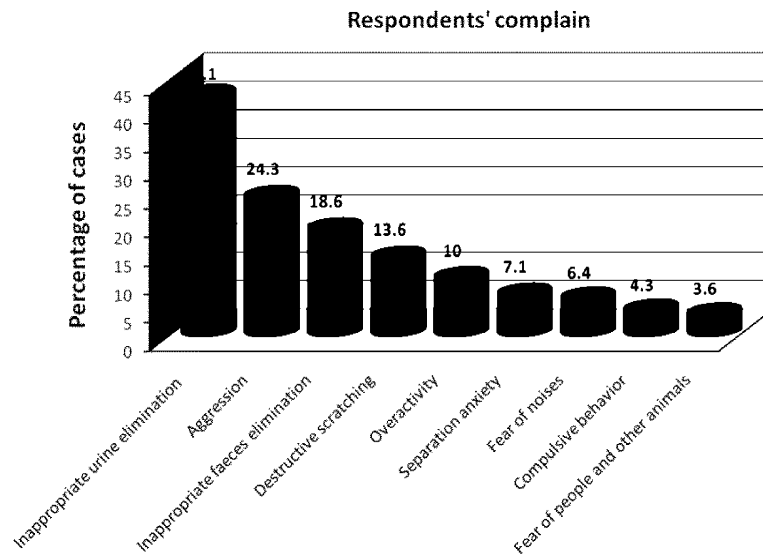


Fig. 1: Percentage of cases according to the respondents' complain.

Table 1: Associations between cat's independent variables and prevalence of different behavior problems

Behavior problem	Breed		Sex		Age			Mating status		
	ESH n(%)	Persian n(%)	Male n(%)	Female n(%)	Kitten n(%)	Adult n(%)	Geriatrics n(%)	Mated n(%)	No mating n(%)	Neutered n(%)
Inappropriate elimination of urine	48(46.2)	11(30.6)	48(64) ^a	11(16.9) ^b	4(26.7)	45(41.3)	10(62.5)	13(59.1)	36(39.1)	10(38.5)
Aggression	31(29.8) ^a	3(8.3) ^b	24(32) ^a	10(15.4) ^b	4(26.7) ^a	21(19.3) ^a	9(56.2) ^b	7(31.8)	23(25)	4(15.4)
Inappropriate elimination of faeces	21(20.2)	5(13.9)	19(25.3) ^a	7(10.8) ^b	2(13.3)	19(17.4)	5(31.2)	5(22.7)	17(18.5)	4(15.4)
Destructive scratching	15(14.4)	4(11.1)	11(14.7)	8(12.3)	2(13.3)	13(11.9)	4(25)	1(4.5)	15(16.3)	3(11.5)
Overactivity	9(8.7)	5(13.9)	8(10.7)	6(9.2)	1(6.7)	10(9.2)	3(18.8)	1(4.5)	10(10.9)	3(11.5)
Separation anxiety	8(7.7)	2(5.6)	6(8)	4(6.1)	0(0)	8(7.3)	2(12.5)	3(13.6)	4(4.3)	3(11.5)
Fear of noises	6(5.8)	3(8.3)	4(5.3)	5(7.7)	1(6.7)	8(7.3)	0(0)	2(9.1)	5(5.4)	2(7.7)
Compulsive behavior	6(5.8)	0(0)	3(4)	3(4.6)	1(6.7)	4(3.7)	1(6.2)	0(0)	4(4.3)	2(7.7)
Fear of people and other animals	4(3.8)	1(2.8)	2(2.7)	3(4.6)	1(6.7)	3(2.8)	1(6.2)	1(4.5)	2(2.2)	2(7.7)

^{a, b} for each parameter, numbers with different superscripts in the same row indicate significant difference ($P < 0.05$)

Table 2: Associations between owner's factors and the prevalence of different behavior problems

