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# INFLUENCE OF BREED, GENDER, REPRODUCTIVE STATUS AND ORIGIN ON NOISE RELATED FEARS IN THE BELGRADE POPULATION OF DOGS

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*The prevalence of canine noise-related fears was studied by the questionnaire method of dogs' owners from different part of Belgrade. Dog-owners (N=147) were chosen from a variety of sources (permissive municipal areas and parks for walking of dogs, dog shows and exhibitions and veterinary surgeries for small animal practice). Owners indicated noise-related fears in 59 dogs (40.14%). Twenty-six (17.69%) of them were mixed breed dogs and 33 (22.45%) were pure breed dogs. Noise-related fears were indicated in 25 females (17.01%) and in 34 (23.13%) males and, in 27 (18.37%) intact and 32 (21.77%) neutered dogs. From 59 dogs with noise-related fears 13 of them (8.84%) were directly purchased from breeders and 46 (31.30%) were obtained from other sources. There was a statistically significant difference ($p<0.001$) in the rate of noise-related fears between the dogs directly purchased from breeders and dogs obtained from other sources.*

*Key words: behaviour, dog, fear, noise*

## INTRODUCTION

Seibert and Landsberg (2008) noted that veterinary practitioners have traditionally made a clear distinction between physical and mental health. However, physical problems of patients become the focus of attention, while mental well-being is largely ignored. Behavioural problems may impair the welfare of pet dogs directly affecting their emotional state or indirectly affecting the relationship between owners and their pets (Fatjó *et al.* 2006, Vučinić *et al.* 2009). Many behavioural problems are expressions of anxiety, chronic fear and phobia. According to Sherman and Mills (2008) separation anxiety and noise-related phobias are two common complaints identified by dog owners. Iimura *et al.* (2007) found that fear of thunderstorms was the second most common canine noise phobia, falling just behind fear of fireworks.

All authors who published papers on a phobia in domestic dogs defined this pathological behaviour on the same or similar manner. Phobias are excessive

fears disproportionate to the circumstance that causes them or it is a disproportionate fear to the danger of the real situation. Phobia is defined as a persistent, excessive and irrational fear response to the situation (McCobb *et al.* 2001, Ballamwar *et al.* 2008). There are many causes of phobia in domestic dogs such as: inadequate conditions of development existing from youth, early socialization deficit, deprivation syndrome, genetic factors, traumatic events, associative learning, by either classic or instrumental conditioning (Heiblum, 2008). Responses to stimuli that initiate phobias may differ between dogs depending on their experiences and the intensity and frequency of the noise. Some dogs respond to noise by hiding quietly. Others may display problematic behaviours, endangering themselves, others, or the environment. Presenting signs may include panting, pacing, trembling, remaining near the owner, salivation, vocalization, destructive behaviour, indoor elimination, and self-trauma (Heiblum, 2008, Horwitz, 2009). In their study, McCobb *et al.* (2001) estimated that 17 of 41 dogs with a known age of onset began exhibiting thunderstorm phobia <1 year of age. Blackwell *et al.* (2005) studied firework fears and phobias in domestic dogs. They estimate that dogs born in the autumn and winter were less likely to react fearfully to loud noises than those born in the spring or summer. Older dogs were more likely to show fearful behaviour in response to loud noises than younger dogs. They did not find significant differences between dog breeds. However cross-bred dogs were more likely to be fearful of loud noises than pure breed dogs. Overall *et al*. (2001) estimated associations between separation anxiety and thunderstorm and noise phobias in dogs. These authors suggested that dogs with any of these conditions should be screened for other conditions, also. Bamberger and Houpt (2006) found that females were over-represented for phobias. These authors evaluated dogs with phobias at a median age of 6.5 years, compared with dogs with other behavioural problems (median age of 2.5 years).

In 1996 Dodman proposed that pain associated with the discharge of static electricity might transform mild thunderstorm anxiety into severe thunderstorm phobia. Dodman (1996) based his theory on owner reports that they received static electric shocks when they touched their dog during storms and that many dogs seek electrically grounded "safe" locations during storms. According to some theories storm phobia is essentially a thunder noise phobia (learned or innate) and that the dog becomes conditioned to fear other aspects of the storm including changes in illumination level, lightning, darkness, wind and noise. Also it is a hypothesis that some dogs appear to detect storms before their owners. It leads to the possibility that dogs can sense changes in the environment that their owners can not, such as changes in barometric pressure, ozone concentration or levels of static electricity (Cottam *et al*, 2005). Siniscalch *et al.* (2008) found that dogs usually process their species-typical vocalizations using the left hemisphere and the thunderstorm sounds using the right hemisphere. Dogs turned their head to the right side (left hemisphere) in response to conspecific vocalizations, but to the left side in response to the sound of the thunderstorm. Also, they estimate that dogs were more reactive when they attended to playbacks of "thunderstorm". Branson and Rogers (2006) studied the relationship between paw preference

