# EPIDEMIOLOGICAL ASPECTS OF RABIES IN NEPAL

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## Preface & Acknowledgement

Two types of surveillance studies were arried out by the team member of this centre. The one by collecting secondary informations from the identified institutions/ hospitals/ nurshing homes/ clinics/ pharmaceauticals and the public. The second one by the primary survey findings frome the different hospitals/ health centres/ health posts. Survey team visited to 10 different hospitals of terai regions which are named as Mechi Zonal Hospital, Koshi Zonal Hospital, Sagarmatha Zonal Hospital, Janakpur Zonal Hospital, Narayani Zonal Hospital, Bharatpur Hospital, Lumbini Zonal Hospital, Bheri Zonal Hospital, Seti Zonal Hospital and Mahakali Zonal Hospital. All the recorded morbidity and mortality data on human post-exposure treatment cases in the hospitals were collected and analyzed at centre's computer. The team visited all the zonal veterinary hospitals of 10 zones of terai regions as well as rabies control project at veterinary complex, Tripureshwor to collect on the morbidity and mortality data on rabies animals/ exposed animals, vaccine production and supply for both animals and human use. The objectives of this survey study were :

1) To conduct the epidemiological surveillance on morbidity and mortality of dog bite and contact cases in human beings from different rabies clinics of the hospitals.

2) To analyse the age, sexwise, monthwise case fatality rate due to rabies and post-exposure treatment along with types of anti-rabies vaccine used and its availability in the country.

3) To study the animal rabies surveillance in the country.

4) To study the anti rabies vaccine production, procurement, demand and supply for the both human and animals.

I am most grateful to the Medical Superintendents of different hospitals mainly of terai areas, Director of the Epidemiology Division, Department of Health Services, Ministry of Health, Chief of the Rabies Control Project, Department of Livestock Services, Ministry of Agriculture alongwith medical staffs working in different rabies clinics for their kind support and information provided to our team. I must thank all the staffs of this centre particularly Minu Sharma, Mr. S.P. Bhandary and Mr. Narayan Karki for their wounderful work during survey as well as report writting.

Dr. D. D. Joshi
Project Coordinator

# Conversion Table from Nepali year B.S. to English year A.D.

| Nepali Month Conversion Table | |
|---|---|
| Nepali Month | Equivalent |
| Baishak | Nepali Year Begins<br>middle of April to middle of June |
| Jestha | middle of May to middle of July |
| Asadh | middle of June to middle of July |
| Srawan | middle of July to middle of August |
| Bhadra | middle of August to middle of September |
| Aswin | middle of September to middle of October |
| Kartik | middle of October to middle of November |
| Mangsir | middle of November to middle of December |
| Poush | middle December of to middle of January |
| Magh | middle of January to middle of February |
| Falgun | middle of February to middle of March |
| Chaitra | middle of March to middle of April |

| Nepali Year Conversion Table | |
|---|---|
| Nepali Year (Begins in Mid April) | Equivalent |
| B.S. | A.D. |
| 2045 | 1988/89 |
| 2046 | 1989/90 |
| 2047 | 1990/91 |
| 2048 | 1991/92 |
| 2049 | 1992/93 |
| 2050 | 1993/94 |
| 2051 | 1994/95 |
| 2052 | 1995/96 |
| 2053 | 1996/97 |
| 2054 | 1997/98 |
| 2055 | 1998/99 |


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# EPIDEMIOLOGICAL ASPECTS OF RABIES IN NEPAL

## Summary

Rabies is a highly fatal viral infection acting on the central nervous system of almost all warm-blooded animals. In the present epidemiological surveillance study two types of surveillance studies were arried out by the team member of this centre. The first one by collecting secondary informations from the identified institutions/ hospitals/ nurshing homes/ clinics/ pharmaceauticals and the public. The second one by the primary survey findings frome the different hospitals/ health centres/ health posts. Survey team visited to 10 different hospitals of terai regions which are named as Mechi Zonal Hospital, Koshi Zonal Hospital, Sagarmatha Zonal Hospital, Janakpur Zonal Hospital, Narayani Zonal Hospital, Bharatpur Hospital, Lumbini Zonal Hospital, Bheri Zonal Hospital, Seti Zonal Hospital and Mahakali Zonal Hospital. All the recorded morbidity and mortality data on human post-exposure treatment cases in the hospitals were collected and analyzed at centre's computer. The team visited all the zonal veterinary hospitals of 10 zones of terai regions as well as rabies control project at veterinary complex, Tripureshwor to collect on the morbidity and mortality data on rabies animals/ exposed animals, vaccine production and supply for both animals and human use.

Human rabies Hydrophobia death cases reported in Kathmandu ranging from15 to 20 every year and 120 to 200 death cases during 1991 to 1996 in Nepal every year. It has been observed that almost 100% animal bite to human is from dog (both pet and stray dogs). Dog bites cases are more during December to March months of the year. This could be because of littering period of the dogs and also breeding period. This is the time when there is more contamination and contact of the pet, community and stray dogs. If one dog is suspected rabies then it can infect easily other dogs during this period. Although there is no such distincts demarcation in the number of human patients bitten by suspected rabid dogs and other animals. Dog bite cases are more in children than adult, among children also male are more prone to dog bite than female.

In Nepal first time phenolised sheep brain Rabies vaccine production for use in animals was started by then the Central Veterinary Laboratory Tripureshwor, Kathmandu in 1970. In those days only few thousand mililitres of Vaccines were produced annually. The demand for the Rabies vaccine is increasing every year. Considering the zoonotic value and fatalness of the Rabies disease a separate Rabies control project office was established by His Majesty's Government in 1981. Production of 5% BPL inactivated semple type Rabies vaccine for human use was initiated in 1982. This vaccine was tested for its potency and quality by WHO Rabies Reference Laboratory, Kasauli, India and Pasteur Institute Paris, France and was certified for human use[25]. During F.Y. 1984/85 to 1998 a total of 6,145,420 ml. at % BPL inactivated Rabies Vaccine was produced was supplied free of cost to the Dept. of Health Services according to agreement. This vaccine cost would be Rs. 21,18,300 at the rate of Rs. 2.00 per ml. Sheep brain anti-rabies vaccine Production (ml) F.Y. 1984/85 to 1998.

In Nepal Animals Reservoir for Rabies are ,dog, cat, jackal, monkey, rodents and others. About 94% of the bite and contact is from dogs (pet, community and stray dogs). The total population of dogs in Nepal is 1849110. The detail human and dog population ratio and region and districts wise dog population is mentioned in seperate section 4.5 of this report.

It is Necessary and most urgent to take actions by His Majesty's Government of Nepal and concerned institutions to implement all the RECOMMENDATIONS Made And Proposed By The FIRST NATIONAL SEMINAR ON RABIES, which was held on 17-22 November, 1985, Kathmandu.

# EPIDEMIOLOGICAL ASPECTS OF RABIES IN NEPAL

## 1. Background

### 1.1 Background Informaton on Nepal

Nepal is a land-locked country bordered by China to the north and India to the west, south and east. It's dimensions are roughly 885 km (east to west) by 193 km (mean width) with a total land area of 147,181 $km^2$. Politically, Nepal is divided into 5 developmental regions, 14 zones, and a total of 75 districts. The population was 18,491,097 in 1991 and is growing at a rate of 2% a year. For such a small country, Nepal is a land of extremes, and can be divided into 4 main geographic regions. The Himalayan Mountain region in the north contains the worlds tallest peak, Sagarmatha (Mt. Everest) at 8,848 meters, and 8 of the worlds 14 highest peaks. In sharp contrast is the lowland Terai region to the south, which ranges in altitude from only 100 to 300 meters above sea level. The other 2 geographic regions are the hill region, which includes the Siwalik and Mahabharat ranges, and Valley region, which includes the Kathmandu and Pokhara Valleys. The Terai region is the primary agricultural region of the country and has a hot tropical climate with high seasonal rainfall and lush natural vegetation (see Nepal map).

### 1.2 Epidemiological Background on Rabies

Rabies is a highly fatal viral infection acting on the central nervous system of almost all warm-blooded animals. It has taken its toll in both human and animal lives. At present, rabies has become an important international epidemiological and ecological problem affecting public health, agriculture, forestry and hunting. Rabies constitutes serious loss to the livestock industry[1,2,6,30,31,32,33]. Most of the countries including Nepal affected by the disease. Underreporting may be due to difficulties in establishing the number of deaths, confirming it in the laboratory or due to inaccurate clinical diagnoses. Bovine rabies is of great concern, since cattle losses have a tremendous economic impact on the livestock industry. This centre has carried out surveillance studies on rabies in Nepal during the year 1997/98. This centre has also conducted a study on the socio-economic aspects of rabies in the human population in Nepal. Human post-exposure treatment cases by age and gender for rabies during the year 1996/97 is mentioned in the table. It has been observed that 94% human bites are from dogs. Contact with suspected rabid animals (including dogs and other animals) was 5% and the remaining 1% was from bites by other animals. In a socio-economical study, patients surveyed (565), that had been bitten by dogs and subsequently came to the clinic for post-exposure treatment. The largest group were students, with 33%. The range of cost per person for treatment US$ 10 minimum to US$ 100 maximum. Those people who were taking BPL Sheep Brain Rabies Vaccine paid the minimum cost.

