Vol 30, Issue 2, April 2016

VETERINARIA

Survey of canine aggression in northern and central Italy

It is difficult to give a universally acceptable definition of aggression. In general, it can be defined as an overt or intentional behaviour shown by an individual to harm or otherwise cause a noxious stimulus against another individual. All dogs may show aggressive behaviour, but the inclination to do so can vary enormously, depending on genetic, neurochemical and hormonal factors, socialisation and learning. This study aims to provide an overview of Italian documented cases of dog bite incidents and to assess the circumstantial factors that led to the attack.
We studied 9231 reports of dog attacks that occurred in central and northern Italy from 1998 to 2005. The information collected by the various local health authorities was often incomplete, so fewer data are available for each variable than the total number of reports.
Based on our results, it is possible to draw an identikit of the biter dog: male, adult, mixed breed or belonging to Italian Kennel Club groups 1 or 2, which attacks mainly adult strangers. Numerous data were missing from the reports collected by local health authorities. It is to be hoped that in the future the collection will be integrated with an objective description of the events, analysing everything that happened before the attack, including dog's postures and signs of threat, in order to obtain a better picture of the animal's dangerousness.

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Keywords - Dogs, bites, dog aggression.

INTRODUCTION

It is difficult to give a universally acceptable definition of aggression. In general, it can be defined as an overt or intentional behaviour shown by an individual to harm or otherwise "cause a noxious stimulus" against another individual[1]. It is a complex behaviour, with a multifactorial aetiology. All dogs may show aggressive behaviour, but the inclination to do so can vary enormously among individuals, depending on genetic, neurochemical and hormonal factors (in particular testosterone), socialisation and learning. Serotonin (5-HT), in particular, seems to be implicated in the modulation of behavioural responses and it has been shown that aggressive dogs have lower concentrations of circulating 5-HT than do non-aggressive ones.
The role of learning in the development and persistence of aggressive behaviour should also be emphasised: if an animal learns that it can obtain control of a situation by being aggressive (where "control of a situation" means not only the management of certain dynamics but also the removal of a stimulus that represents a threat to the animal), the behaviour will be reinforced.
Thus, if aggressiveness leads to disappearance of the stimulus, the dog will tend to repeat the behaviour every time the stimulus recurs[2,3,4,5].
Aggression can be classified on the basis of its target (for example, members of the family or strangers) or apparent function. Although a classification according to the target of the aggression is more objective, the one based on function is more useful from a clinical point of view, because effective management of aggressive behaviours depends more on the underlying reasons than on the selection of the victim.

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Received: 09/06/2015 - Accepted: 21/01/2016

A functional classification of aggression is clinically more useful, because effective management of aggressive behaviour depends more on the reasons for the aggression than on the selection of the victim.

The various forms of aggression can be classified into the following categories[6]:

- Status-related, competitive aggression
- Social aggression (among familiar dogs)
- Aggression against unfamiliar dogs
- Fear-related aggression
- Territorial aggression
- Maternal aggression
- Pain-induced aggression
- Play aggression
- Predatory aggression.

Unfortunately, there is a paucity of data in the literature on dog-biting incidents in Italy. The aim of this study was to provide a picture of the documented cases of dog bites in some regions of northern and central Italy in a defined period of time.

MATERIALS AND METHODS

In the period from 1998 to 2005, 9231 reports of canine aggression were collected in five regions of central and northern Italy (Emilia-Romagna, Liguria, Lombardy, Marche and Piedmont). Since 2005 data have been collected using a new computerised system, as established in the State-Regions Agreement of February 6, 2003 on the well-being of companion animals and pet-therapy. Our data, which risked being lost because they were still in paper form, were collected and computerised in order to preserve the information, which could be of importance for the prevention of canine aggression.