Behavior problem	Family members		Multicast households		Outdoor access			Owner's education			Owner's marital status		
	< 4 n(%)	> 4 n(%)	Yes n(%)	No n(%)	Indoor- only n(%)	Indoor- Outdoor n(%)	Outdoor- only n(%)	≤ D n(%)	AD n(%)	BSc n(%)	≥ MSc n(%)	Yes n(%)	No n(%)
Inappropriate urine elimination	19 (33.9)	40 (47.6)	13 (48.1)	46 (40.7)	51 (64.6) ^a	3 (6.5) ^b	5 (33.3) ^b	30 (52.6)	4 (44.4)	22 (35.5)	3 (25)	25 (39.7)	34 (44.2)
Aggression	9 (16.1)	25 (29.8)	13 (48.1) ^a	21 (18.6) ^b	29 (36.7) ^a	2 (4.3) ^b	3 (20) ^b	18 (31.6)	4 (44.4)	9 (14.5)	3 (25)	13 (20.6)	21 (27.3)
Inappropriate faeces elimination	10 (17.9)	16 (19)	6 (22.2)	20 (17.7)	25 (31.6) ^a	0 (0) ^b	1 (6.7) ^b	15 (26.3)	0 (0)	10 (16.1)	1 (8.3)	11 (17.5)	15 (19.5)
Destructive scratching	6 (10.7)	13 (15.5)	7 (25.9) ^a	12 (10.6) ^b	15 (19)	3 (6.5)	1 (6.7)	9 (15.8)	1 (11.1)	7 (11.3)	2 (16.7)	7 (11.1)	12 (15.6)
Overactivity	5 (8.9)	9 (10.7)	4 (14.8)	10 (8.8)	12 (15.2)	1 (2.2)	1 (6.7)	7 (12.3)	0 (0)	6 (9.7)	1 (8.3)	6 (9.5)	8 (10.4)
Separation anxiety	4 (7.1)	6 (7.1)	1 (3.7)	9 (8)	7 (8.9)	2 (4.3)	1 (6.7)	5 (8.8)	0 (0)	5 (8.1)	0 (0)	5 (7.9)	5 (6.5)
Fear of noises	3 (5.4)	6 (7.1)	1 (3.7)	8 (7.1)	8 (10.1)	1 (2.2)	0 (0)	2 (3.5)	1 (11.1)	5 (8.1)	1 (8.3)	3 (4.8)	6 (7.8)
Compulsive behavior	4 (7.1)	2 (2.4)	1 (3.7)	5 (4.4)	6 (7.6)	0 (0)	0 (0)	3 (5.3)	0 (0)	3 (4.8)	0 (0)	1 (1.6)	5 (6.5)
Fear of people and other animals	3 (5.4)	2 (2.4)	1 (3.7)	4 (3.5)	5 (6.3)	0 (0)	0 (0)	0 (0)	1 (11.1)	2 (3.2)	2 (16.7)	4 (6.3)	1 (1.3)

^{a, b} for each variable, numbers with different superscripts in the same row indicate significant difference ($P < 0.05$)

The average age at evaluation was 3.1 years. Thirty six cats were Persian (25.8%) and 104 (74.2%) were European Shorthair (ESH). The total percentage of behavior problems in Iranian cats presented to the Small Animal Clinic at Islamic Azad University have summarized in Fig. 1.

About half of respondents (67, 47.9%) declared that their cat has exhibited at least one behavior problem. Inappropriate elimination of urine and fear of people and other animals were the main and least owner complaints, respectively. The average number of behavior problems per cat was 1.3 (182/140).

Evaluation of relation between independent variables such as age, sex, breed, mating status, number of family members, multicats households, outdoor access, owner's education and marital status with behavioral problems indicated that male cats were more likely to exhibit inappropriate elimination of faeces ($\chi^2 = 4.884$; $P = 0.027$), aggression ($\chi^2 = 5.22875$; $P = 0.022$) and inappropriate elimination of urine ($\chi^2 = 31.651$; $P = 0.000$) than their female counterparts. Geriatric cats were more likely to exhibit aggression (Fisher's exact test; $P = 0.003$) than adults or kittens. Additionally, European Shorthair cats were more likely to exhibit aggression ($\chi^2 = 6.707$; $P = 0.01$) than Persian cats. No effect of mating status was found on the likelihood of cats' showing behavior problems (Table 1).