For the first time this socio-economical survey study of the patients bitten by suspected rabid dogs and other animals in Nepal was carried out during 1996 and 1997. The survey team went out in 36 districts, 10 zonal hospitals, 14 district hospitals and 2 regional hospitals. The team visited to the rabies vaccination centres of these hospitals and asked one by one to all the 565 patients visited during survey time to the above mentioned treatment centres. Socio-economical study was carried out on the 565 patients bitten by suspected rabid animals who came to the 11 postexposure treatment centres of the country. All 565 patients were interviewed with the help of questionnaire by the study team[20].

Since 94% of the suspected rabid animal bite to human is from dogs (pet dogs, community dogs and street dogs) [12,13,14,15]. Therefore it was essential to study the dog population ratio to human population in both urban and rural areas of the country. The team visited 11 urban areas and 10 rural areas of 5 development regions taking terai and hilly districts as a sample for the study of the country. Total 1200 people were asked about the dog population ratio of pet and street dogs. The survey team had also carried out the dog counting observation study during the study period.

It is Necessary and most urgent to take actions by His Majesty's Government of Nepal and concerned institutions to implement all the RECOMMENDATIONS Made and Proposed By The FIRST NATIONAL SEMINAR ON RABIES, which was held on 17-22 November, 1985, Kathmandu. These strategies are still valied to be emplemented by the government for rabies control in Nepal both in human and animal population[3,4,5,13,20].

## 2. Objectives :

1) To conduct the epidemiological surveillance on morbidity and mortality of dog bite and contact cases from different rabies clinics of the hospitals.

2) To analyse the age, sexwise, monthwise case fatality rate due to rabies and post-exposure treatment along with types of anti-rabies vaccine used and its availability.

3) To study the animal rabies surveillance in the country.

4) To study the anti rabies vaccine production, procurement, demand and supply for the both human and animals.

## 3. Methodology

There are two types of surveillance studies were arried out by the team member of this centre. The first one by collecting secondary informations from the identified institutions/ hospitals/ nurshing homes/ clinics/ pharmaceauticals and the public. The second one by the primary survey findings frome the different hospitals/ health centres/ health posts.

### 3.1 Human Rabies Surveillance Study

Survey team visited to 10 different hospitals of terai regions which are named as Mechi Zonal Hospital, Koshi Zonal Hospital, Sagarmatha Zonal Hospital, Janakpur Zonal Hospital, Narayani Zonal Hospital, Bharatpur Hospital, Lumbini Zonal Hospital, Bheri Zonal Hospital, Seti Zonal Hospital and Mahakali Zonal Hospital. All the recorded morbidity and mortality data on human post-exposure treatment cases in the hospitals were collected and analyzed at centre's computer.

### 3.2 Animal Rabies Surveillance Study

The team visited all the zonal veterinary hospitals of 10 zones of terai regions as well as rabies control project at veterinary complex, Tripureshwor to collect on the morbidity and mortality data on rabies animals/ exposed animals, vaccine production and supply for both animals and human use.

## 4. Results

### 4.1 Nationwide Morbidity and Mortality Statistics of Human Post-exposure Cases Against Rabies

Human rabies Hydrophobia death cases reported in Kathmandu ranging from15 to 20 every year and 120 to 200 death cases during 1991 to 1996 in Nepal every year. This is presented in table 1 and fig. 1 & 2. It has been observed that almost 100% animal bite to human is from dog (both pet and stray dogs).

**Table 1 : Human rabies Hydrophobia death cases reported in Kathmandu, Nepal during 1991-1996**

| Description | | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| Nationality | Nepalese | 23 | 30 | 47 | 42 | 19 | 27 |
| | Foreigners | 0 | 0 | 4 | 7 | 3 | 2 |
| | Total | 23 | 30 | 51 | 49 | 22 | 29 |
| Biting animal | Dog | 87% | 94% | 96% | 94% | 100% | 100% |
| | Cat | 0% | 0% | 0% | 3% | 0% | 0% |
| | Jackal | 9% | 3% | 4% | 3% | 0% | 0% |
| | Mongoose | 4% | 3% | 0% | 0% | 0% | 0% |
| Site of bite | Leg | 35% | 60% | 51% | 32% | 55% | 52% |
| | Thigh | 0% | 10% | 8% | 6% | 0% | 3% |
| | Hand | 20% | 10% | 12% | 22% | 32% | 21% |
| | Finger | 0% | 0% | 4% | 16% | 4% | 7% |
| | Trunk | 0% | 0% | 0% | 4% | 0% | 3% |
| | Above neck | 0% | 7% | 12% | 20% | 20% | 7% |
| | Unknown | 45% | 13% | 13% | 0% | 0% | 7% |
| Male to female ratio | | 3:01 | 3:01 | 3:01 | 2:01 | 3:01 | 3:01 |
| Age group | 0-14 years | 40% | 33% | 37% | 65% | 77% | 45% |
| | 14+years | 60% | 67% | 63% | 35% | 23% | 55% |

*Source : Epidemiology and Disease Control Division, Department of Health Services Ministry of Health, Kathmandu, Nepal,*
*National Zoonoses Surveillance Report 1997*

**Fig. 1**

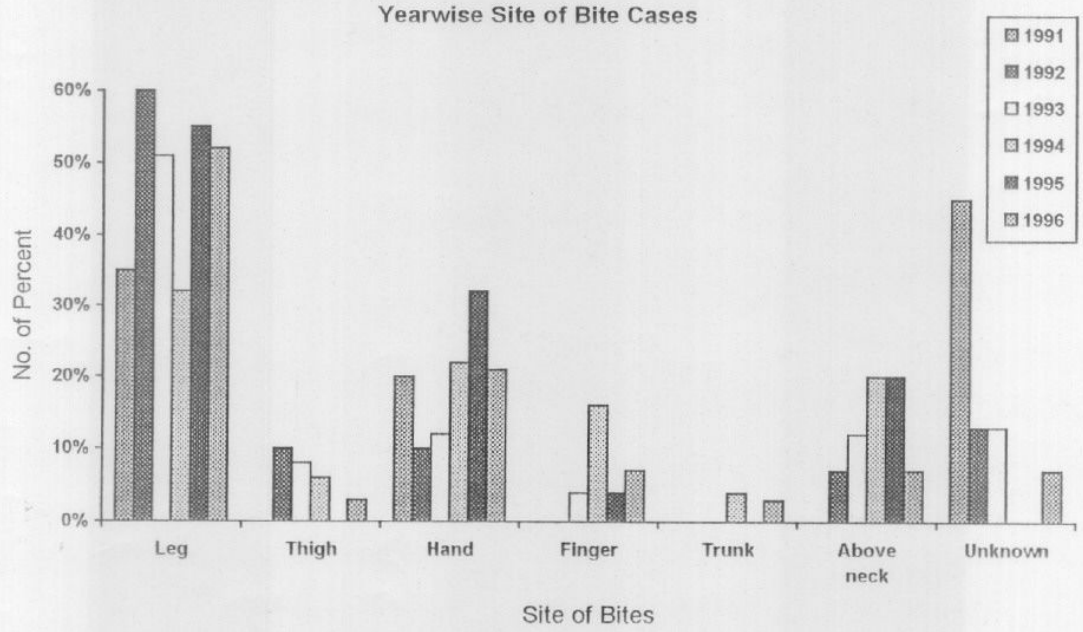
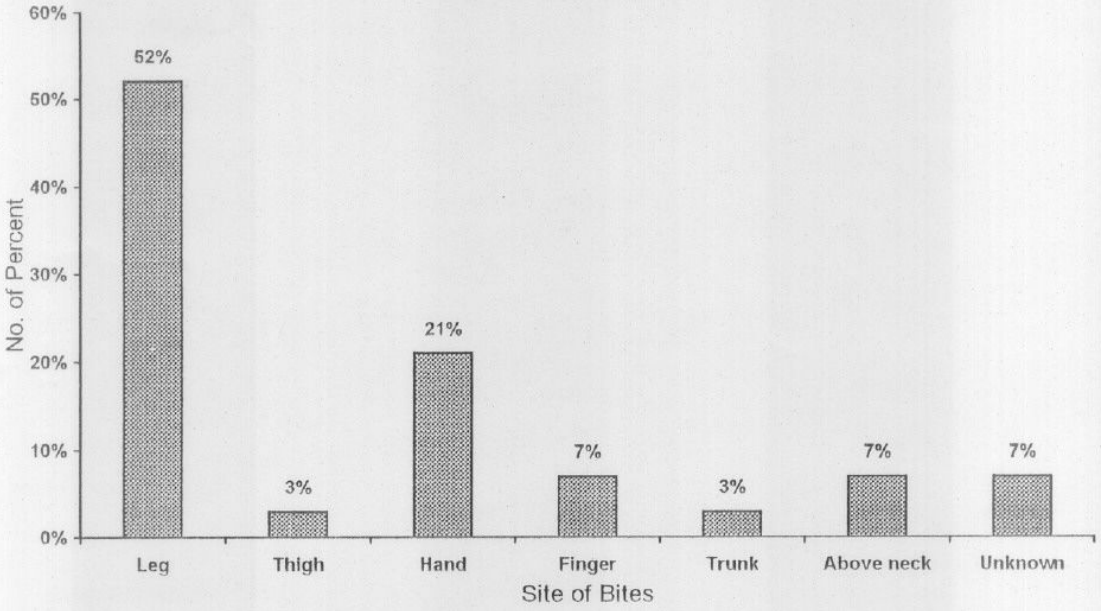


Fig. 2

Site of Bite Cases of 1996



Hospitalwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996 is presented in table 2. Dog bite cases are more in children than adult, among children also male are more prone to dog bite than female.