strength and noise phobia in *Canis familiaris*. Dogs without a significant paw preference were significantly more reactive to the sounds of thunderstorms and fireworks than the dogs with either a left-paw or right-paw preference. Branson (2008) concluded that dogs with a significant left-paw or right-paw preference showed no observable behavioral change in response to thunderstorms and fireworks, whereas ambilateral dogs showed fear responses, indicating that nonlateralization of neural functions may be associated with intense emotional responses.

The aim of this study was to establish reliable information to the prevalence of noise-related fears in dogs of known owners in Belgrade.

## MATERIALS AND METHODS

The same methodology as that use by Blackwell *et al.* (2005) for RSPCA survey of firework fears and phobias in the domestic dog in UK was applied in the study of noise-related fears prevalence in the population of dogs in Belgrade. Data were collected through a questionnaire survey of dog-owners in different parts of Belgrade. Dog-owners (N=147) were chosen from a variety of sources (permissive municipal areas and parks for walking of dogs, dogs shows and exhibitions and veterinary surgeries for small animal practice). The questionnaire consisted of three main groups of questions. The first group of questions related to demographic data on owners, the second group related to demographic data on dogs (age, sex, reproductive status, source of dog obtaining) and the third group of questions related to the behaviour of a dog especially on signs of behavioural disorders. Statistical computations were performed in the program MedCalc by comparison of proportions and Chi-square analysis. If the P-value was less than 0.05 it could be concluded that there was a statistical significant difference between the two proportions.

## RESULTS

Structure of the sample included in the survey is shown in Table 1. The total number of 147 dogs' owners was included in the survey. Sixty-eight owners of mixed breed dogs and 79 owners of pure breed dogs filled the questionnaire. Eighty of them were owners of male dogs (38 male mixed breed dogs and 42 male pure breed dogs). Sixty-seven were owner of female dogs (30 female mixed breed dogs and 37 female pure breed dogs). Seventy-two intact dogs and 75 neutered dogs were included in the survey. Owners indicated noise-related fears in 59 dogs (40.14%). Twenty-six (17.69%) of them were mixed breed dogs and 33 (22.45%) were pure breed dogs (Table 2). Noise-related fears were indicated in 25 females (17.01%) and in 34 (23.13%) males (Table 3) and, in 27 (18.37%) intact and 32 (21.77%) neutered dogs (Table 4). From 59 dogs with noise-related fears 13 of them (8.84%) were directly purchased from breeders and 46 (31.30%) were obtained from other sources (Table 5, Fig.1).

Table 1. Sample structure and number (N) of dogs with noise related fears or phobia

| Breed (N) | | Gender (N) | | Reproductive status (N) | | Noise related fears (N) | |
|---|---|---|---|---|---|---|---|
| Mixed breed | 68 | Male | 38 | Intact | 16 | Reported | 5 |
| | | | | | | Not reported | 11 |
| | | | | Neutered | 22 | Reported | 10 |
| | | | | | | Not reported | 12 |
| | | Female | 30 | Intact | 7 | Reported | 2 |
| | | | | | | Not reported | 5 |
| | | | | Neutered | 23 | Reported | 9 |
| | | | | | | Not reported | 14 |
| Pure breed | 79 | Male | 42 | Intatc | 25 | Reported | 11 |
| | | | | | | Not reported | 14 |
| | | | | Neutered | 17 | Reported | 8 |
| | | | | | | Not reported | 9 |
| | | Female | 37 | Intact | 24 | Reported | 9 |
| | | | | | | Not reported | 15 |
| | | | | Neutered | 13 | Reported | 5 |
| | | | | | | Not reported | 8 |

Statistical analysis didn't point to significant differences in the incidence of noise related fears among dogs of mixed or pure breeds (Table 2), male or female dogs (Table 3), or among intact or neutered dogs (Table 4).