Regarding to the target of aggression, cats showed aggression more frequently towards other cats (19/34; 55.9%) than towards people (15/34; 44.1%). Most families (84/140; 60%) had four or more than four members. There was no significant relation between the numbers of persons who live in the families with likelihood of behavior problems occurrence. Multicats household (27/140; 19.2%) was not very common in our study area; although cats from multicats households showed more destructive scratching ($\chi^2 = 4.353$; $P = 0.037$) and more aggressive problems towards other cats ($\chi^2 = 10.359$; $P = 0.001$) than cats from households with only one cat. In our study the proportion of indoor-only cats (79/140; 56.4%) was much higher than outdoor-only cats (15/140; 10.7%) and indoor-outdoor cats (46/140; 32.8%). The indoor-only cats were more likely to exhibit aggression toward people ($\chi^2 = 16.725$; $P = 0.000$), inappropriate elimination of faeces ($\chi^2 = 20.827$; $P = 0.000$) and inappropriate elimination of urine ($\chi^2 = 40.693$; $P = 0.000$) (Table 2).

Most of owners (77/140; 55%) were married at the present study and there was no significant relation between owners' marital status with behavior problems occurrence. There was no significant relation between

owners' education with likelihood of behavior problems occurrence. The majority of cats had simultaneously two behavior problems (22.1%) and the proportions of cats with 3, 4 and 5 simultaneously behavior problems were 15, 7.1 and 0.7%, respectively.

DISCUSSION

According to the present study, inappropriate elimination of urine is the most frequent complaint declared by cat owners, which is similar to other available reports [16, 22 - 24]. Aggression and elimination problems are the most commonly reported behavior problems in Iranian cats at the present study. These results are similar to those obtained in other referral practices [24-27]. For instance, according to the Association of Pet behavior Counselors, around 39% of cats were referred for inappropriate elimination and 32% for aggression problems [25]. These data indicate that these problems are very common and also that they may be particularly challenging and therefore poorly tolerated by many owners who will ask for advice more readily than when the cat shows another problem [9, 10].

Based on other reports, intercat aggression appears to be more frequent than aggression towards people [15, 26-28]. In our study, the high proportion of indoor cats (56.4%) combined with multicats households (19.2%) could contribute to the high percentage of aggression between cats in the caseload [26, 29]. Conflicts among cats may be more likely if the home range is small, as it occurs with indoor cats [30].

According to Leyhausen, indoor cats may show aggression as a result of dispersion being prevented. Furthermore, the lack of a developed communicative language in cats as compared with dogs may increase the likelihood of aggressive encounters [31]. According to Bernstein and Strack, indoor cats should have access to at least two rooms and an additional space should be added in multicats households [32].

In our study area, the proportion of indoor cats (79/140; 56.4%) was much higher than in other countries [29, 33]. For instance, in UK, the majority of cats have access to the outside and less than 20% of cats were kept indoors permanently [26]. These results suggest that behavior problems may be associated with keeping cats indoors, as previously reported by other investigators [29, 34, 35]. It is important to emphasize, however, that quality of space is at least as important as the amount of space per se. Environmental enrichment in the form of vertical structures, scratching posts and hiding places, for example, can improve the welfare of cats [35].

Further, it is also very important to avoid either a monotonous and impoverished environment or unpredictable changes, as both could cause stress [30, 37]. According to our results and to previous studies, housing a single cat is correlated with a high likelihood of aggressive behavior towards the owners [26]. Cats kept without contact with other cats can direct play behavior towards their owner more frequently than group-housed cats [25, 38].

