PAPER

Decline in human dog bite cases during a street dog sterilisation programme in Jaipur, India

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Context

Human dog bite injuries are a major public health problem, particularly where there are large populations of free-roaming or street dogs. An estimated 17 million human dog bite cases occur in India each year. Dog bites are also a major source of human rabies infections; over 90 per cent of human rabies cases are caused by the bite of an infected dog. There is little information on the means to reduce these injuries

Free-roaming dog populations, which exist in many developing countries, cannot be managed effectively by culling, as this is often culturally unacceptable, inhumane and is defeated by the reproductive capacity of dogs. In south Asia, street dog populations are increasingly being controlled by mass sterilisation programmes, often known as animal birth control (ABC) programmes. Data on the effectiveness of these programmes are sparse. This study presents data on the effects of one such mass street dog sterilisation programme on human dog bite cases in Jaipur, India.

Main conclusion

Reported human dog bite cases were found to be seasonal in Jaipur, with the main peak in January and a secondary peak in June. Canine reproduction was found to be seasonal, with peak whelping activity in November. The peak in dog bite cases followed the peak in dog breeding by about 12 weeks, at which age pups are still closely bonded to their dams. The proportion of bitches sterilised by the city's ABC programme rose initially and has remained between 70 and 80 per cent of the total female dog population for more than five years. The number of human animal bite cases declined significantly despite a rapidly expanding human population.

There was a significant positive correlation between pregnancy and bite frequency three to four months later.

Approach

Publicly displayed human dog bite data were obtained from Jaipur's main clinic, specialising in such injuries. Further data were available from published sources. The seasonality of breeding in street dogs was noted from the records of the ABC programme and from previously published accounts. These data series were compared statistically.

Results

Reported human dog bite cases were found to be seasonal in Jaipur, peaking in January, with a secondary peak in June. Canine reproduction was found to be seasonal, with peak whelping activity in November. The peak in dog bite cases followed the peak in dog breeding by about 12 weeks; there was a significant positive correlation between these two data sets.

Whereas sterilisation could not have led to an immediate halt in the growth of the dog population, the rapid increase in the percentage of spayed females could have prevented a further increase in bite frequency, if dog bites are indeed primarily due to bitches trying to protect their puppies.

Interpretation

This study suggests that a programme of sterilisation of bitches in a free-roaming dog population may, in addition to controlling the dog population, also help reduce the number of human dog bite cases reported. The suggested mechanism of this public health benefit may arise because many dog bites occur as a result of bitches protecting their pups from actual or perceived human interference. Spaying bitches in a population results in less maternal behaviour, one such behaviour being the protection of puppies.

Although no causal link has been proven, it seems probable that human dog bites follow a seasonal pattern influenced by reproductive behaviour in street dogs, and that a programme of mass sterilisation of female street dogs may help to limit the number of human dog bite cases by changing dog behaviour.

The analysis was based on the available human and canine population data collected retrospectively, rather than on data collected specifically. Consequently, there are uncertainties about the data. Many of the public health statistics in India are of uncertain quality. The dog bite unit of the city hospital receives patients from a wide area including those outside of the city; other medical facilities exist in Jaipur to which some dog bite patients may report. The geographical area from which the street dog population data were obtained was a small part of the whole city. Although the ABC programme has been undertaken with equal vigour throughout the city, and data exist to support this assertion, it is less than ideal that the dog population data arise from a small part of the whole city. Further research in other cities and street dog populations is necessary.

Significance of findings

Human dog bite injuries are a major public health problem throughout the world, and especially in areas with large free-roaming dog populations and endemic rabies. Little information is available on methods to reduce the burden of dog bites. The findings reported here suggest that an ABC programme (of street dog sterilisation and vaccination) may help reduce maternal protective aggression and thus lessen the number of bite cases. This is in addition to the previously reported benefits to rabies control of ABC programmes. The public health benefits of an ABC programme may serve to convince governments of the advantages of humane street dog control policies in place of culling and other ineffective and inhumane methods. These benefits should be taken into account when considering the economic implications of various methods of street dog control.

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