The information contained in the forms notifying episodes of canine aggression to the local health authorities included data on the biting dog, such as breed, gender, age, size, registration in the list of pet animals, anti-rabies vaccination and recidivism. As far as concerns the victim, the information included age, degree of relation to the offending dog, gender, site and type of injuries. Finally, the date of the episode and the municipality in which it occurred were also recorded.

The data were entered into a database and analysed using descriptive statistics. Pearson's chi square test was performed to determine whether there were any correlations between age, breed, gender and type of lesion. The software used for the statistical analysis was SPSS (version 22).

RESULTS

Unfortunately the forms received by the various local health authorities were often incomplete and so the data available for each variable are less than the total

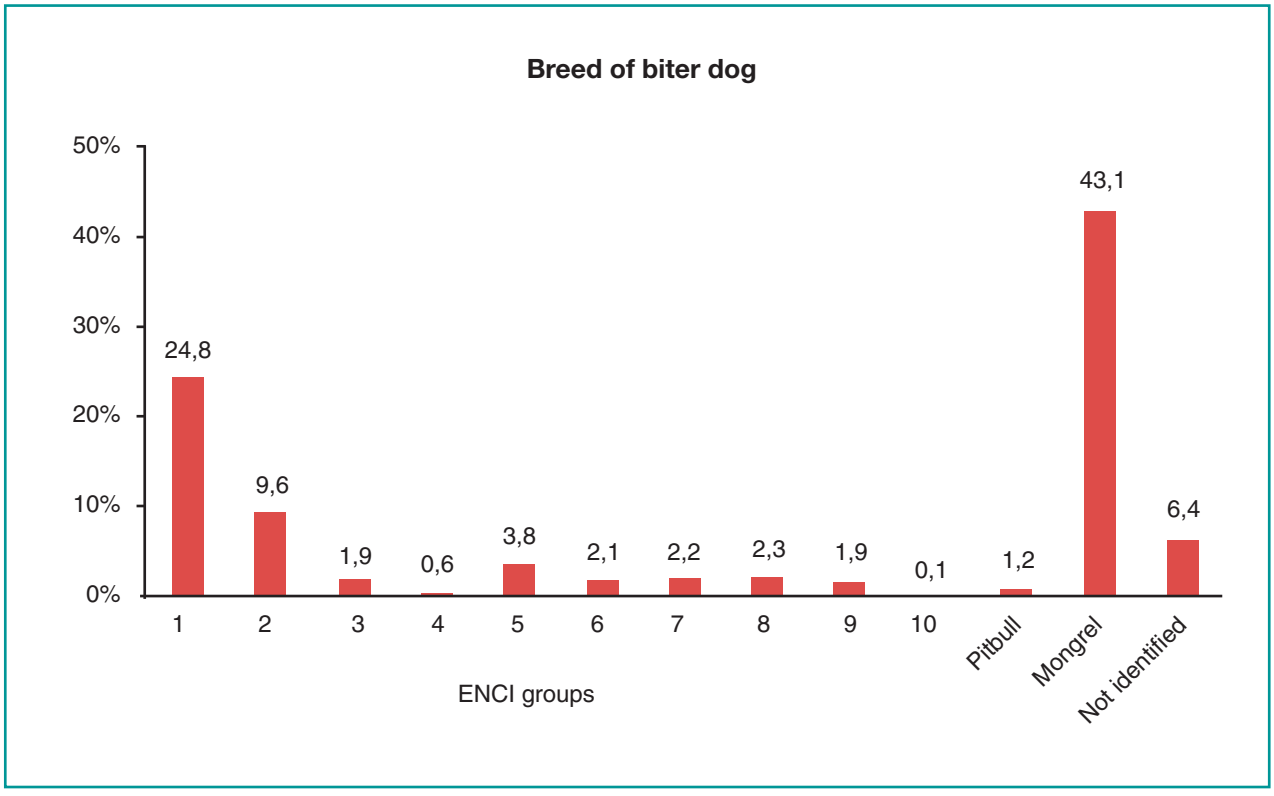

Figure 1 - The percentages of dog breeds (ENCI groups) reported for biting.

number of reports. Of a total of 9231 notification forms, 4861 included the age, gender and breed of the biter dog. Only 616 forms reported the type of victim (familiar or stranger, age and gender), while 1864 contained information on the type of injury caused by the dog. Extremely few forms included all the information: only 321 of the total 9231 notifications received.