**Table 2: Hospitalwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996**

| Hospital | Source of Exposure to Rabid Animals | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dog bite | | | | Dog contact | | | | Other animal bite | | | |
| | >15 years | | <15 years | | >15 years | | <15 years | | >15 years | | <15 years | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| Mechi | 174 | 111 | 317 | 153 | 8 | 1 | 22 | 14 | 7 | 3 | 11 | 11 |
| Koshi | 210 | 80 | 226 | 77 | 8 | 14 | 34 | 22 | 9 | 8 | 12 | 5 |
| Sagarmatha | 165 | 44 | 95 | 76 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Janakpur | 373 | 133 | 379 | 200 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 4 |
| Narayani | 551 | 120 | 515 | 105 | 1 | 0 | 3 | 0 | 17 | 0 | 12 | 4 |
| Bharatpur | 106 | 35 | 160 | 61 | 21 | 12 | 59 | 41 | 6 | 3 | 64 | 28 |
| Lumbini | 245 | 103 | 230 | 120 | 7 | 0 | 16 | 6 | 4 | 15 | 26 | 8 |
| Bheri | 182 | 67 | 386 | 99 | 0 | 0 | 0 | 0 | 3 | 1 | 13 | 2 |
| Seti | 206 | 77 | 123 | 76 | 0 | 2 | 2 | 1 | 2 | 0 | 3 | 0 |
| Mahakali | 189 | 76 | 187 | 101 | 9 | 2 | 8 | 6 | 2 | 2 | 7 | 6 |
| Total | 2401 | 846 | 2618 | 1068 | 54 | 31 | 144 | 90 | 51 | 33 | 153 | 68 |

Hospitalwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997 is presented in table 3.

**Table 3 : Hospitalwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997**

| Hospital | Source of Exposure to Rabid Animals | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dog bite | | | | Dog contact | | | | Other animal bite | | | |
| | >15 years | | <15 years | | >15 years | | <15 years | | >15 years | | <15 years | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| Mechi | 67 | 29 | 108 | 59 | 1 | 1 | 11 | 4 | 3 | 0 | 6 | 7 |
| Koshi | 175 | 67 | 169 | 71 | 5 | 1 | 5 | 6 | 11 | 6 | 9 | 4 |
| Sagarmatha | 45 | 20 | 71 | 45 | 3 | 0 | 2 | 3 | 1 | 0 | 7 | 6 |
| Janakpur | 161 | 81 | 196 | 62 | 0 | 0 | 0 | 0 | 3 | 1 | 4 | 2 |
| Narayani | 279 | 54 | 246 | 43 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 |
| Bharatpur | 68 | 26 | 80 | 45 | 19 | 6 | 24 | 19 | 3 | 4 | 35 | 15 |
| Lumbini | 93 | 46 | 90 | 52 | 2 | 2 | 2 | 6 | 4 | 2 | 11 | 6 |
| Bheri | 196 | 90 | 240 | 85 | 0 | 0 | 0 | 0 | 2 | 4 | 9 | 3 |
| Seti | 127 | 54 | 117 | 56 | 0 | 1 | 1 | 1 | 4 | 1 | 2 | 4 |
| Mahakali | 68 | 31 | 96 | 43 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| Total | 1279 | 498 | 1413 | 561 | 31 | 11 | 46 | 40 | 33 | 18 | 85 | 48 |

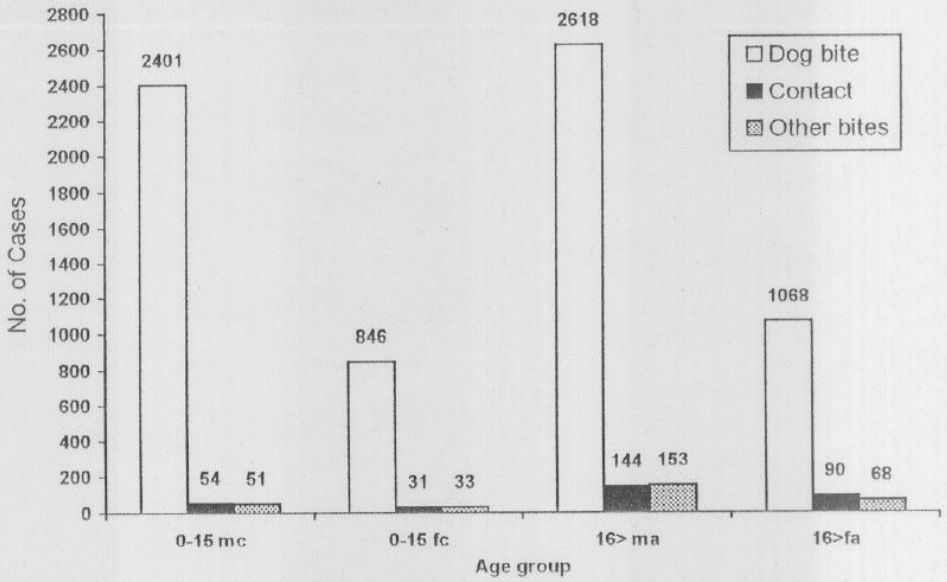
Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996 is presented in table 4 and fig. 3.

**Table 4 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | |
|---|---|---|---|---|---|---|---|
| | Dog bite | % | Dog Contact | % | Other animals bites | % | Total Cases |
| 0-15 Male Child | 2401 | 35 | 54 | 17 | 51 | 17 | 2506 |
| 0-15 Female Child | 846 | 12 | 31 | 10 | 33 | 11 | 910 |
| 16 & above Male Adult | 2618 | 38 | 144 | 45 | 153 | 50 | 2915 |
| 16 & above Female Adult | 1068 | 15 | 90 | 28 | 68 | 22 | 1226 |
| Grand Total | 6933 | 100 | 319 | 100 | 305 | 100 | 7557 |

**Fig. 3**

**Age & Sexwise Cases**




Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997 is presented in table 5.

**Table 5 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 1279 | 34 | 31 | 24 | 33 | 18 | 1343 |
| >15 Female Child | 498 | 13 | 11 | 9 | 18 | 10 | 527 |
| <16 Male Adult | 1413 | 38 | 46 | 36 | 85 | 46 | 1544 |
| <16 Female Adult | 561 | 15 | 40 | 31 | 48 | 26 | 649 |
| Grand Total | 3751 | 100 | 128 | 100 | 184 | 100 | 4063 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996 is presented in table 6 and fig. 4 & 5. Dog bites cases are more during December to March months of the year. This could be because of littering period of the dogs and also breeding period. This is the time when there is more contamination and contact of the pet, community and stray dogs. If one dog is suspected rabies then it can infect easily other dogs during this period. Although there is no such distincts demarcation in the number of human patients bitten by suspected rabid dogs and other animals.

