

ORIGINAL ARTICLE

Incidence of injuries caused by dogs and cats treated in emergency departments in a major Italian city

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Objective: This study aimed to estimate the incidence and characteristics of injuries caused by dogs and cats in the population of a major Italian city.

Methods: The clinical records of all patients attending the emergency department (ED) were obtained from the two main hospitals of the city, covering an estimated population of over half a million. A case was defined as a patient admitted for bite or scratch injuries caused by dogs, cats, or other mammals between 1 January 2000 and 31 December 2002. For each case, the information collected included age and sex of the patient, the anatomical site of the injury, and the species of the animal involved.

Results: The average yearly incidence of dog and cat bite/scratches was 58.4 and 17.9 cases per 100 000 residents, respectively. Admissions peaked during the summer months. Dogs accounted for 76.9% and cats for 19.7% of cases. Dog injuries were significantly more common in males and younger individuals. Children younger than 9 years had a significantly higher risk of being bitten on the head, face, or neck. Conversely, injuries from cats were significantly more common in females and older people.

Conclusions: Surveillance of injuries caused by dogs and cats could provide useful information for planning and evaluating public health interventions. Collection of data from hospital EDs may be an appropriate, simple, and quick tool for monitoring the phenomenon and evaluating the associated risk factors.

As in other industrialised countries, the pet population is continuously increasing in Italian cities. This is a consequence of the recognised benefits having a pet can provide for the general wellbeing of their owners, in particular, children. However, pets and other synantropic animals that live in close contact with human beings represent a potential source of zoonoses and injuries, caused directly or indirectly.¹

Among mammals, dogs and cats are the commonest animals found in Italian cities, as pets or as strays. Bites and scratches represent the most important public health issue related to dogs and cats because of the associated physical and psychological trauma, wound infection by different microorganisms, and the risk of zoonoses transmission.¹

In the past the risk of transmission of rabies was the most important public health issue associated with bites and scratches, but nowadays attention is mainly focused on the associated medical and public health monetary costs. It is important to monitor the phenomenon for correct estimation of its incidence and associated costs, and also for the description and evaluation of the associated risk factors—for example, the demographics of the victims and the role of aggressive dog breeds may help in defining preventive measures or legislative initiatives to reduce the incidence of dog bites.^{2–5}

The present study aimed to estimate the incidence and characteristics of the injuries caused by dogs and cats in the population of a major Italian city (Bologna, northern Italy), treated in hospital emergency departments (EDs).

METHODS

The city of Bologna (area 140 km²) has a resident population of about 380 000⁶ and a canine population of approximately 20 000 dogs with a human to dog ratio of 19:1. We acquired information on the age and sex distribution of the resident population from the Statistic Service of the Emilia-Romagna

region. The clinical records of patients attending EDs were obtained from the two main hospitals of the city, which cover an estimated population of 500 000.

A case was defined as a patient presenting with bite or scratch injuries caused by dogs, cats, or other mammals between 1 January 2000 and 31 December 2002. We classified the patients according to the injury severity score defined by the Italian Ministry of Health, which ranks injuries in four groups mainly in terms of threat to life. For each case, the information collected included age and sex of the patient, the anatomical site of the injury, and the species of the animal involved.

We analysed the data with SPSS software for Windows 10.0. The crude association between categorical exposure variables (sex, body localisation, and injury severity score) and the incidence of injuries was evaluated with the χ^2 test. The Kolmogorov–Smirnov test for goodness of fit was used to verify normality of the sample distribution, and, on the basis of the results of this test, the Mann–Whitney U test was used to compare quantitative data. Age specific incidence was standardised by the indirect method, and the standardised morbidity ratio (SMR) with 95% confidence interval (CI) was used as a measure of increased risk.

RESULTS

A total of 1509 patients with bites and scratches from mammals were admitted to the EDs during the three year study period, accounting for 0.21% of the total number of patients admitted to the EDs. Most of the injuries were caused by dogs (n = 1160, 76.9%) followed by cats (n = 297, 19.7%). Other pets (rabbits, guinea pigs, hamsters) accounted for 2.3% and synantropic animals (rats, mice) for 1.1%. Of those injured by cats and dogs, 869 patients (59.7%) were resident in the Bologna municipality, 372 (25.5%) in the neighbouring municipalities, and 216 (14.8%) in others Italian regions.

Table 1 Age standardised morbidity ratio (SMR) of injuries caused by dogs and cats

Population by sex	Animal causing injury	No of cases observed	No of cases expected	SMR	95% CI	χ^2
202 408 (Female)	Dog	288	-	-	-	-
177 419 (Male)	Dog	377	84	1.5	1.3-1.7	20.5
						($p < 0.0001$)
202 408 (Female)	Cat	149	63	2.4	2.1-2.6	118.6
177 419 (Male)	Cat	55	-	-	-	-
						($p < 0.0001$)

The average yearly incidence of dog and cat bite/scratches in the population of Bologna (n = 869) was 58.4 (95% CI 53.9 to 62.8) and 17.9 (95% CI 15.5 to 20.4) cases per 100 000 residents, respectively (fig 1). We observed significant differences ($p < 0.05$) in the sex and the age of patients presenting with dog or cat injuries. Dog bite/scratches were more common in males (71 v 47 cases per 100 000, $p < 0.0001$), whereas cat bite/scratches were more frequent among females (24 v 10 cases per 100 000, $p < 0.0001$).

As shown in table 1, after making adjustment for age, the risk of dog bite/scratches injuries was 1.5 (95% CI 1.3 to 1.7) times higher in males than in females. The risk of cat bite/scratches injuries was 2.4 (95% CI 2.1 to 2.6) times higher in females than in males.