Figure 1 shows, in percentages, the breeds of dogs involved in biting episodes. The dogs most frequently reported belonged to the heterogeneous group of mongrels, followed by animals in groups 1 and 2 of the Italian Kennel Club (ENCI) classification, which include shepherd dogs and molossers, respectively.

The incidence of bites and the number of inscriptions in the ENCI were compared for the various breeds. Data were not available on-line for the years 1998 to 2001, but could be evaluated for the years 2002 to 2005: in our sample the percentage of mongrels varied between 40% and 50% (with an increase from 2002 to 2005), the percentage of dogs in ENCI group 1 varied between 17% and 25%, the percentage of group 2 dogs was about 10-11% and the percentage of group 7 dogs (pointers) was about 2%, whereas this group is the largest group from the point of view of ENCI registrations. Indeed, the percentage distribution of breeds registered with the ENCI is between 16% and 18% for group 1, from 17% to 18% for group 2 and from 26 to 27% for group 7.

As illustrated by Figure 2, the gender of the biting dog was not reported in 35.8% of the cases; almost half of the aggression episodes were caused by males, 16.4% by females.

Information on the age of the dog was not available in 46.2 % of the cases. In those cases in which the age of the dog was known, most were adults, aged between 3 and 7 years old; in 23.8% of cases, the reported dog was over 7 years old (Figure 3).

As far as concerns the bite victims, just over 50% of the cases reported could be evaluated, since 46.6% of the reports did not include information on the person involved. Thirty-six percent of the victims were strangers and, in most cases, adults (Figures 4 and 5).

Figure 6 presents, in percentages, the sites of the bites. The most commonly affected zones were the upper and lower limbs. Figure 7 shows the period in which the aggression occurred: it can be seen that the incidence increased from March onwards. Finally, Figure 8 illustrates the severity of the injuries reported by the victims, although this information was lacking from most of the notification forms (about 80%).

Chi square analysis regarding age, breed and type of injury, performed on a sample of 1008 report forms, did not reveal statistically significant results.

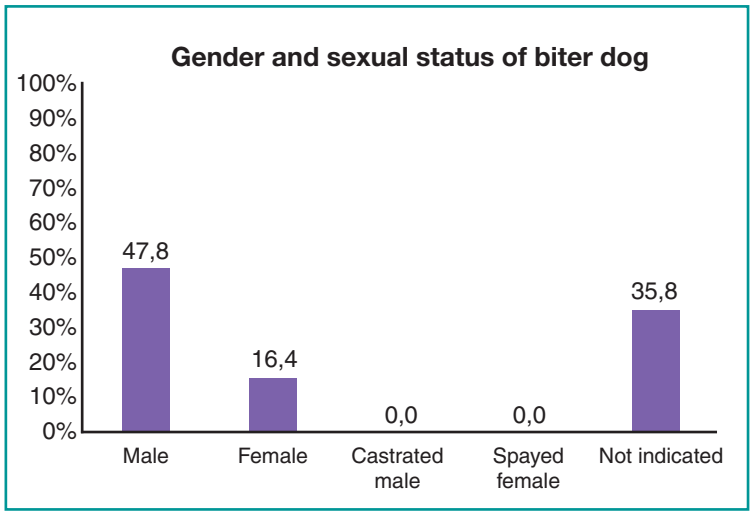

Figure 2 - The gender and sexual status of the dogs reported for biting.