**Table 6 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1996**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Jan | 591 | 9 | 51 | 16 | 33 | 11 | 675 |
| Feb | 835 | 12 | 34 | 11 | 35 | 11 | 904 |
| March | 751 | 11 | 31 | 10 | 39 | 13 | 821 |
| April | 437 | 6 | 30 | 9 | 10 | 3 | 477 |
| May | 382 | 6 | 18 | 6 | 16 | 5 | 416 |
| June | 537 | 8 | 29 | 9 | 18 | 6 | 584 |
| July | 456 | 7 | 18 | 6 | 35 | 11 | 509 |
| Aug | 530 | 8 | 33 | 10 | 25 | 8 | 588 |
| Sept | 514 | 7 | 25 | 8 | 23 | 8 | 562 |
| Oct | 567 | 8 | 12 | 4 | 18 | 6 | 597 |
| Nov | 587 | 8 | 8 | 3 | 23 | 8 | 618 |
| Dec | 746 | 11 | 30 | 9 | 30 | 10 | 806 |
| **Total** | **6933** | **100** | **319** | **100** | **305** | **100** | **7557** |

Fig. 4

**Months wise cases**

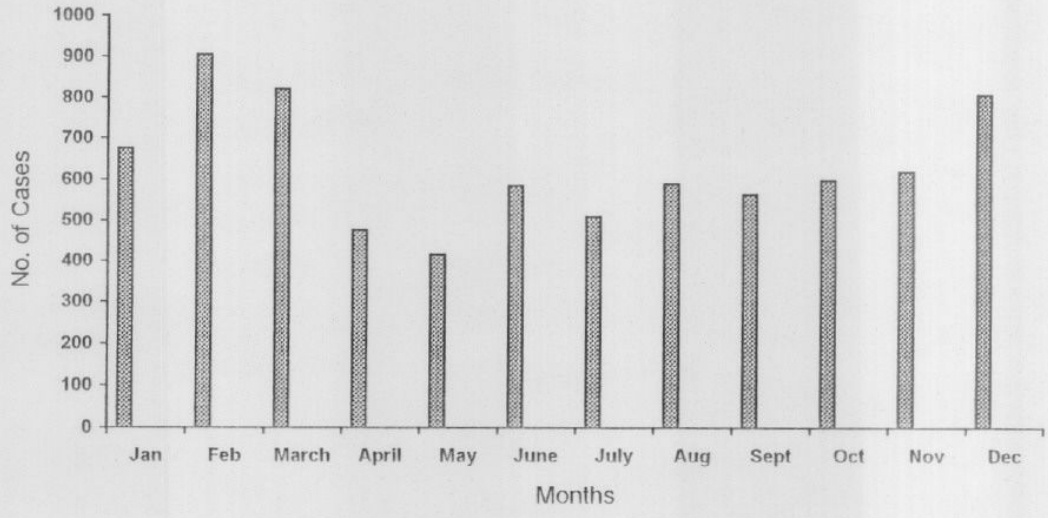
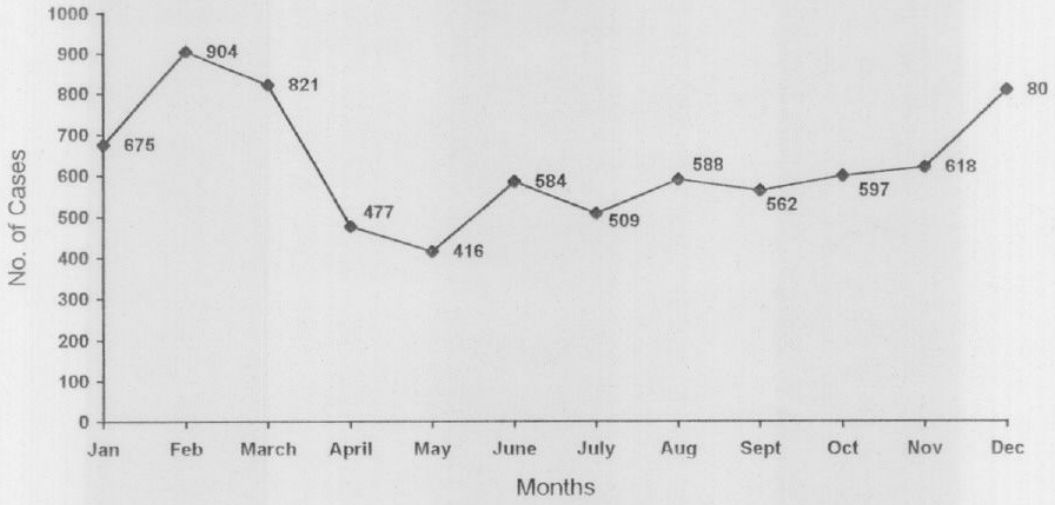


Fig. 5

Months wise cases




Monthwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997 is presented in table 7.

**Table 7 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Nepal Year of 1997**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Jan | | | | | | | |
| Feb | | | | | | | |
| March | | | | | | | |
| April | 770 | 21 | 27 | 21 | 36 | 20 | 833 |
| May | 714 | 19 | 11 | 19 | 21 | 11 | 746 |
| June | 434 | 12 | 22 | 17 | 30 | 16 | 486 |
| July | 527 | 14 | 26 | 20 | 42 | 23 | 595 |
| Aug | 583 | 16 | 15 | 12 | 30 | 16 | 628 |
| Sept | 157 | 4 | 13 | 10 | 6 | 3 | 176 |
| Oct. | 115 | 3 | - | | 11 | 6 | 126 |
| Nov. | 284 | 8 | 10 | 8 | 5 | 3 | 299 |
| Dec. | 167 | 4 | 4 | 3 | 3 | 2 | 174 |
| Total | 3751 | 100 | 128 | 100 | 184 | 100 | 4063 |

## 4.2 Hospitalwise Morbidity and Mortality Statistics of Human Post-exposure Cases Against Rabies

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2053 is presented in table 8.

**Table 8 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 174 | 23 | 8 | 18 | 7 | 22 | 189 |
| >15 Female Child | 111 | 15 | 1 | 2 | 3 | 10 | 115 |
| <16 Male Adult | 317 | 42 | 22 | 49 | 11 | 34 | 350 |
| <16 Female Adult | 153 | 20 | 14 | 31 | 11 | 34 | 178 |
| Grand Total | 755 | 100 | 45 | 100 | 32 | 100 | 832 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2054 is presented in table 9.

**Table 9 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 67 | 25 | 1 | 6 | 3 | 18 | 71 |
| >15 Female Child | 29 | 12 | 1 | 6 | | | 30 |
| <16 Male Adult | 108 | 41 | 11 | 65 | 6 | 38 | 125 |
| <16 Female Adult | 59 | 22 | 4 | 23 | 7 | 44 | 70 |
| Grand Total | 263 | 100 | 17 | 100 | 16 | 100 | 296 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2053 is presented in table 10.

**Table 10 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 59 | 8 | 1 | 2 | | | 60 |
| Jestha | 78 | 10 | | | | | 78 |
| Ashad | 86 | 11 | | | | | 86 |
| Shrawan | 74 | 10 | | | 1 | 3 | 75 |
| Bhadra | 36 | 5 | 1 | 2 | 13 | 41 | 50 |
| Ashwin | 43 | 6 | 25 | 56 | 3 | 9 | 71 |
| Kartik | 48 | 6 | 6 | 13 | 5 | 16 | 59 |
| Mangsir | 43 | 6 | | | 1 | 3 | 44 |
| Paush | 78 | 10 | 8 | 18 | 3 | 9 | 89 |
| Magh | 29 | 4 | | | 3 | 9 | 32 |
| Falgun | 79 | 10 | 3 | 7 | | | 82 |
| Chaitra | 102 | 14 | 1 | 2 | 3 | 9 | 102 |
| Total | 755 | 100 | 45 | 100 | 32 | 100 | 832 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2054 is presented in table 11.

**Table 11 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mechi Zonal Hospital, Jhapa, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 79 | 30 | 1 | 6 | | | 80 |
| Jestha | 53 | 20 | 1 | 6 | 1 | 6 | 55 |
| Ashad | 36 | 14 | 5 | 29 | 4 | 25 | 45 |
| Shrawan | 62 | 24 | 7 | 41 | 11 | 69 | 80 |
| Bhadra | 27 | 10 | 3 | 18 | | | 30 |
| Ashwin | 6 | 2 | | | | | 6 |
| Kartik | | | | | | | |
| Mangsir | | | | | | | |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 263 | 100 | 17 | 100 | 16 | 100 | 296 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2053 is presented in table 12.

**Table 12 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 210 | 35 | 8 | 10 | 9 | 26 | 227 |
| >15 Female Child | 80 | 13 | 14 | 18 | 8 | 24 | 102 |
| <15 Male Adult | 226 | 38 | 34 | 44 | 12 | 35 | 272 |
| <15 Female Adult | 77 | 13 | 22 | 28 | 5 | 15 | 104 |
| Grand Total | 593 | 100 | 78 | 100 | 34 | 100 | 705 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2054 is presented in table 13.

**Table 13 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 175 | 36 | 5 | 29 | 11 | 37 | 191 |
| >15 Female Child | 67 | 14 | 1 | 35 | 6 | 20 | 74 |
| <15 Male Adult | 169 | 35 | 5 | 29 | 9 | 30 | 183 |
| <15 Female Adult | 71 | 15 | 6 | 6 | 4 | 13 | 84 |
| Grand Total | 482 | 100 | 17 | 100 | 33 | 100 | 532 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2053 is presented in table 14.

**Table 14 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | | | | | | | |
| Jestha | 19 | 3 | | | 2 | 6 | 21 |
| Ashad | 49 | 8 | 37 | 47 | 3 | 8 | 89 |
| Shrawan | 63 | 11 | 9 | 12 | 8 | 24 | 80 |
| Bhadra | 23 | 4 | 9 | 12 | 2 | 6 | 34 |
| Ashwin | 73 | 12 | | | 5 | 15 | 78 |
| Kartik | 28 | 5 | | | | | 28 |
| Mangsir | 72 | 12 | 7 | 9 | 8 | 24 | 87 |
| Paush | 72 | 12 | | | 1 | 3 | 73 |
| Magh | 100 | 17 | 14 | 18 | 3 | 8 | 117 |
| Falgun | 94 | 16 | 2 | 2 | 2 | 6 | 98 |
| Chaitra | | | | | | | |
| Total | 593 | 100 | 78 | 100 | 34 | 100 | 705 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2054 is presented in table 15.

