

DECODING THE PROFILE OF CASES WITH DOG BITES AT A TERTIARY CARE CENTER IN INDIA: A COMPREHENSIVE ASSESSMENT STUDY

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ABSTRACT

Background: Dog bites are a common condition that makes subjects visit healthcare centers in India. However, existing literature data is scarce concerning organized surveillance or community-based results to assess the acute prevalence of rabies infection spread in India.

Aim: The present study aimed to assess the epidemiological characteristics and extent of concern associated with dog bites at a tertiary care center in India and to evaluate the risk factors associated with animal bites in the Indian scenario.

Methods: The present study assessed 218 male and 217 female subjects who presented to the center with dog bites. The study duration was two months. The classification for exposure followed the guidelines of the WHO (World Health Organization). The data gathered was statistically analyzed for results formulation.

Results: It was seen that the subjects from both genders and all the age groups were reported to have animal bites. However, with an increase in the age of study subjects, the incidence of animal bites decreased. Child subjects were more vulnerable to animal bites and the majority of the affected subjects were males except for elderly subjects. The majority of the subjects were contributed by low socioeconomic groups. The most commonly associated animal was dogs followed by cats. The majority of affected subjects reported within 24 to 48 hours of bite. The cases that were reported later than 5 days were either elderly illiterate or younger children that attended the healthcare forcefully.

Conclusions: The present study concludes that dog bite cases are more common in male subjects compared to female subjects and in child subjects aged <10 years with more third-degree bite cases. The tendency to seek healthcare was less than expected.

Keywords: animal bite, Dog bite, epidemiology, prophylaxis, rabies

INTRODUCTION

A potential exposure to rabies infection is seen in nearly half of the population around the globe residing at places where people are residing in countries or territories with the existence of dog bite rabies cases. As per the reported data, nearly 150 subjects die from rabies with the majority of the subjects in the age range of less than 15 years. On application of this data to the developed country population, this makes one subject death every 10 minutes.¹ It is seen that nearly 55000 humans die from rabies every year in Asia and Africa after being in contact with rabid dogs. The existing data is in support of the practicality and feasibility of the strategies for vaccination after a dog bite, the existing quantitative data are scarce concerning the demographic process of rabies and its transmission dynamics.²

It has been estimated that more than 99 percent of human rabies transmission cases via rabies-infected dogs lead to a high public health cost. A recent increase has been reported in the deaths associated with human rabies infection in parts of Latin America, Africa, and Asia which points that rabies is rapidly re-emerging as a major healthcare concern globally. Despite rabies being a disease preventable with the vaccine, it contributes to more than 50 thousand deaths every year globally in humans with 95 percent of these deaths alone in Africa and Asia and 3 billion subjects at the potential threat of death.^{3,4}

In India, rabies is an endemic condition where nearly 91% of all animal bites are by dogs. Among these dogs, 40% are household pets and 60% are stray dogs. In India, in the year 2005, the data reported 12,700 deaths from Rabies with the identifiable symptoms of the disease which can be considered as 1.1 lakh deaths for every one lakh population. 50% of these deaths were in child subjects less than 15 years of age, 91% were from rural areas, and 62% of the dead subjects were males.^{5,6}

Nearly one-third of dog bite cases were from Uttar Pradesh and three-fourths from seven southeastern and central states including Madhya Pradesh, Assam, Bihar, Andhra Pradesh, Orissa, Uttar Pradesh, and Chhattisgarh. Following the data of the Government of India, the Ministry of Health and Family Welfare, and the Central Bureau of Health Intelligence, the total number of deaths from rabies in 2010 was 181 deaths which increased to 253 deaths in the year 2011. The existing literature data is scarce addressing this vital issue posing a significant burden on the healthcare system.^{7,8}

The present study, hence, was aimed to assess the epidemiological characteristics and extent of concern associated with dog bites at a tertiary care center in India and to evaluate the risk factors associated with animal bites in the Indian scenario.

MATERIALS AND METHODS

The present cross-sectional clinical study was done to assess the epidemiological characteristics and extent of concern associated with dog bites at a tertiary care center in India and to evaluate the risk factors associated with animal bites in the Indian scenario. The study subjects were the ones

visiting the institute with dog bites. Verbal and written informed consent were taken from all the study participants before their enrollment.

The present study utilized the pre-structured, pre-tested, and predesigned questionnaire which was based on an interview which was conducted with the assistance of the experts and a faculty member concerning the animal bite. The tool for data collection comprised of questions related to the family characteristics information including the type of family, residence, and others. The informed consent and data collection tools for the study were custom-made in Hindi and English languages for a better understanding of the questionnaire by the participants.

The exposure in the study subjects was classified following the guidelines by WHO (World Health Organization) in which all the subjects with bite cases were identified and recorded. The recall assessment time for the study subjects was 1 year. A provoked bite was considered for the cases when the bite was secondary to the initiating interaction from the subjects with the dog while playing with the dog or by annoying the dog during meals.