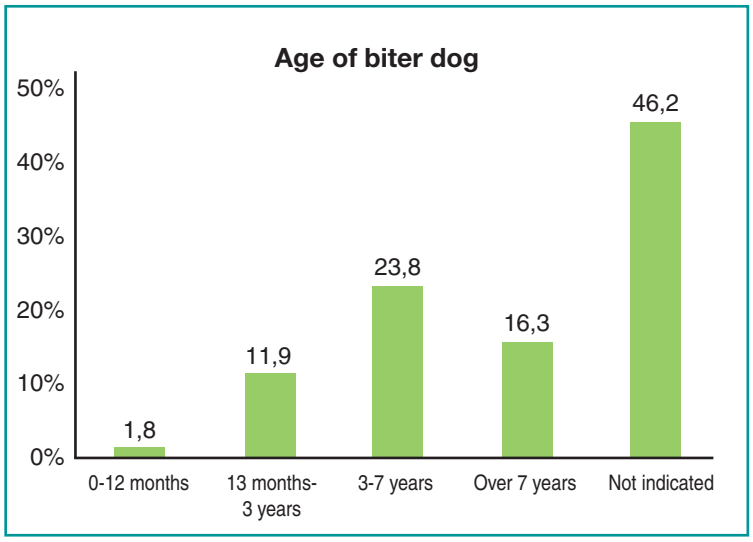

Figure 3 - The age distribution of the dogs reported for biting.

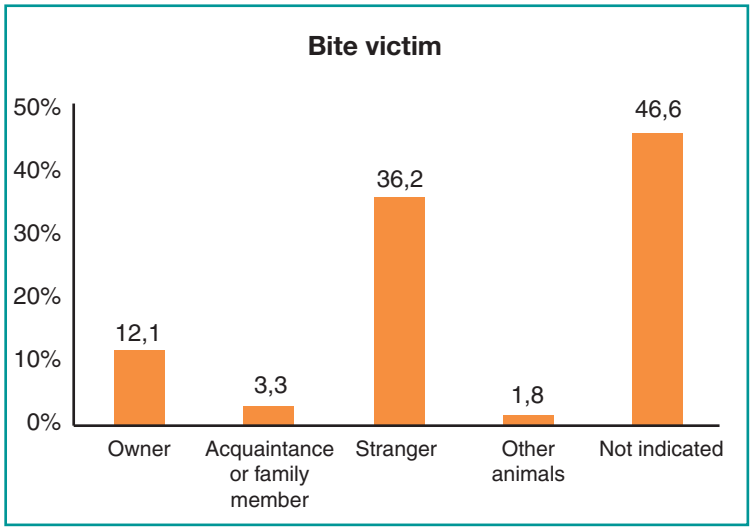

Figure 4 - The distribution of the victims, according to type of relationship with the animal reported for biting.

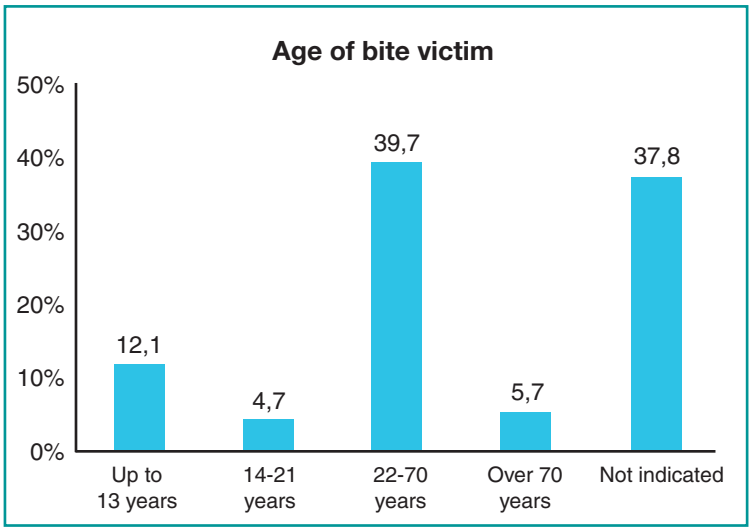

Figure 5 - The age distribution of the bite victims.