**Table 15 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Koshi Zonal Hospital, Biratnagar, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 92 | 19 | 5 | 29 | 3 | 9 | 100 |
| Jestha | 102 | 21 | | | 2 | 6 | 104 |
| Ashad | 42 | 9 | | | 8 | 24 | 50 |
| Shrawan | 88 | 18 | 1 | 6 | 6 | 18 | 95 |
| Bhadra | 119 | 25 | 5 | 29 | 7 | 21 | 131 |
| Ashwin | 29 | 6 | 6 | 35 | 2 | 6 | 37 |
| Kartik | 10 | 2 | | | 5 | 15 | 15 |
| Mangsir | | | | | | | |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 482 | 100 | 17 | 100 | 33 | 100 | 532 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2053 is presented in table 16.

**Table 16 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 165 | 34 | | | 1 | 50 | 166 |
| >15 Female Child | 44 | 9 | | | | | 44 |
| <15 Male Adult | 195 | 41 | | | 1 | 50 | 196 |
| <15 Female Adult | 76 | 16 | | | | | 76 |
| Grand Total | 480 | 100 | | | 2 | 100 | 482 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2054 is presented in table 17.

**Table 17 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 45 | 25 | 3 | 38 | 1 | 7 | 49 |
| >15 Female Child | 20 | 11 | | | | | 20 |
| <15 Male Adult | 71 | 39 | 2 | 25 | 7 | 50 | 80 |
| <15 Female Adult | 45 | 25 | 3 | 38 | 6 | 43 | 54 |
| Grand Total | 181 | 100 | 8 | 100 | 14 | 100 | 203 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2053 is presented in table 18.

**Table 18 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 34 | 7 | | | | | 34 |
| Jestha | 49 | 10 | | | | | 49 |
| Ashad | 47 | 10 | | | 2 | 100 | 49 |
| Shrawan | 37 | 8 | | | | | 37 |
| Bhadra | 64 | 13 | | | | | 64 |
| Ashwin | 20 | 4 | | | | | 20 |
| Kartik | 27 | 6 | | | | | 27 |
| Mangsir | 29 | 6 | | | | | 29 |
| Paush | 45 | 9 | | | | | 45 |
| Magh | 39 | 8 | | | | | 39 |
| Falgun | 42 | 9 | | | | | 42 |
| Chaitra | 47 | 10 | | | | | 47 |
| Total | 480 | 100 | | | 2 | 100 | 482 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2054 is presented in table 19.

**Table 19 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Sagarmatha Zonal Hospital, Rajbiraj, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 33 | 18 | 8 | 100 | | | 41 |
| Jestha | 44 | 24 | | | | | 44 |
| Ashad | 28 | 15 | | | 1 | 7 | 29 |
| Shrawan | 29 | 16 | | | 6 | 43 | 35 |
| Bhadra | 47 | 26 | | | 7 | 50 | 54 |
| Ashwin | | | | | | | |
| Kartik | | | | | | | |
| Mangsir | | | | | | | |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 181 | 100 | 8 | 100 | 14 | 100 | 203 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2053 is presented in table 20.

**Table 20 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 373 | 34 | | | | | 373 |
| >15 Female Child | 133 | 12 | | | 1 | 7 | 134 |
| <15 Male Adult | 379 | 35 | | | 9 | 64 | 388 |
| <15 Female Adult | 200 | 18 | | | 4 | 29 | 204 |
| Grand Total | 1085 | 100 | | | 14 | 100 | 1099 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2054 is presented in table 21.

**Table 21 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 161 | 32 | | | 3 | 30 | 164 |
| >15 Female Child | 81 | 16 | | | 1 | 10 | 82 |
| <15 Male Adult | 196 | 39 | | | 4 | 40 | 200 |
| <15 Female Adult | 62 | 12 | | | 2 | 20 | 64 |
| Grand Total | 500 | 100 | | | 10 | 100 | 510 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2053 is presented in table 22.

**Table 22 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 52 | 5 | | | 2 | 14 | 54 |
| Jestha | 65 | 6 | | | 4 | 29 | 69 |
| Ashad | 86 | 8 | | | | | 86 |
| Shrawan | 68 | 6 | | | | | 68 |
| Bhadra | 115 | 11 | | | | | 115 |
| Ashwin | 84 | 8 | | | | | 84 |
| Kartik | 105 | 10 | | | | | 105 |
| Mangsir | 57 | 5 | | | 2 | 14 | 59 |
| Paush | 109 | 10 | | | | | 109 |
| Magh | 102 | 9 | | | 2 | 14 | 104 |
| Falgun | 132 | 12 | | | 1 | 7 | 133 |
| Chaitra | 110 | 10 | | | 3 | 21 | 113 |
| Total | 1085 | 100 | | | 14 | 100 | 1099 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2054 is presented in table 23.

**Table 23 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Janakpur Zonal Hospital, Dhanusha, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 133 | 27 | | | 7 | 70 | 140 |
| Jestha | 116 | 23 | | | 1 | 10 | 117 |
| Ashad | 50 | 10 | | | | | 50 |
| Shrawan | 85 | 17 | | | | | 95 |
| Bhadra | 47 | 9 | | | | | 47 |
| Ashwin | 9 | 2 | | | | | 9 |
| Kartik | 17 | 3 | | | | | 17 |
| Mangsir | 43 | 9 | | | 2 | 20 | 45 |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 500 | 100 | | | 10 | 100 | 510 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2053 is presented in table 24.

**Table 24 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 551 | 43 | 1 | 25 | 17 | 52 | 569 |
| >15 Female Child | 120 | 9 | | | | | 120 |
| <15 Male Adult | 515 | 40 | 3 | 75 | 12 | 36 | 530 |
| <15 Female Adult | 105 | 8 | | | 4 | 12 | 109 |
| Grand Total | 1291 | 100 | 4 | 100 | 33 | 100 | 1328 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2054 is presented in table 25.

**Table 25 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 279 | 45 | | | 2 | 67 | 281 |
| >15 Female Child | 54 | 8 | | | | | 54 |
| <15 Male Adult | 246 | 40 | | | 1 | 33 | 247 |
| <15 Female Adult | 43 | 7 | | | | | 43 |
| Grand Total | 622 | 100 | | | 3 | 100 | 625 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2053 is presented in table 26.

**Table 26 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 103 | 8 | | | | | 103 |
| Jestha | 41 | 3 | | | | | 41 |
| Ashad | 99 | 8 | | | 5 | 15 | 104 |
| Shrawan | 70 | 5 | | | 3 | 9 | 73 |
| Bhadra | 99 | 8 | | | 5 | 15 | 104 |
| Ashwin | 118 | 9 | | | 8 | 24 | 126 |
| Kartik | 90 | 7 | 2 | 50 | | | 82 |
| Mangsir | 118 | 9 | | | 1 | 3 | 119 |
| Paush | 172 | 13 | | | 5 | 15 | 177 |
| Magh | 84 | 7 | | | 2 | 6 | 86 |
| Falgun | 132 | 10 | 1 | 25 | 2 | 6 | 135 |
| Chaitra | 165 | 13 | 1 | 25 | 2 | 6 | 169 |
| Total | 1291 | 100 | 4 | 100 | 33 | 100 | 1329 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj , Year of 2054 is presented in table 27.

**Table 27 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Narayan Sub-Regional Hospital, Birgunj , Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 108 | 17 | | | 1 | 33 | 109 |
| Jestha | 120 | 19 | | | | | 120 |
| Ashad | 77 | 12 | | | | | 77 |
| Shrawan | 101 | 16 | | | | | 101 |
| Bhadra | 136 | 22 | | | 2 | 67 | 138 |
| Ashwin | | | | | | | |
| Kartik | | | | | | | |
| Mangsir | 80 | 13 | | | | | 80 |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 622 | 100 | | | 3 | 100 | 625 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2053 is presented in table 28.

**Table 28 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 106 | 29 | 21 | 15 | 6 | 6 | 133 |
| >15 Female Child | 35 | 10 | 12 | 8 | 3 | 3 | 50 |
| <15 Male Adult | 160 | 44 | 69 | 48 | 64 | 63 | 293 |
| <15 Female Adult | 61 | 17 | 41 | 29 | 28 | 28 | 130 |
| Grand Total | 362 | 100 | 143 | 100 | 101 | 100 | 606 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2054 is presented in table 29.

**Table 29 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 68 | 31 | 19 | 28 | 3 | 6 | 90 |
| >15 Female Child | 26 | 12 | 6 | 9 | 4 | 7 | 36 |
| <15 Male Adult | 78 | 36 | 24 | 35 | 36 | 67 | 138 |
| <15 Female Adult | 45 | 21 | 19 | 28 | 11 | 20 | 75 |
| Grand Total | 217 | 100 | 68 | 100 | 54 | 100 | 339 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2053 is presented in table 30.