The age of patients with dog bites/scratches was significantly lower than that of patients with cat bites/scratches (36 v 54 years, $p < 0.001$). The highest incidence of injuries caused by dogs and cats was observed in the age range of 20–29 years (102.0 per 100 000) and 60–69 years (26.2 per 100 000), respectively.

The peak incidence of both dog and cat bite/scratches was in the warm season with 45.2% and 50.2% of the cases, respectively, presenting between May and August.

Dog bites more commonly involved the lower extremities (36.1%), followed by hands (30.4%), arms (18.3%), face, head, and neck (9.5%), and trunk (5.5%). However, bites to the face, head, and neck were more frequent in children under 9 years of age and accounted for 36% of the cases in this age group. This proportion was significantly higher than in the rest of the population ($p = 0.001$). Cat bites and scratches most frequently involved the hands (69.6%),

followed by the lower extremities (14.7%), arms (13.3%), and face, head, and neck (2.3%).

Most of the patients (97.3% and 99.7% for dog and cat injuries, respectively) were in the two lowest injury severity score classes and none was in the highest class.

DISCUSSION

In this study, 0.21% of the patients seen between 2000 and 2002 at the EDs of the two main hospitals in Bologna attended for bites or scratches caused by dogs and cats. This corresponds to an average yearly incidence rate of 58.4 cases per 100 000 residents for dog bites and 17.9 cases per 100 000 residents for injuries caused by cats.

These figures appear to be lower than those reported in previous studies of ED admissions, which ranged from 73 to 300 cases per 100 000 inhabitants.⁷⁻¹³ The incidence of bite/scratches can vary according to socioeconomic conditions in the country and the area (urban/rural) being considered in a study. Other confounding factors that can influence the incidence rates are: age distribution of the human population, density of the dog and cat populations, the types of breed among the dog population and the ratio between pet and stray dogs.¹⁴

The average yearly incidence of 58.4 dog bites per 100 000 estimated in this study is for an urban area with a residents/dog ratio of 19:1. This is much lower than the 192.5 cases per 100 000 estimated in Switzerland by Matter *et al.*¹⁵ However, the latter figure is for a population resident in both urban and rural areas, with a resident/dog ratio of 5:1, almost fourfold higher than that in Bologna.

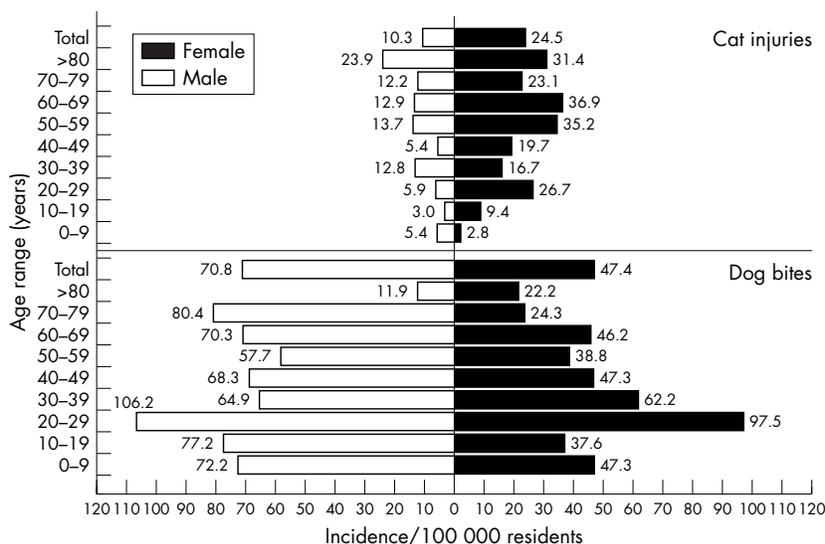


Figure 1 Crude incidence rates of injuries caused by dogs and cats among the residents of Bologna according to age range and sex (2000–2002).

It is likely that the actual incidence of animal bites and scratches in Bologna is higher than the estimate reported in this study, since milder cases are often treated by family practitioners and are not referred to hospitals. The Swiss study¹⁵ mentioned above estimated that about 70% of the animal bites/scratches occurring in the population were treated at hospital EDs.

It is interesting to note that about a third of the patients were assigned the lowest severity score rank. This indicates that emergency hospital care can be considered as inappropriate in a considerable proportion of cases. In the case of children, use of emergency hospital care could be due to parental anxiety and more generally due to the persisting worry of acquiring severe zoonoses including rabies (although in Italy this was eradicated 30 years ago). Better health education of the population may be useful in reducing such behaviour. The risk factors identified in this study are quite similar to those identified in similar studies conducted in other countries.^{11–16} Bites and scratches injuries were more common in summer. Dog bite injuries were significantly more common in males and younger individuals; children younger than 9 years had a significantly higher risk of being bitten on the head, face, or neck. Conversely, cat injuries were significantly more common in females and older people.

In conclusion, bites/scratches from dogs and cats are common events in Bologna and represent an important public health issue in the light of the continuous increase in the pet population in Italy.¹ Surveillance of injuries caused by dogs and cats could provide information necessary for planning and evaluating veterinary hygiene interventions, such as control of canine and feline stray populations or policies towards aggressive breeds, and for implementing health education initiatives. Collection of data from hospital EDs may be an appropriate, simple, and, quick tool for monitoring the phenomenon and evaluating the associated risk factors.

CONTRIBUTORS

F Ostanello: study design, statistical analysis, writing the paper. A Caprioli: interpretation of the results, writing the paper. A Gherardi:

original idea, interpretation of the results. S Prosperi: revision of paper. L La Placa and A Passini: data collection.

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