

## ORIGINAL ARTICLES

# HUMAN RABIES IN BANGLADESH – A STUDY OF 684 CASES

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### Abstract

*This descriptive study in the Infectious Disease Hospital, Dhaka, on rabies was carried out to see the patterns of presentation, age group at risk, state of vaccination following animal exposure and the interval between animal exposure and the development of the disease. Of 684 cases of rabies from June 1999 to November 2003, majority (64.18%) of the victims were within 15 years of age. Male gender (76.75%) and rural people (86.40%) constituted the bulk of the cases. 80.26% of cases had WHO category III exposure. Most of the cases were not vaccinated (86.04%). Among 93 cases who received vaccine, only 9.67% took tissue culture vaccine and 90.3% were treated with nerve tissue vaccine. None of the 684 cases were treated with RIG. Dog was the principal animal responsible for 95.76% cases. 65.93% of the cases developed the disease between 31 to 100 days after the animal exposure.*

### Introduction

Rabies, a major public health problem in Bangladesh, is distributed uniformly in all parts of the country. Despite the development of first rabies vaccine in 1885, the World Health Organization estimates that between 30,000 and 70,000 people die worldwide of rabies each year<sup>1</sup>. Most of these deaths occur in developing countries because of inadequate control of rabies in domesticated animals, and about 30,000 death results in India alone<sup>2-3</sup>. Accurate statistics are not available; however, scattered hospital records indicate that about 2000 people die from rabies each year in Bangladesh. Dogs are mainly responsible for the transmission of rabies to humans in this country. Diagnosis of rabies is made on clinical grounds and the laboratory facilities are limited.

An estimated 6 million people under go post-exposure treatment (PET) of rabies annually worldwide<sup>4</sup>. In the United States approximately 40,000 people receive PET annually while there has been an average of three fatal cases of human rabies cases per year since 1980<sup>5</sup>. About 100,000 patients receive PET annually in Bangladesh. Most patients in this country take nerve tissue vaccines (NTV) as part of the PET but the use of tissue culture vaccine

(TCV) has been increased lately. Use of rabies immune globulin (RIG) is very limited because of its high price and inadequate supply. About 150 cases of human rabies are admitted to the Infectious Disease Hospital, Dhaka (IDH) every year. This figure has not been changed too much over the last 10 years, indicating the need to review the approach in preventing rabies in Bangladesh. This descriptive study was carried out to see the patterns of presentation, age group at risk, state of vaccination following animal exposure and the interval between animal exposure and the development of the disease at the IDH, the main referral center for rabies patients in Bangladesh.

### Patients and Methods

**Study site and Duration:** All the clinically diagnosed cases of rabies, referred to the IDH between June 1999 to November 2003 were included in the study. Structured questionnaire had data on age, sex, rural/urban, category of wounds, status and type of vaccination, species and status of animal involved, and the interval between animal bite and development of rabies. Cases were categorized for the degree of exposure on the basis of criteria recommended by the WHO. Relatives and attendants

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of the victims provided the necessary information for this study. Necessary details were not available in some cases because of the ignorance of the relatives about the facts and were not included in the study. The data were analyzed and compiled accordingly.

**Results**

Out of 698 clinically diagnosed cases of rabies, referred to the IDH between June 1999 to November 2003, 684 cases were finally included in the study. 64.18% (439/684) of cases occurred in age group below 15 years of age. Age group 16-30 contributed to 12.28% (84/684) of cases while age group 31-60 years were affected in 19.00% (130/684) of cases. 4.53% (31/684) of cases were above 60 years of age. (Table I).

**Table-I**  
*Age distribution of the rabies patients at IDH (n=684)*

| Age group in years | Number of cases | Percentage |
|--------------------|-----------------|------------|
| 1-15               | 439             | 64.18%     |
| 16-30              | 84              | 12.28%     |
| 31-60              | 130             | 19.00%     |
| 61 and above       | 31              | 4.53%      |

Males contributed to 76.75% (525/684) of cases. While 13.59% (93/684) of cases belonged to the urban area, 86.40% (591/684) were from rural areas. 95.76% (655/685) of cases gave history of dog bite. The other animals involved were cat (19/684 = 2.77%), mongoose (8/684 = 1.16%) and fox (2/684 = 0.29%). Rabid animals were responsible for exposure in 18.27% (125/684) of cases whereas pet animals transmitted the disease to humans in 8.91% (61/684) of cases. However, 72.80% (498/684) of cases were caused by stray animals. Of 684 cases, 549 (80.26%) had WHO category III exposure and 135 (19.74%) cases received WHO category I and II exposure (Table II).