**Table 30 : Monthwise Human Post-Exposure Treatment Cases Against Rabies**

**in Bharatpur Hospital, Chitwan, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 46 | 13 | 29 | 20 | 8 | 8 | 83 |
| Jestha | 16 | 4 | 18 | 13 | | | 34 |
| Ashad | 24 | 7 | 10 | 7 | 7 | 7 | 41 |
| Shrawan | 26 | 7 | 8 | 6 | 6 | 6 | 40 |
| Bhadra | 28 | 8 | 3 | 2 | 1 | 1 | 32 |
| Ashwin | 20 | 6 | 7 | 5 | 4 | 4 | 31 |
| Kartik | 31 | 9 | 3 | 2 | 7 | 7 | 41 |
| Mangsir | 30 | 8 | | | 6 | 6 | 36 |
| Paush | 34 | 9 | 3 | 2 | 6 | 6 | 43 |
| Magh | 34 | 9 | 26 | 18 | 22 | 22 | 82 |
| Falgun | 47 | 13 | 7 | 5 | 18 | 18 | 72 |
| Chaitra | 26 | 7 | 29 | 20 | 16 | 16 | 71 |
| Total | 362 | 100 | 143 | 100 | 101 | 100 | 606 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2054 is presented in table 31 .

**Table 31 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bharatpur Hospital, Chitwan, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 39 | 18 | 11 | 16 | 14 | 26 | 64 |
| Jestha | 18 | 8 | | | 13 | 24 | 31 |
| Ashad | 23 | 10 | 17 | 25 | 11 | 20 | 51 |
| Shrawan | 32 | 15 | 18 | 26 | 10 | 19 | 60 |
| Bhadra | 38 | 18 | 5 | 7 | 1 | 2 | 44 |
| Ashwin | 21 | 10 | 7 | 10 | 2 | 4 | 30 |
| Kartik | 16 | 7 | | | | | 16 |
| Mangsir | 30 | 14 | 10 | 15 | 3 | 5 | 43 |
| Paush | | | | | | | |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 217 | 100 | 68 | 100 | 54 | 100 | 339 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2053 is presented in table 32.

**Table 32 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 245 | 33 | 7 | 24 | 4 | 10 | 256 |
| >15 Female Child | 103 | 15 | | | 5 | 12 | 108 |
| <15 Male Adult | 230 | 33 | 16 | 55 | 23 | 58 | 269 |
| <15 Female Adult | 120 | 17 | 6 | 21 | 8 | 20 | 134 |
| Grand Total | 698 | 100 | 29 | 100 | 40 | 100 | 767 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2054 is presented in table 33.

**Table 33 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 93 | 33 | 2 | 17 | 4 | 17 | 99 |
| >15 Female Child | 46 | 16 | 2 | 17 | 2 | 9 | 50 |
| <15 Male Adult | 90 | 32 | 2 | 17 | 11 | 48 | 103 |
| <15 Female Adult | 54 | 19 | 6 | 50 | 6 | 26 | 66 |
| Grand Total | 283 | 100 | 12 | 100 | 23 | 100 | 318 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2053 is presented in table 24.

**Table 34 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 63 | 9 | | | | | 63 |
| Jestha | 38 | 5 | | | 9 | 23 | 47 |
| Ashad | 38 | 5 | | | | 42 | 38 |
| Shrawan | 25 | 4 | | | 17 | 12 | 42 |
| Bhadra | 57 | 8 | | | 5 | 3 | 62 |
| Ashwin | 30 | 4 | | | 1 | | 31 |
| Kartik | 108 | 15 | | | | | 108 |
| Mangsir | 58 | 8 | | | 1 | 3 | 58 |
| Paush | 42 | 6 | 18 | 62 | 4 | 10 | 64 |
| Magh | 55 | 8 | 11 | 38 | | | 66 |
| Falgun | 74 | 11 | | | | | 74 |
| Chaitra | 110 | 16 | | | 3 | 7 | 113 |
| Total | 698 | 100 | 29 | 100 | 40 | 100 | 767 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2054 is presented in table 35.

**Table 35 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Lumbini Zonal Hospital, Butwal, Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 81 | 29 | 1 | 8 | 5 | 22 | 87 |
| Jestha | 68 | 24 | 9 | 75 | | | 77 |
| Ashad | 25 | 9 | | | 1 | 4 | 26 |
| Shrawan | 22 | 8 | | | 5 | 22 | 27 |
| Bhadra | 56 | 20 | 2 | 17 | 11 | 48 | 69 |
| Ashwin | 13 | 4 | | | | | 13 |
| Kartik | | | | | | | |
| Mangsir | 2 | 1 | | | | | 2 |
| Paush | 16 | 5 | | | 1 | 4 | 17 |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 283 | 100 | 12 | 100 | 23 | 100 | 318 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2053 is presented in table 36.

**Table 36 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 182 | 29 | | | 3 | 16 | 185 |
| >15 Female Child | 67 | 10 | | | 1 | 5 | 68 |
| <15 Male Adult | 286 | 45 | | | 13 | 68 | 299 |
| <15 Female Adult | 99 | 16 | | | 2 | 11 | 101 |
| Grand Total | 634 | 100 | | | 19 | 100 | 653 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2054 is presented in table 37.

**Table 37 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 196 | 32 | | | 2 | 11 | 198 |
| >15 Female Child | 90 | 15 | | | 4 | 22 | 94 |
| <15 Male Adult | 240 | 39 | | | 9 | 50 | 249 |
| <15 Female Adult | 85 | 14 | | | 3 | 17 | 88 |
| Grand Total | 611 | 100 | | | 18 | 100 | 629 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2053 is presented in table 38.

**Table 38 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 48 | 8 | | | | | 48 |
| Jestha | 43 | 7 | | | 1 | 5 | 44 |
| Ashad | 37 | 6 | | | 2 | 11 | 39 |
| Shrawan | 29 | 5 | | | | | 29 |
| Bhadra | 40 | 6 | | | | | 40 |
| Ashwin | 32 | 5 | | | 1 | 5 | 33 |
| Kartik | 41 | 6 | | | | | 41 |
| Mangsir | 50 | 8 | | | 3 | 16 | 53 |
| Paush | 78 | 12 | | | 3 | 16 | 81 |
| Magh | 58 | 9 | | | | | 58 |
| Falgun | 89 | 14 | | | 7 | 36 | 98 |
| Chaitra | 89 | 14 | | | 2 | 11 | 91 |
| Total | 634 | 100 | | | 19 | 100 | 653 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj ,Year of 2054 is presented in table 39.

**Table 39 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Bheri Zonal Hospital, Nepalgunj ,Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 89 | 15 | | | 2 | 11 | 91 |
| Jestha | 65 | 11 | | | 3 | 17 | 68 |
| Ashad | 81 | 13 | | | 2 | 11 | 83 |
| Shrawan | 75 | 12 | | | 4 | 22 | 79 |
| Bhadra | 88 | 14 | | | 2 | 11 | 90 |
| Ashwin | 15 | 2 | | | | | 15 |
| Kartik | 50 | 8 | | | 3 | 17 | 53 |
| Mangsir | 66 | 11 | | | | | 66 |
| Paush | 82 | 13 | | | 2 | 11 | 84 |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 611 | 100 | | | 18 | 100 | 629 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2053 is presented in table 40.

**Table 40 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 206 | 43 | | | 2 | 40 | 208 |
| >15 Female Child | 77 | 16 | 2 | 40 | | | 79 |
| <15 Male Adult | 123 | 25 | 2 | 40 | 3 | 60 | 128 |
| <15 Female Adult | 76 | 16 | 1 | 20 | | | 77 |
| Grand Total | 482 | 100 | 5 | 100 | 5 | 100 | 492 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2054 is presented in table 41.

**Table 41 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 127 | 36 | | | 4 | 36 | 131 |
| >15 Female Child | 54 | 15 | 1 | 33.3 | 1 | 9 | 46 |
| <15 Male Adult | 117 | 33 | 1 | 33.3 | 2 | 18 | 120 |
| <15 Female Adult | 56 | 16 | 1 | 33.3 | 4 | 36 | 61 |
| Grand Total | 354 | 100 | 3 | 100 | 11 | 100 | 368 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2053 is presented in table 42.

**Table 42 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 14 | 3 | | | | | 14 |
| Jestha | 21 | 4 | | | | | 21 |
| Ashad | 32 | 7 | | | 2 | 40 | 34 |
| Shrawan | 28 | 6 | 1 | 20 | | | 29 |
| Bhadra | 30 | 6 | | | | | 30 |
| Ashwin | 36 | 7 | | | | | 36 |
| Kartik | 32 | 7 | 1 | 20 | | | 33 |
| Mangsir | 59 | 12 | 1 | 20 | | | 60 |
| Paush | 49 | 10 | 1 | 20 | 3 | 60 | 53 |
| Magh | 33 | 7 | | | | | 33 |
| Falgun | 73 | 15 | 1 | 20 | | | 74 |
| Chaitra | 75 | 16 | | | | | 75 |
| Total | 482 | 100 | 5 | 100 | 5 | | 492 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi,Year of 2054 is presented in table 43.