Depending on the source of information, there could be some discrepancies between epidemiologic studies. Previous studies showed that the most common behavior problem was inappropriate elimination followed by destructive scratching [16]. According to the present study, however, destructive scratching is the fourth behavior problem and accounted for a very small number of cases. This could be due to the fact that destructive scratching is not perceived as serious enough as to seek the advice of a behaviorist [16].

In the present study in agreement of other reports [39, 40], inappropriate elimination of urine was more frequent in males (48/75; 64%) than their female counterparts (11/65; 16.9%). As other authors have reported. Spraying is a normal behavior in sexually intact cats, but this behavior may also develop in castrated and ovariectomized cats with as many as 10% of males and 5% of females spraying on a frequent basis as adults [41]. According to Pryor although spraying is not a primary means of urine elimination in most cats but feline communication may be its main function. Both males and females spray, although males and estrous females spray more often [37]. Hart and Hart speculate that the male's own urine odor probably makes him more self-assured and comfortable [42].

According to the present study, male cats were more likely to display aggression (24/75; 32%) than their female counterparts (10/65; 15.4%). Jongman declare that intact males display stronger territorial behavior than females, although both sexes mark their territory with urine spraying and scratching of vertical surfaces. In relation to aggressive behavior, there are few fights between females of a colony, possibly because most of the females in a colony are related. In general, however, intact males do fight over reproductive females and females do fight with unfamiliar females. Female cats are considered more social than intact males and stay within their territory, whereas males may disperse in search of reproductive females [43].

In the present study, geriatric cats were more likely to exhibit aggression than adults or kittens. The incidence of behavior problems increases with advancing age [40].

According to Houpt A decline in hearing and vision are normal aging changes that may affect behavior and can lead to subsequent fear, phobias, or aggression [44].

According to the present study, European Shorthair cats were the most reported breed in aggressive incidents, which could be due to the popularity of this breed in our study area, as in previous studies regarding to other breeds' population in a region, reports have been different [45]. However, an official census of cat's breeds in our area was not available. Unlike what occurs in canine aggression, the feline breed is not an outstanding parameter in reviewed epidemiological studies [46].

In the present study, the indoor-only cats were more likely to display inappropriate faeces and urine elimination and aggression toward people. Buffington reviewed the veterinary literature for epidemiological data on cats confined indoors. He found that some behavior problems such as inappropriate elimination were associated with keeping cats indoors [35].

The main concern with an indoor environment is that, compared with the outdoors, it is relatively impoverished, predictable and monotonous and may cause the cat to experience boredom and stress. While we often do not know what cats do when they are outdoors, it is generally assumed that indoor cats are less active and that this inactivity can lead to obesity and other problems. Certain behaviors, such as scratching items and spraying urine, may be considered normal when performed by a cat outdoors but become problematic when performed indoors [30].

Cats confined indoors spend proportionately more time with people than cats with access to the outdoors, which has been interpreted as cats seeking additional stimulation in an environment that is relatively less stimulating [47].

According to the present study, cats from multicat households showed more destructive scratching and more aggressive problems towards other cats than cats from households with only one cat. Previous studies showed that having 'bully' cats in the household is likely to lead to problems of serious intercat aggression and secondary behavior problems that are a consequence of subordinates being kept away from important resources, such as litterboxes. If later attempts are made to introduce another cat, such asocial individuals are likely to exhibit uninhibited aggression or excessive fear of the newcomer [48]. While adult, intact male cats may engage in intense aggressive conflict, particularly in the presence of an estrous female [49, 50].

CONCLUSIONS

This paper presented the first study on behavior problems in a population of Iranian domestic cats. According to the results of the present study, inappropriate elimination of urine was the main owner complaints, followed by aggression. Male cats were more likely to exhibit inappropriate elimination of faeces, aggression and inappropriate elimination of urine than their female counterparts. Geriatric cats were more likely to exhibit aggression than adults or kittens.

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