Table 2. Breed influence on noise related fears in dogs

| Breed | Total number of dogs in survey | | Dogs with noise related fears | | Statistical analysis | |
|---|---|---|---|---|---|---|
| | Number (N) | % | Number (N) | (%) | | |
| Mixed breed dogs | 68 | 46.26 | 26 | 17.69 | Difference | 4.760% |
| | | | | | 95% Confidence interval | -4.875% to 4.324% |
| Pure breed dogs | 79 | 53.74 | 33 | 22.45 | Chi-square | 0.763 |
| | | | | | Degree of freedom | 1 |
| | | | | | Significance level | p = 0.3825 |
| Total | 147 | 100.00 | 59 | 40.14 | | |

Table 3. Gender influence on noise related fears in dogs

| Gender | Total number of dogs in survey | | Dogs with noise related fears | | Statistical analysis | |
|---|---|---|---|---|---|---|
| | Number (N) | % | Number (N) | (%) | | |
| Female | 67 | 45.58 | 25 | 17.01 | Difference | 6.120% |
| Male | 80 | 54.42 | 34 | 23.13 | 95% Confidence interval | -3.515% to 15.664% |
| Total | 147 | 100.00 | 59 | 40.14 | Chi-square | 1.356 |
| | | | | | Degree of freedom | 1 |
| | | | | | Significance level | p = 0.2443 |

Table 4. Reproductive status influence on noise related fears in dogs

| Reproductive status | Total number of dogs in survey | | Dogs with noise related fears | | Statistical analysis | |
|---|---|---|---|---|---|---|
| | Number (N) | % | Number (N) | (%) | | |
| Intact | 72 | 45.58 | 27 | 18.35 | Difference | 3.400% |
| Neutered | 75 | 54.42 | 32 | 21.77 | 95% Confidence interval | -6.233% to 12.982% |
| Total | 147 | 100.00 | 59 | 40.14 | Chi-square | 0.339 |
| | | | | | Degree of freedom | 1 |
| | | | | | Significance level | p = 0.5605 |

Table 5. Dog source influence on noise related fears

| Dog source | Total number of dogs in survey | | Dogs with noise related fears | | Statistical analysis | |
|---|---|---|---|---|---|---|
| | Number (N) | % | Number (N) | (%) | | |
| Directly purchased from breeder | 54 | 36.73 | 13 | 8.84 | Difference | 22.460% |
| Other source | 93 | 63.27 | 46* | 31.30* | 95% Confidence interval | 13.065% to 31.569% |
| | | | | | Chi-square | 21.734 |
| | | | | | Degree of freedom | 1 |
| | | | | | Significance level | p<0.0001 |
| Total | 147 | 100.00 | 59 | 40.14 | * - Significant difference | |

However, statistical analysis points to the relative higher frequency of noise related fears in dogs obtained from other sources than those directly obtained from breeders. There was a statistical significant difference ($p<0.0001$) in the rate of noise-related fears between the dogs directly purchased from breeders and

dogs obtained from other sources (Table 5). Noise related fears were reported in 8.84% of dogs directly purchased from breeders compared to 31.30% of dogs from other sources of origin. Only 13 of 54 owners of dogs directly purchased from breeders indicated noise related fears in their pets (8.84%). Other 46 dogs (31.30%) with signs of noise related fears originated form different sources (Fig. 1). Their owners that thay adopted them from the municipal shelter (N=12), several private shelters in Belgrade (N=9), obtained dogs as a gift (N=9), found and picked up unwanted dogs directly from a street (N=8), obtained pets from societies for animal protection (N=5) or from a previous owner who wanted to relinquish a pet (N=3).