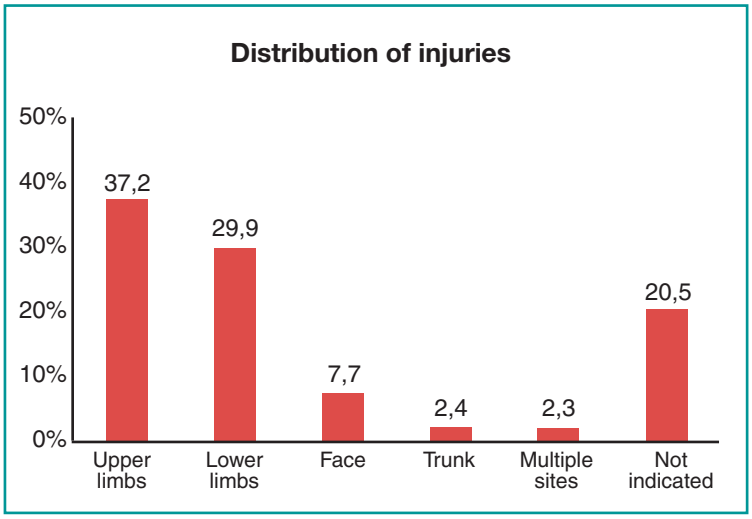

Figure 6 - The distribution of injuries among the people bitten.

DISCUSSION

The results of our study showed that dog bites were most frequently perpetrated by mongrels, shepherd type dog breeds and molossers. Unfortunately, the lack of official data on the real number of dogs belonging to each breed and the number of mongrels in Italy prevents us from establishing, with certainty, whether these dogs are involved in more biting episodes because they are actually more aggressive than others or simply because there are more of them in the country[7].

We noted a greater prevalence of male animals than females in our survey: this finding is concordant with data in the literature indicating that males bite more than females[7,8]. Testosterone acts as a behavioural modifier, inducing dogs to react more intensely: when a sexually entire male decides to respond to a stimulus, he does it faster, with greater intensity and for a longer period than does a sterilised animal. When a sexually intact dog reacts to a stranger or another dog, he will be quicker to bark, growl or bite than will a castrated dog and will continue for a longer time[8]. Unfortunately, we did not have information on sterilisation of the animals reported for aggressive episodes although, in general in veterinary practice in Italy, it is more common to spay bitches and leave the males intact. It would be very useful to have information on this issue in order to evaluate the efficacy of castration in the control of aggressiveness. In fact, it has been reported that castration is effective in reducing only some types of aggressiveness: Hopkins et al. reported a 60% reduction in intra-species aggressiveness, but found no improvement in territorial or fear-related forms of inter-species aggression[9].

In agreement with the data reported in the literature, according to which males bite more frequently than females, there was also a prevalence of males involved in episodes of aggression in our survey.

According to the results from our survey, biting dogs were more likely to be between 3 and 7 years old; the studies published in the literature show that relatively young animals (up to 5 years old) show more aggressive behaviour. This can be related to the fact that some forms of aggressiveness appear when the animal reaches sexual and social maturity[10,11].

The data obtained from our survey concerning the type of victim (mainly adults unknown to the aggressor), contrasted with those in the literature, in which owners, or at least members of owners' families, in particular children, were the prevalent victims[6,7,12]. One possible explanation for this difference could be that episodes occurring within a family are not notified to the authorities because the owners fear controls by the local health authority, whereas a stranger is more likely to report a bite because of concerns regarding transmission of diseases or infections. Another possible explanation is that, in some cases, owners declare having been bitten by an unknown dog rather than confessing that they were attacked by their own dog.

Consistent with the fact that, in this study, the majority of the victims were adults, most of the injuries involved the limbs; it is reported in the literature that it is children who are mainly suffer injuries to the face, head and neck[7,13].