**Table-IV**  
*Type of vaccine used by rabies cases (n=93)*

| Type of vaccine | Number of cases | Percentage | Vaccine-doses Completed | Vaccine-doses Not completed |
|-----------------|-----------------|------------|-------------------------|-----------------------------|
| NTV             | 84              | 90.32%     | 58                      | 36                          |
| TCV             | 9               | 9.67%      | 4                       | 5                           |

**Table-II**  
*Distribution of WHO wound category (n=684)*

| Category of wound(s)  | Number of cases | Percentage |
|-----------------------|-----------------|------------|
| WHO category III      | 549             | 80.26%     |
| WHO category I and II | 135             | 19.74%     |

Most of the cases were bitten on lower limbs (540 = 78.94%) while head and neck region received bite in 146 (21.34%) cases. Multiple wounds constituted 15.64% (107/684) of cases and 84.35% (577/684) of cases had single wound. 86.04% (591/684) of cases were totally unvaccinated while 13.59% (93/684) of cases received vaccine (Table III).

**Table-III**  
*State of vaccination of rabies patients at IDH (n=684)*

| State of vaccination | Number of cases | Percentage |
|----------------------|-----------------|------------|
| Vaccine received     | 93              | 13.59%     |
| Vaccine not received | 591             | 86.04%     |

Of 93 cases, who were vaccinated completely or incompletely, 84 (58 cases actually completed the course) received NTV while only 9 (4 cases actually completed the course) took TCV (Table IV). None of cases were given rabies immune globulin (RIG). 16.95% (116/684) of cases developed the symptoms of rabies between 11 to 30 days of exposure to the animals while 65.93% (451/684) of cases became symptomatic between 31 to 100 days following exposure to the animals. Only 0.87% (6/684) of cases developed rabies with 10 days of animal exposure (Table V).

**Table-V**  
*Interval between animal bite and development of the disease (n=684)*

| Interval in days  | Number of cases | Percentage |
|-------------------|-----------------|------------|
| Within 10         | 6               | 0.87%      |
| In between 11-30  | 116             | 16.95%     |
| In between 31-100 | 451             | 65.93%     |
| 101 and above     | 111             | 16.22%     |

### Discussion

Rabies is a fatal but easily preventable disease<sup>6</sup>. Despite trials with various antiviral agents, there is no therapy of proven value once the disease is developed<sup>7</sup>. Appropriate care of wound, adequate post exposure treatment (PET) with modern TCV with RIG (when indicated) according to WHO guideline can prevent the disease amongst most of the persons exposed to rabid animal<sup>8-9</sup>. In this descriptive study, cases occurred in all age groups but majority of cases (439/684 = 64.18%) were within 15 years of age. This age distribution reflects that children were the principal victims, and this finding is comparable to other studies<sup>3, 10</sup>. Occurrence of 76.75% of the cases in males relates to the higher rates of exposure to animals among males than females. There are many misconceptions associated with animal bite management, which deprive the patients of getting the right PET in Bangladesh. Poverty, ignorance and faith in indigenous medicines are more common in rural people and it is not surprising that cases belonged to the rural areas (591 = 86.40%) contributed to the bulk of the cases in this study. Although 549 (80.26%) cases had category III exposure, none of the cases were given RIG. This is an essential component of rabies post-exposure treatment<sup>11</sup>, especially in persons who would have short incubation period (category III exposure with bites on head and neck area) because it takes at least 10 days to produce immunity following primary vaccination. RIG was not available during the study period in Bangladesh. Although at this moment limited amount of RIG is available in Dhaka, its very high price and unavailability in other parts of the country make it difficult to provide correct PET. More over RIG is not prescribed many times even when it is available as also happened in India<sup>3</sup>. 86.04% (591/684) of cases were never administered even a single dose of anti-rabies vaccine. Of 84 cases,

who had been administered NTV, only 58 cases actually completed the doses. It may be due to unavailability of NTV, especially in the rural area. NTV of unreliable potency and high rates of associated complications are still being used as the main weapon for PET in Bangladesh and in other developing countries<sup>3, 11-12</sup>. Many persons especially children fear to take NTV as part of PET of rabies in Bangladesh. Modern tissue culture vaccines (TCV) are more effective and safer, but are expensive and cannot be afforded by most of the poor people of this country. In this study only 9 cases were given TCV and 4 cases actually completed the course. Like many countries dog is the principal animal responsible (655/685 = 95.76%) for transmission of the disease to humans in this study<sup>3, 13</sup>. So effective measures to control canine rabies are necessary to reduce human rabies in Bangladesh. Pets may get infected from rabid animals. Those who ignored the bite from an “apparently healthy but rabid” animal did not take appropriate treatment and paid the ultimate price. So pets are not always safe as per as the rabies is concerned, and pet animals transmitted the disease to humans in 8.91% (61/684) of cases in this study and comparable to findings in the neighboring country<sup>3</sup>. Only 0.87% (6/684) of cases developed rabies within 10 days of animal exposure indicate that the incubation period could be very short in some cases. RIG is very important live saving measure for this group of patients because even the modern TCV needs about 10 days to produce adequate immunity against rabies<sup>11</sup>.

Rabies remains an important cause of mortality in the developing countries, and is difficult to eliminate from a country like Bangladesh. However, effective control of canine rabies, adequate post exposure treatment with modern TCV and RIG (when indicated) according to WHO guideline, health education, and committed and coordinated actions from different government and non-government organizations, can only make a rabies-free Bangladesh.

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