The present study chose 3 surveyors randomly to survey along with the paramedical staff that was chosen by an examiner with expertise on rabies with debriefing and briefing sessions. All the staff worked under the supervision of the investigators. Healthcare workers motivated and informed the family members to participate in the study along with future intervention scope if needed. All the subjects were explained about the detailed study design before participation. A personal interview was done to record the personal and family characteristics.

No medical complaint was reported and the complete study design was well tolerated by all the study subjects the time utilized for the data collection was under 15 minutes which also included the counseling time till the complete collection of the data. The data were not revealed for intervention, management, or assessment. One examiner gave information concerning the vital role of reporting the animal bite to the healthcare workers during the sessions on behavior change in the students to help get study findings.

The data gathered were analyzed statistically using the SPSS software version 21.0 (IBM Corp., Armonk, NY, USA) and the chi-square test. The data were expressed as mean and standard deviation and frequency and percentage. Statistical significance was kept at a p-value of <0.05.

RESULTS

The present cross-sectional clinical study was done to assess the epidemiological characteristics and extent of concern associated with dog bites at a tertiary care center in India and to evaluate the risk factors associated with animal bites in the Indian scenario. The present study assessed 218 male and 217 female subjects who presented to the center with dog bites. The study duration was two months. The classification for exposure followed the guidelines of the WHO (World Health Organization). The majority of the female subjects were in the age range of 21-30 years with 76 females where dog bite was seen in 2 females followed by 11-20 years age range with 47 females reporting 2 cases of dog bite. The highest number of females with dog bites was 3 seen in 20 subjects from 0-10 years of age range. Among male subjects, the majority of the dog bite cases were from the age range of 0-10 and 21-30 years with 4 subjects each. Overall highest number of

dog bite cases were in subjects aged 0-10, 11-20, and 21-30 years with 7, 5, and 6 subjects respectively as shown in Table 1.

On assessing the distribution of dog bites and pattern of seeking treatment in study participants, it was seen that the site of a dog bite was extremities in 63.33% (n=21) subjects, trunk in 24.2% (n=8) study subjects, and face in 12.1% (n=4) study subjects respectively. For home management done in 3 study subjects, chili paste was applied by no participant, soap water, only water, and no management was adopted by 16.6% (n=1) study subjects each. 30 subjects reported to a healthcare facility after a dog bite where the reporting time was >24 hours, 24-48 hours, and >48 hours in 66.6% (n=20), 30% (n=9), and 3.33% (n=1) study subjects respectively. The question regarding RIG (Rabies Immune globulin) was answered by 18 study subjects whereas RIG was not received by 55.5% (n=10) study subjects and was received by 44.4% (n=8) study subjects respectively. Treatment was taken from the public sector in 96.6% (n=29) study subjects and from the private sector in 3.33% (n=1) study subjects respectively (Table 2).

Concerning the gender-wise distribution of anti-rabies management in study subjects, for class I bite, no treatment/household treatment, local doctor treatment, and anti-rabies treatment was taken in 1 male and 1 female, 1 male and no female, and 2 males and 1 female subject respectively. For Class II b=dog bite, no treatment/household treatment, local doctor treatment, and anti-rabies treatment were taken in 1 male, no subject, and 3 males and 5 female subjects respectively. In class III dog bite cases, no treatment/household treatment, local doctor treatment, and anti-rabies treatment were taken in no subject, no subject, and 10 males and 8 females respectively as summarized in Table 3.

The study results also showed that the cases that reported late to the healthcare facility, after 5 days of dog bite were brought to the institute forcefully by their friends, close relatives, or family members. The subjects that reported late to the institute following a dog bite were either the illiterate elderly subjects or the younger children.

DISCUSSION

The present study assessed 218 male and 217 female subjects who presented to the center with dog bites. The study duration was two months. The classification for exposure followed the guidelines of the WHO (World Health Organization). The majority of the female subjects were in the age range of 21-30 years with 76 females where dog bite was seen in 2 females followed by 11-20 years age range with 47 females reporting 2 cases of dog bite. The highest number of females with dog bites was 3 seen in 20 subjects from 0-10 years of age range. Among male subjects, the majority of the dog bite cases were from the age range of 0-10 and 21-30 years with 4 subjects each. Overall highest number of dog bite cases were in subjects aged 0-10, 11-20, and 21-30 years with 7, 5, and 6 subjects respectively. These results were similar to Malini S et al⁹ in 2010 and Modi BK¹⁰ in 2009 where authors reported similar demographics and gender distribution in their study subjects having dog bites.