Our data show that the aggressive episodes occurred mainly in spring, with a peak incidence in May; the number of episodes was stable during the summer and decreased in the autumn and winter. This finding is easily explained by the fact that people spend much more

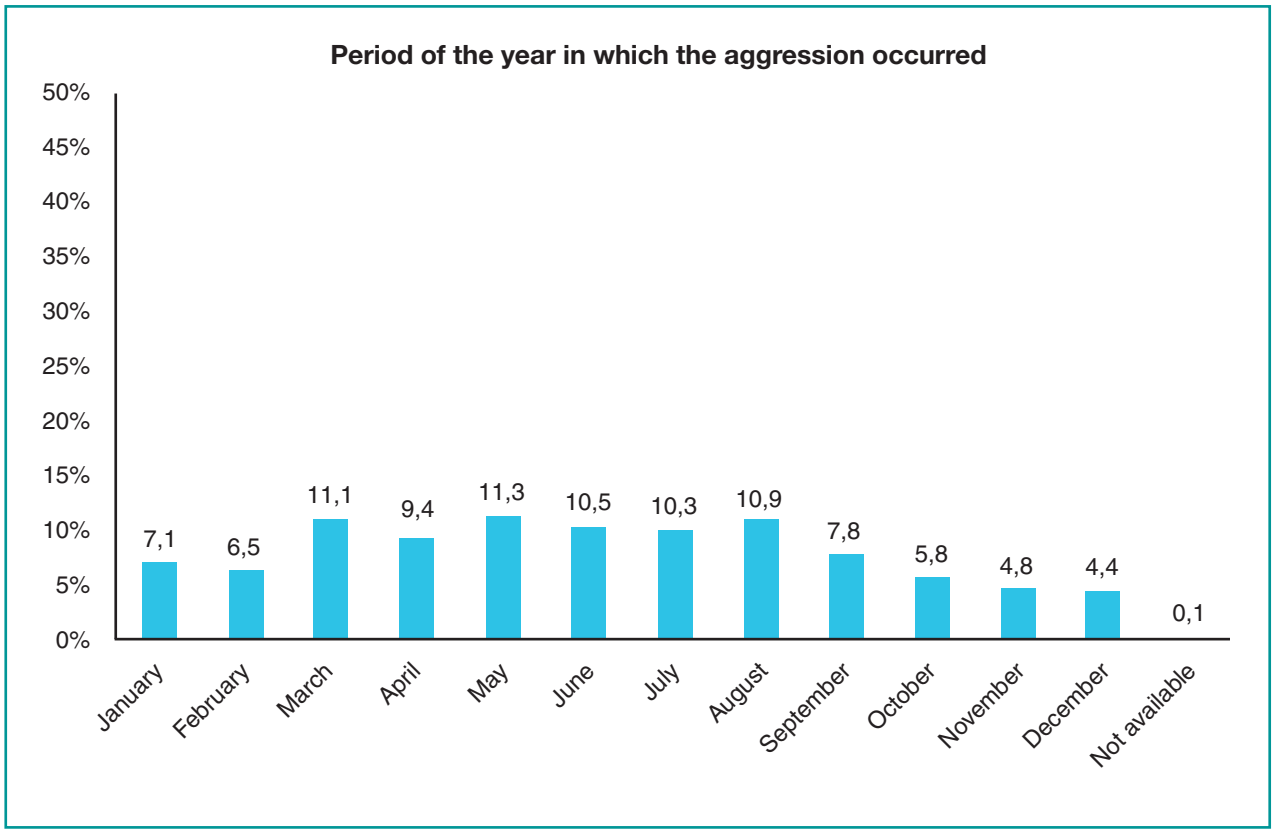

Figure 7 - The monthly incidence of dog-biting episodes.

time outdoors in the hot seasons and, consequently, have a higher probability of meeting a dog[14,15].