**Table 43 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Seti Zonal Hospital, Kailali, Dhangadi,Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 94 | 27 | 1 | 33 | 4 | 36 | 99 |
| Jestha | 83 | 23 | | | | | 83 |
| Ashad | 36 | 10 | | | 3 | 27 | 39 |
| Shrawan | | | | | | | |
| Bhadra | 9 | 3 | | | | | 9 |
| Ashwin | 37 | 10 | | | 1 | 9 | 38 |
| Kartik | 21 | 6 | | | 3 | 27 | 24 |
| Mangsir | 30 | 8 | | | | | 30 |
| Paush | 44 | 12 | 2 | 67 | | | 46 |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 354 | 100 | 3 | 100 | 11 | 100 | 368 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar, Year of 2053 is presented in table 44.

**Table 44 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar, Year of 2053**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 189 | 34 | 9 | 36 | 2 | 12 | 200 |
| >15 Female Child | 76 | 14 | 2 | 8 | 2 | 12 | 80 |
| <15 Male Adult | 187 | 34 | 8 | 32 | 7 | 41 | 202 |
| <15 Female Adult | 101 | 18 | 6 | 24 | 6 | 35 | 113 |
| Grand Total | 553 | 100 | 25 | 100 | 17 | 100 | 595 |

Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar , Year of 2054 is presented in table 45.

**Table 45 : Age & Sexwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar , Year of 2054**

| Age & Sex | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| >15 Male Child | 68 | 29 | 1 | 33.3 | | | 69 |
| >15 Female Child | 31 | 13 | | | | | 31 |
| <15 Male Adult | 96 | 40 | 1 | 33.3 | 1 | 50 | 98 |
| <15 Female Adult | 43 | 18 | 1 | 33.3 | 1 | 50 | 45 |
| Grand Total | 238 | 100 | 3 | 100 | 2 | 100 | 100 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar, Year of 2053 is presented in table 46.

**Table 46 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar, Year of 2053**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 18 | 3 | | | | | 18 |
| Jestha | 32 | 6 | | | | | 32 |
| Ashad | 39 | 7 | | | | | 39 |
| Shrawan | 36 | 7 | | | | | 36 |
| Bhadra | 38 | 7 | 22 | 88 | | | 60 |
| Ashwin | 58 | 10 | 3 | 12 | 1 | 6 | 62 |
| Kartik | 57 | 10 | | | | | 57 |
| Mangsir | 61 | 11 | | | | | 61 |
| Paush | 67 | 12 | | | | | 67 |
| Magh | 57 | 10 | | | 1 | 6 | 58 |
| Falgun | 63 | 11 | | | 5 | 29 | 68 |
| Chaitra | 27 | 5 | | | 10 | 59 | 37 |
| Total | 553 | 100 | 25 | 100 | 17 | 100 | 595 |

Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar,Year of 2054 is presented in table 47.

**Table 47 : Monthwise Human Post-Exposure Treatment Cases Against Rabies in Mahakali Zonal Hospital, Kanchanpur, Mahendranagar,Year of 2054**

| Months | Source of Exposure to Rabid Animals | | | | | | Total Cases |
|---|---|---|---|---|---|---|---|
| | Dog bites | % | Dog contact | % | Other animals bites | % | |
| Baisakh | 22 | 9 | | | | | 22 |
| Jestha | 45 | 19 | 1 | 33 | 1 | 50 | 47 |
| Ashad | 36 | 15 | | | | | 36 |
| Shrawan | 33 | 14 | | | | | 33 |
| Bhadra | 16 | 7 | | | | | 16 |
| Ashwin | 27 | 11 | | | 1 | 50 | 28 |
| Kartik | 1 | 0.4 | | | | | 1 |
| Mangsir | 33 | 14 | | | | | 33 |
| Paush | 25 | 11 | 2 | 67 | | | 27 |
| Magh | | | | | | | |
| Falgun | | | | | | | |
| Chaitra | | | | | | | |
| Total | 238 | 100 | 3 | 100 | 2 | | 243 |

Post-exposure treatment against rabies, types of animal bites and types of treatment given during 1991-1996 is presented in table 48.

**Table 48 : Post-exposure treatment against rabies, types of animal bites and types of treatment given during 1991-1996**

| Persons treated | Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| for domestic animal bites | Dog | 16,091 | 16,614 | 19,695 | 18,975 | 16,118 | 14,346 |
| | Cat | 131 | 60 | 98 | 60 | 86 | 75 |
| | Others* | 241 | 160 | 350 | 415 | 196 | 36 |
| | Total | 16,436 | 16,834 | 20,143 | 19,450 | 16,400 | 14,57 |
| Persons treated for wild animal bites | Jackal | 102 | 50 | 32 | 25 | 45 | 41 |
| | Monkey | 430 | 305 | 375 | 290 | 228 | 200 |
| | Rodents | 235 | 251 | 281 | 120 | 105 | 162 |
| | Others** | 37 | 92 | 117 | 95 | 30 | 35 |
| | Total | 804 | 698 | 805 | 530 | 468 | 438 |
| Saliva contact only | | 1,785 | 1,836 | 2,115 | 1,434 | 1,078 | 941 |
| Persons receiving vaccine alone | | 18,998 | 19,339 | 23,036 | 21,392 | 17,929 | 15,832 |
| Persons receiving vaccine and serum | | 27 | 29 | 27 | 22 | 17 | 4 |

*Others** = *Ruminants, horses*
*Others*** = *Tiger, leopard, bear, rhinoceros, mongoose, wolf*
*Source : Epidemiology and Disease Control Division, Department of Health Services, Ministry of Health, Kathmandu, Nepal*

## 4.3 Anti-rabies Vaccine (ARV) Production, Procurement, Demand and Supply for Human and Animals

In Nepal first time phenolised sheep brain Rabies vaccine production for use in animals was started by then the Central Veterinary Laboratory Tripureshwor, Kathmandu in 1970. In those days only few thousand mililitres of Vaccines were produced annually. The demand for the Rabies vaccine is increasing every year. Considering the zoonotic value and fatalness of the Rabies disease a separate Rabies control project office was established by His Majesty's Government in 1981. Production of 5% BPL inactivated semple type Rabies vaccine for human use was initiated in 1982. This vaccine was tested for its potency and quality by WHO Rabies Reference Laboratory, Kasauli, India and Pasteur Institute Paris, France and was certified for human use[25].

### 4.3.1 Types of Vaccine :

At present the following types of rabies vaccines are being produced in Rabies Control & Public Health Section, Tripureshwor :

- Production of pre-exposure 20% phenolised Rabies vaccine for use in dogs and cats.
- Production of post-exposure 5% phenolised Rabies vaccine for animal use.
- Productionof post-exposure 5% BPL inactivated Rabies vacine for human use.

### 4.3.2 Vaccine Production :

During F.Y. 1984/85 to 1998 a total of 6,145,420 ml. at % BPL inactivated Rabies Vaccine was produced was supplied free of cost to the Dept. of Health Services according to agreement. This vaccine cost would be Rs. 21,18,300 at the rate of Rs. 2.00 per ml. Sheep brain anti-rabies vaccine Production (ml) F.Y. 1984/85 to 1998 is presented in table 49.

**Table 49 : Sheep brain anti-rabies vaccine Production (ml) F.Y. 1984/85 to 1998**

| | Type of anti-rabies vaccine | | |
|---|---|---|---|
| Fiscal year | Carbolised 20% | Carbolised 5% (for post-expousre prophylactic treatment of domestic animals) | BPL inactivated 5% |
| 1984/85 | 41,250 | 169,900 | 64,520 |
| 1985/86 | 56,220 | 290,950 | 56,900 |
| 1986/87 | 70,300 | 219,800 | 171,350 |
| 1987/88 | 126,450 | 189,350 | 246,100 |
| 1988/89 | 85,600 | 130,200 | 324,700 |
| 1989/90 | 92,850 | 221,050 | 258,300 |
| 1990/91 | 112,970 | 257,700 | 283,250 |
| 1991/92 | 91,950 | 186,950 | 337,250 |
| 1992/93 | 90,000 | 289,450 | 353,500 |
| 1993/94 | 131,600 | 261,100 | 461,250 |
| 1994/95 | 82,262 | 422,800 | 2323,900 |
| 1995/96 | 85,900 | 548,800 | 334,800 |
| 1996/97 | 92,700 | 402,850 | 298,800 |
| 1997/98 | 12700 | 402850 | 298800 |
| 1998 | 95050 | 314300 | 332000 |
| Total | 1,267,802 | 4,308,050 | 6,145,420 |

*Source : Rabies Control and Public Health Section MOA*

### 4.3.3 Present Weaknesses in Vaccine Production :

1. Difficulty in procurement of young lambsheep in time.
2. Present space and building is not enough for vaccine production.
3. Difficulty in carcass disposal due to lack of incinerator and space to make a disposal pit.
4. Insufficient water supply.