It was seen that on assessing the distribution of dog bites and pattern of seeking treatment in study participants, it was seen that the site of a dog bite was extremities in 63.33% (n=21) subjects,

trunk in 24.2% (n=8) study subjects, and face in 12.1% (n=4) study subjects respectively. For home management done in 3 study subjects, chili paste was applied by no participant, soap water, only water, and no management was adopted by 16.6% (n=1) study subjects each. 30 subjects reported to a healthcare facility after a dog bite where the reporting time was >24 hours, 24-48 hours, and >48 hours in 66.6% (n=20), 30% (n=9), and 3.33% (n=1) study subjects respectively. The question regarding RIG (Rabies Immune globulin) was answered by 18 study subjects whereas RIG was not received by 55.5% (n=10) study subjects and was received by 44.4% (n=8) study subjects respectively. Treatment was taken from the public sector in 96.6% (n=29) study subjects and from the private sector in 3.33% (n=1) study subjects respectively. These results were consistent with the findings of Tiwari R et al¹¹ in 2009 and Hanspal JS et al¹² in 2007 where authors reported similar data concerning dog bite factors and treatment as seen in the results of the present study.

The study results showed that concerning the gender-wise distribution of anti-rabies management in study subjects, for class I bite, no treatment/household treatment, local doctor treatment, and anti-rabies treatment was taken in 1 male and 1 female, 1 male and no female, and 2 males and 1 female subject respectively. For Class II b=dog bite, no treatment/household treatment, local doctor treatment, and anti-rabies treatment were taken in 1 male, no subject, and 3 males and 5 female subjects respectively. In class III dog bite cases, no treatment/household treatment, local doctor treatment, and anti-rabies treatment were taken in no subject, no subject, and 10 males and 8 females respectively. These findings were in agreement with the results of Behera TR et al¹³ in 2008 and Khokhar A et al¹⁴ in 2003 where authors suggested comparable treatment strategies to the present study in their respective studies.

The results of the present study also showed that the cases that reported late to the healthcare facility, after 5 days of dog bite were brought to the institute forcefully by their friends, close relatives, or family members. The subjects that reported late to the institute following a dog bite were either the illiterate elderly subjects or the younger children. These results were in line with the results of Sudharshan MK et al¹⁵ in 2007 and Suraweera W et al¹⁶ in 2012 where authors suggested that illiterate old and younger subjects are reluctant to seek treatment for a dog bite.

CONCLUSION

Within its limitations, the present study concludes that dog bite cases are more common in male subjects compared to female subjects and in child subjects aged <10 years with more third-degree bite cases. The tendency to seek healthcare was less than expected. Further studies from different geographical areas are needed to reach a definitive conclusion.

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TABLES

| Age groups (years) | Females | | Males | | Total | |
|--------------------|---------|----------|-------|----------|-------|----------|
| | Total | Dog bite | Total | Dog bite | Total | Dog bite |
| 0-10 | 20 | 3 | 26 | 4 | 46 | 7 |
| 11-20 | 47 | 2 | 45 | 3 | 92 | 5 |
| 21-30 | 76 | 2 | 60 | 4 | 136 | 6 |
| 31-40 | 28 | 2 | 31 | 1 | 59 | 3 |

| | | | | | | |
|---------------|-----|----|-----|----|-----|-----|
| 41-50 | 23 | 2 | 23 | 3 | 46 | 5 |
| 51-60 | 6 | 2 | 16 | 1 | 22 | 3 |
| >60 | 17 | 1 | 17 | 1 | 34 | 2 |
| Total | 217 | 14 | 218 | 17 | 435 | 231 |

Table 1: Sociodemographic data of study participants with dog bite

| Parameters | Number (n) | Percentage (%) |
|---|------------|----------------|
| Site of the dog bite (n=33) | | |
| Extremities | 21 | 63.63 |
| Trunk | 8 | 24.2 |
| Face | 4 | 12.1 |
| Home management pattern (n=3) | | |
| Chilli pastes | 0 | 0 |
| Soap water | 1 | 16.6 |
| Only water | 1 | 16.6 |
| No management | 1 | 16.6 |
| Reporting time after dog bite (n=30) hours | | |
| >24 | 20 | 66.6 |
| 24-48 hours | 9 | 30 |
| <48 hours | 1 | 3.33 |
| RIG (n=18) | | |
| Not received | 10 | 55.5 |
| Received | 8 | 44.4 |
| Treatment from (n=30) | | |
| Public sector | 29 | 96.6 |
| Private sector | 1 | 3.33 |

Table 2: Distribution of dog bites and pattern of seeking treatment in study participants

| Bite class | No/household treatment | | Local doctor treatment | | Anti-rabies treatment | | Total | |
|--------------|------------------------|---------|------------------------|---------|-----------------------|---------|-------|---------|
| | Males | Females | Males | Females | Males | Females | Males | Females |
| I | 1 | 1 | 1 | 0 | 2 | 1 | 4 | 2 |
| II | 1 | 0 | 0 | 0 | 3 | 5 | 4 | 5 |
| III | 0 | 0 | 0 | 0 | 10 | 8 | 10 | 8 |
| Total | 2 | 1 | 1 | 0 | 15 | 14 | 18 | 15 |

Table 3: Gender-wise distribution of anti-rabies management in study subjects