Although generalisations cannot be made because of the incompleteness of the data in the local authority notification forms, on the basis of the data that we have, the typical profile of an episode of canine biting involves an adult, male, mongrel or ENCI group 1 or 2 dog which injures an unknown adult person. The missing data appear equally distributed in the various categories and there are no particular reasons for believing that our results are to be attributed to a particular category of responses. In this regard, the validity of our findings does not appear to be compromised.

In fact, a given breed of dog cannot be claimed to be more or less dangerous than another because there is a lack of official data on the real number of dogs in each group in Italy; consequently, a particular breed could cause more bite injuries only because there are more of that type of dog. However, considering our data in the light of ENCI registrations in 2002-2005, it can be seen that the largest group of dogs registered with the Club is group 7, but that these breeds of dogs are poorly represented among the biters in our survey. It is undoubtedly true that some breeds cause worse injuries than others, which perhaps bite more frequently but have much less impressive effects. However, all breeds

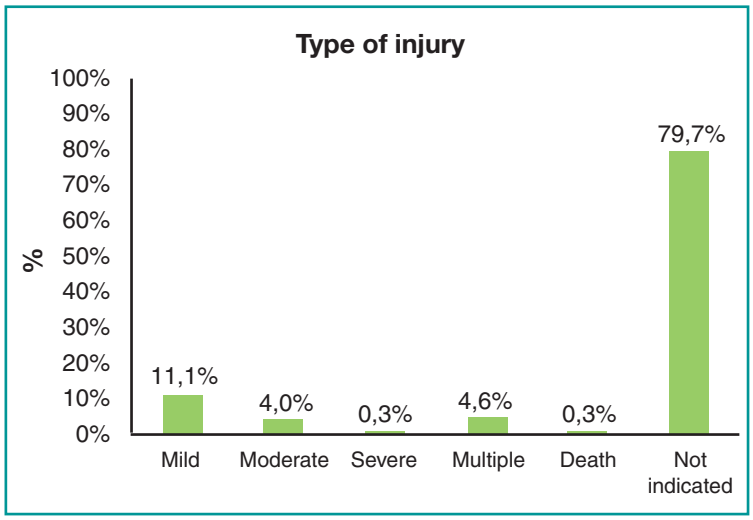

Figura 8 - The distribution of severity of injuries among the victims of dog bites.

are potentially dangerous and the prevention of aggression should not be focused on a "black list" of dog breeds, but should be approached differently, through training dogs and educating their owners; this is because, although the majority of victims in our survey were strangers, owners may in fact not report their own dogs for a fear of the possible consequences. A good divulgation of information about dogs would be useful, aimed not only at owners, but also at people who do

not have a dog and at children, in order to reduce the misunderstanding between humans and dogs that often underlies episodes of aggression.

One major problem encountered in this work was the amount of missing data, which unfortunately prevented us from obtaining important information such as the places and times that the aggression occurred and the circumstances that led the dog to bite. This incompleteness of the data also affected the statistical analysis, since the hierarchy of relationships between variables (in particular gender, age and breed) could not be identified from the information available. It is to be hoped that reports collected in the future are completed with an objective description of the episodes, with a better analysis of all that happened before the attack itself, including the postures assumed by the dog and signals of threat, in order to obtain a more realistic picture of the dangerousness of an animal.

The prevention of aggression should not be focused on a "black list" of dog breeds, but should be approached differently, through training dogs and educating their owners.

KEY POINTS

- All dogs may show aggressive behaviour, but the inclination to do so can vary enormously, depending on genetic, neurochemical and hormonal factors, socialisation and learning.
- In the absence of official data on the real number of dogs of a given breed in Italy, a certain group could be considered more likely to bite than another simply because there are more of that particular group.
- A good divulgation of information about dogs would be useful, aimed not only at owners, but also at people who do not have a dog and at children, in order to reduce the misunderstanding between humans and dogs that often underlies episodes of aggression.

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