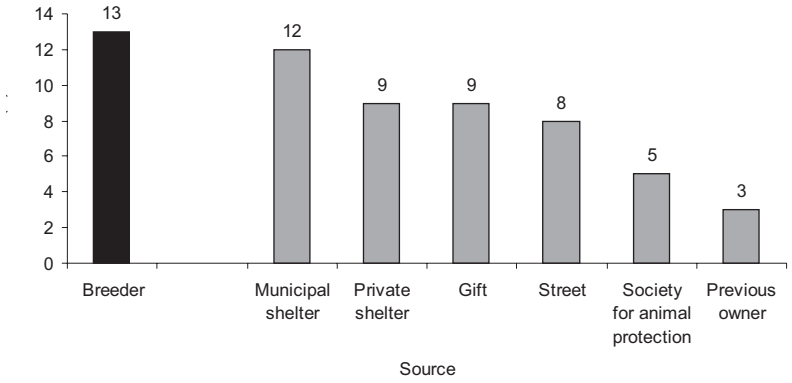


Figure 1. Source of dogs with signs of noise related fears

## DISCUSSION

In our survey 59 of 147 owners (40.14%) indicated noise-related fears in their pets. However, in the survey conducted by Blackwell *et al.* (2005) almost half of owners questioned (49%) reported that their dog was frightened of loud noises. It is possible that the difference between our result and the result of Blackwell *et al.* (2005) is the consequence of the custom of our citizens to celebrate noisily all happenings. Therefore, some of the dogs habituated to the common usage of fireworks and petards. Also, from day to day traffic noise in Belgrade becomes more and more intensive. On the other hand it is possible that some owners are not adequately educated on behavioural disorders in dogs. They are not able to recognise or consider behavioural changes on noises in their pets as a risk for dogs' health and welfare. Also, it is possible that some owners ignore behavioural changes to noises in their pets. There was no significant difference between male and female dogs in the incidence rate to noise-related fears, however the incidence rate was slightly higher in male (23.13%) than in female dogs (17.01%). In our sample the reproductive status (intact or neutered) of dogs did not influence differences in the incidence rate of noise-related fears although the incidence rate

was higher in the neutered group of dogs (21.77%) compared to the intact group (18.37%). Similarly, Spain *et al.* (2004) estimated that early-age gonadectomy was associated with increased rate of noise phobias in male and female dogs. In our study we did not estimate that mixed breed dogs were more likely to be fearful of loud noises than pure breed dogs. However, Blackwell *et al.* (2005) estimated the predisposition to noise-related fears in cross-bred dogs. Moreover, in our survey the incidence rate of noise-related fears in mixed breed dogs was slightly lower (17.69%) than in pure breed dogs (22.45%), but these two rates did not differ significantly. We estimated that dogs purchased directly from breeders were less likely to react fearfully to loud noises than those adopted from shelters, or obtained from societies for animal protection, from streets as strays or abandoned dogs, or from a previous owner who wanted to relinquish a pet. It is possible that dogs obtained from other sources than breeders previously expressed behavioural disorders to loud noises and that those disorders were reasons to be relinquished by their owners. Salman *et al*. (2000) also found that behavioural problems were the most frequent reasons for canine relinquishment. Yalcin and Batmaz (2007) also estimated that phobias in dogs were commonly seen behavioural problems in the Bursa Region of Turkey. When phobia was considered, these authors didn't estimate any predisposition due to sex and age in dogs.

In the time when we conducted the survey the Republic of Serbia had not The Law on Animal Welfare. Therefore, not only owners but also many veterinarians could not be able to recognize the importance of the institution of the responsible dog ownership. Every person can acquire a pet from uncontrolled and unlicensed sources. Also, in the previous years there were no obligations for owners to legalize their ownership over dogs. Now, we possess The Law on Animal Welfare and the source for obtaining a dog is well controlled. In the future it is very important to organize an education of dog owners on dog behavioural problems and to share duties among veterinarians and media in the general education process. Their common role is to inform, to advice and to teach owners of dogs how to prevent noise-related fears and stimuli that produce this behavioural disorder and how to help dogs at the time of onset of behavioural signs of fear-related behaviour. For owners of dogs with noise-related fears it is very important to consult their vets as soon as possible. The duty of veterinarians is to recommend and to support evidence-based therapies for noise-related fearful dogs. Also, it is an unavoidable advisory and educational role of numerous nongovernmental organizations for animal welfare protection in relation to this behavioural problem in dogs. Particularly, it is very important to prevent the uncontrolled use of fireworks and petards during numerous celebrations.

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## UTICAJ RASE, POLA, REPRODUKTIVNOG STATUSA I IZVORA NABAVKE NA STRAHOVE PROUZROKOVANE BUKOM U POPULACIJI PASA U BEOGRADU

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SADRŽAJ

U ovoj studiji je proučavana zastupljenost strahova kod pasa u Beogradu primenom upitnika za njihove vlasnike u različitim delovima Beograda. Vlasnici uključeni u istraživanje (n=147), odabrani su sa različitih mesta kao što su: dozvoljene javne površine i parkovi za šetanje pasa, izložbe pasa I veterinarske ambulante. Vlasnici 59 pasa (40,14%) su naznačili prisustvo strahova usled buke kod svojih ljubimaca. U ovoj grupi pasa bilo je 26 mešanaca (17,69%) i 33 (22,45%) rasna psa. Strah usled buke uočen je kod 25 ženki (17,01%) i 34 mužjaka (23,13%). Broj pasa koji nisu bili sterilisani je bio 27 (18,37%), a sterilisanih 32 (21,77%). Od 59 pasa sa strahovima od buke 13 pasa (8,84%) je bilo kupljeno direktno od odgajivača, dok je 46 pasa (31,30%) nabavljeno iz drugih izvora. Utvrđena je statistički značajana razlika ($p<0,001$) u zastupljenosti strahova usled buke između grupe pasa kupljenih direktno od odgajivača i grupe pasa poreklom iz drugih izvora nabavke.