Demographics and management of dog-bite victims at a level two hospital in KwaZulu-Natal

S J W Kent, B Naicker, D R Wood

Introduction. Dog bites are a significant cause of morbidity and mortality worldwide, particularly where rabies is endemic. There is also a significant financial burden attached to prophylactic treatment to diminish the risk of rabies infection. KwaZulu-Natal (KZN) has a high incidence of human rabies yet little is known about the demographics of dog bites in the province.

Objectives. To analyse the demographics of dog bites in Northern KZN.

Methods. Records of all dog bites presenting to the main referral hospital in northern KZN between August 2007 and September 2011 were analysed.

Results. We collected data for 821 instances of dog bite. Male children aged 6 - 10 years are most likely to present with dog bites, while women >40 years are more likely to present than men in the same age bracket. While initial vaccine administration is high (98%) with all grades of bite, only 82% of grade 3 bites receive immunoglobulin.

Conclusion. Our results correlate well with two large studies of the demographics of dog bites, but are the first to show a reverse in male preponderance of presentations above the age of 40 years. Reasons for low rates of immunoglobulin administration in grade 3 bites are discussed. Finally, methods are suggested to improve data collection and the care of patients presenting with dog bites.

was entered onto a prospectively maintained database on a password-protected computer using Microsoft Excel, and analysed using the same programme. Analysis was carried out using simple descriptive statistics. Records were maintained and analysed in accordance with local policy on patient confidentiality and consent.

All information relating to the cost of immunoglobulin was taken from the hospital pharmacy computer system.

The Ngwelezane Hospital ethics committee approved the study.

**Results**

Between August 2007 and September 2011, a total of 821 patients presented to Ngwelezane Hospital complaining of dog bites. Of these, 458 (55.8%) patients were male, and ages ranged between 0 and 86 years old. Sex was not recorded for 2 patients.

The average age of patients presenting with dog bites was 25 years, and the most common age was 10 years (19 patients). The most common age group to present with dog-bite injuries was age 6 - 10 (148 patients). Younger males were bitten more commonly than younger females, although females >40 years were bitten more commonly than males in the same age group.

Of the 821 bites, 642 (78%) were grade 3; 84 (10%) were grade 2; and 43 (5%) were grade 1. In 52 cases (7%), grade of bite was not recorded. Treatment with rabies vaccine was started in 90% of cases of grade 1 bites, 97% of grade 2 bites and 99% of grade 3 bites (Fig. 2).

Immunoglobulin was administered for 53% of grade 1 bites, 84% of grade 2 bites and 82% of grade 3 bites.

The total cost of treatment with Rabigam (rabies immunoglobulin) was R802 767, for 461 120 international units (IU) of rabies immunoglobulin at R530 for 300 IU. Of this total cost, R640 487 was spent on grade 3 bites and R162 279 on grade 1 and 2 bites.

**Discussion**

A prospectively maintained database was used to demonstrate the demographic features and treatment administered to patients presenting with dog bites to a tertiary referral centre in northern KZN. Males present more frequently than females, and young males (ages 6 - 10) are most likely to present. This trend reverses after the age of 40 years, when females are more likely to present than males. We also showed that 99% of grade 3 bite patients are treated with rabies vaccine, but the rate of treatment with immunoglobulin is lower (82%).

Our results agree with the other large South African study of dog-bite demographics, that suggests that the most common age group to present with dog bites is 4 - 7 years, with a mean of 6.84 years.
Dwyer et al. also found that young male patients are more likely than females to present with dog bites. The other large study on dog-bite demographics, conducted in Florida, USA, suggests that a younger age group (1–4 years) presents more commonly.1

Our results suggest that targeting parents remains the best strategy to ensure that dog-bite patients present at hospitals. This is because most patients are young (6–11) and rely on their parents for healthcare and transport. School-based interventions may also be viable, but this may be less effective because northern KZN’s population is rural and school attendance is relatively low.4

In immunocompromised patients who are bitten by a rabid animal and do not present to hospital, subsequent development of rabies may go unnoticed or be treated as HIV-associated encephalitis or meningitis. Therefore high levels of suspicion for rabies are advisable in all immunocompromised individuals presenting with neurological symptoms. The rabies virus can be tested for by using PCR on buccal swabs; this is an important measure to identify outbreaks of rabies which might otherwise go unnoticed.

Rabies vaccine is administered to patients presenting with dog bites in a high rate of cases. Grade 1 dog bites need no treatment,2 yet 90% of these patients received vaccination and 53% received immunoglobulin. As immunoglobulin is expensive, its use should be reserved for patients with higher-risk bites. Further education on the risk stratification of dog bites could help to rectify this over-treatment, and decrease spending on immunoglobulin.

Patients with grade 3 bites should be given immunoglobulin. In these cases, vaccine should be initiated on the first visit to hospital and only discontinued if the dog remains healthy after 10 days, or if laboratory samples confirm that the animal does not have rabies. However, only 82% of our patients with grade 3 bites received immunoglobulin. Possible reasons for this include:

- If the dog is known to the patient, is known to be vaccinated, and is healthy, then at Ngwelezane Hospital immunoglobulin is not administered as the risk of transmission is judged to be extremely low.
- Since there were no cases of rabies in our cohort, or at the hospital during our study period, or indeed in the whole of South Africa in 2009,5 healthcare providers may be complacent about the importance of immunoglobulin and vaccine administration in grade 3 bites.
- It is possible that the recording of grade of bite was inaccurate, and that many of the bites did not require immunoglobulin.

Over the three-year study period, immunoglobulin costing over R160 000 was administered to dog-bite victims who did not require it. This represents a potential cost saving of around 25%. Rabies immunoglobulin is the 9th most expensive drug purchased by our hospital (after antiretrovirals, insulin and plasma products) and reducing its use would represent a welcome saving.

The limitations of this study primarily relate to the maintenance of the database. Bites are recorded by EMU nurses and doctors, who see and treat the dog-bite patients, in a paper ledger stored in the EMU. Therefore some cases may be incompletely recorded or not recorded, as is seen in the 7% of cases for which grade of bite is not recorded.

We have shown that dog bites in northern KZN are most likely to occur in young males between the ages of 6 and 10 years. Treatment with rabies vaccine is almost universal in patients presenting with dog bite, but administration of immunoglobulin to patients with grade 3 bites is lower than expected. Furthermore, the inappropriate use of expensive immunoglobulin in grade 1 and 2 bites places an unnecessary burden on the healthcare budget. We wish to emphasise the importance of correctly classifying the grade of dog bite and of treating with immunoglobulin when necessary, to minimise cost and maximise prevention of further cases of rabies in humans.

References

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