### 4.3.4 Proposed Future Plan and Activities by the Section :

The following improvement plans are being suggested for Rabies vaccine production (Parajuli et. al. 1998).

1. Considering the strong points of Rabies vaccine production this section should go on Double Track Management System.

2. Tissue culture Rabies vaccine production is to be introduced. This would replace the sheep brain Rabies vaccine in course at time. This would help to overcome to problem of procuring sheep.

3. A separate quality control laboratory is to be established to perform the quality control activities of all biologicals that are produced under new management system.

4. Present revenue rate for 5% phenolised Rabies vaccine is in highly subsidised rate. This rate should be increased at least 4 times. For other vaccines a moderate increment in revenue is to be done. This is required due to increased in price of sheep which is main component in Rabies vaccine production.

**Cost of BPL ARV Production :**

Estimated Cost of Production of 5% BPL Rabies Vaccine for Human use under Double Track System is presented in table 50.

**Table 50 : Estimated Cost of Production of 5% BPL Rabies Vaccine for Human use under Double Track System**

| | |
|---|---|
| Sheep | 63,480.00 |
| Chemicals | 11,220.00 |
| Seed Virus | 300.00 |
| Packing Vials/labels | 18,000.00 |
| Quality Control Tests | 1,000.00 |
| Cost of Manpower/batch | 6,000.00 |
| Cost of Electricity and Water | 6,000.00 |
| Other Misc. | 4,000.00 |
| Total Cost of 60 litre of Vaccine | 1,10,000.00 |
| Actual Cost of 50 ml. vial vaccine | 91.50 |
| Stockist Commision 20% | 18.30 |
| Bonus 10% | 9.15 |
| Profit Margin 25% | 22.87 |
| Maintenance, Depreciation, Exp. vaccine 10% | 9.15 |
| Retail price per vial | 155.00 |
| Net profit per lot of vaccine | 32,080.00 |

*Source : Rabies Control and Public Health Section, Veterinary Complex, Tripureshwor*
[Return per lot - (cost of production + bonus + commision + depriciation] 1,86000 - 1,53,920

**Cost of ARV Production :**

Estimated Cost of Production of 20% and 5% Phonolised Vaccine for Animal use under Double Track System is ptresented in table 51.

**Table 51: Estimated Cost of Production of 20% and 5% Phonolised Vaccine for Animal use under Double Track System**

| | 20% | 5% |
|---|---|---|
| Sheep | 63,480.00 | 63,480.00 |
| Chemicals | 620.00 | 1,000.00 |
| Seed virus | 300.00 | 300.00 |
| Packing / labeling / vials / bottle | 6,000.00 | 4,250.00 |
| Man power / batch | 4,000.00 | 4,000.00 |
| Cost of electricity and water | 6,000.00 | 4,000.00 |
| Other misc. cost | 2,500.00 | 2,500.00 |
| Actual cost of production per batch | 83,200.00 | 89,830.00 |
| Actual cost per vial / bottle | 232.00 | 524.00 |
| Stockist commission 20% | 4.64 | 10.48 |
| Bonus 10% | 2.32 | 5.24 |
| Profit margin 25% | 58.00 | 135.00 |
| Maintenance / depreciation / exp. vaccine 10% | 2.32 | 5.24 |
| Retail price per vial / bottle | 300.00 | 680.00 |
| Net profit per lot of vaccine | 21,460.00 | 7,804.00 |

*Source : Rabies Control and Public Health Section, Veterinary Complex, Tripureshwor*

## 4.4 Animal Rabies Statistics

Number of animal rabies outbreaks, affected, death and vaccinated in Nepal during FY. 1993/94 - 1996/97 is presented in table 52.

**Table 52 : Number of animal rabies outbreaks, affected, death and vaccinated in Nepal during FY. 1993/94 - 1996/97**

| Fiscal Year | Number of | | | | |
|---|---|---|---|---|---|
| | Outbreaks | Cases | Death | % | Vaccination |
| 1993/94 | 104 | 500 | 500 | | 2715 |
| 1994/95 | 142 | 3341 | 180 | | 2035 |
| 1995/96 | 241 | 1504 | 286 | | 2588 |
| 1996/97 | 176 | 1671 | 248 | | 3935 |

*Source : CEU, Contral Veterinary Laboratory and Animal Disease Control Section, Tripureshwor, Katlimandu*

Post exposure vaccination of native domestic animal exposed to Rabies is not recommended because, no significant scientific evidence is available demonstrating its efficacy. (WHO/CDS/VPH/ 94 , 133).

## 4.5 Animal Reservoir for Rabies

In Nepal Animals Reservoir for Rabies are ,dog, cat, jackal, monkey, rodents and others. About 94% of the bite and contact is from dogs (pet, community and stray dogs). The total population of dogs in Nepal is 1849110. The detail human and dog population ratio and region and districts wise dog population is mentioned in seperate section 4.5 of this report.

## 4.6 Dog Population of the Country :

While carrying are dog population consus study it has ben found that there are three types of dogs existing in both urban and rural areas. These are as follows :

1. Pet dog - belonging to individual family, lives inside the house or house compound and most of the time tied or having belt in the neck.

2. Community dog - belonging to a community like temple guthi, boddha stupa, maszit, church, tole, chauk and sometime ethnic group. Such dogs do not belong to any individual family. They are fed by different families and live around that community all the time these population is estimated about 2% more in rural and 10% in urban areas compare to pet dog population.

3. Street or stray dog - such dogs roam around the villages or cities and do not belong to any communities or families. They feed mostly on garbage and left over from houses, hotels, restrurants etc. Their population is estimated 5% more in the villages and 20% more in the urban areas compare to pet dog population.

4. Human : dog population ratio was 10:1 in the villages and 12:1 in urban areas which was found and determined by the survey team. Based on these ratio the dog population has been estimated and calculated on the basis of house hold number and human population of 5 Development regions, 58 Municipalities and 75 Districts in totality.

a) Dog Population Distribution in 5 Development Region

Total dog population in the country is estimated about 1849110 out of which 444676 (25%) in the eastern, 618396 (33%) in the Central, 377068 (20%) in the Western, 241040 (13%) in the Mid-Western and 167930 (9%) in the Far-Western region. The maximum number of the dogs population is 33% in Central region and minimum number 9% is in Far-Western region. The human dog population ratio is 10:1 in totality. The Human and Dog Population Ratio by Five Development Region of Nepal is presented in Table 53 and fig. 6 & 7.

**Table 53 : Human and Dog Population Ratio by Five Development Region of Nepal**

| S.N. | Name of Dev. Region | House Hold | Human Population | Dog Population | Percentage |
|---|---|---|---|---|---|
| 1. | Eastern | 821762 | 4446749 | 444676 | 25 |
| 2. | Central | 1115428 | 6183955 | 618396 | 33 |
| 3. | Western | 690160 | 3770678 | 377068 | 20 |
| 4. | Mid-Western | 415846 | 2410414 | 241040 | 13 |
| 5. | Far-Western | 285525 | 1679301 | 167930 | 9 |
| | Total | 3328721 | 18491097 | 1849110 | 100 |

Fig. 6

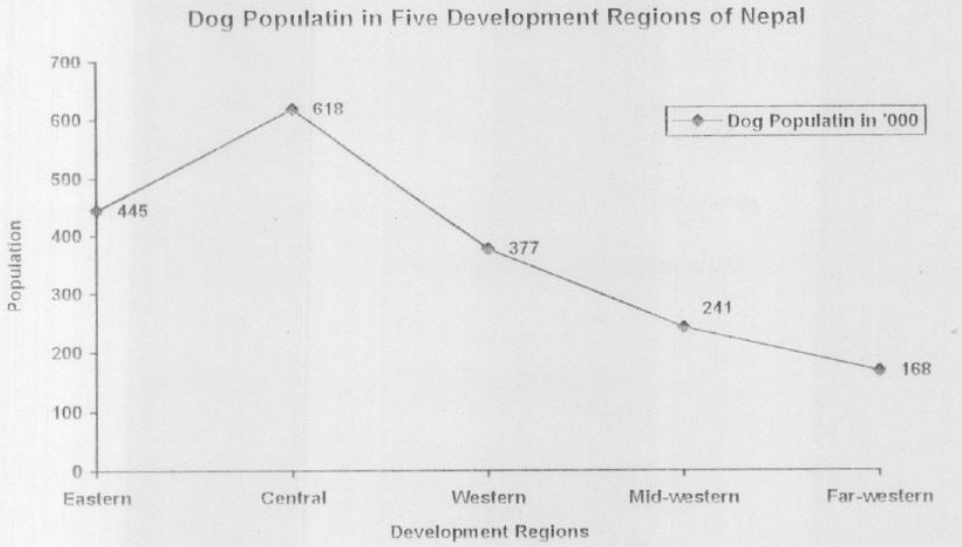
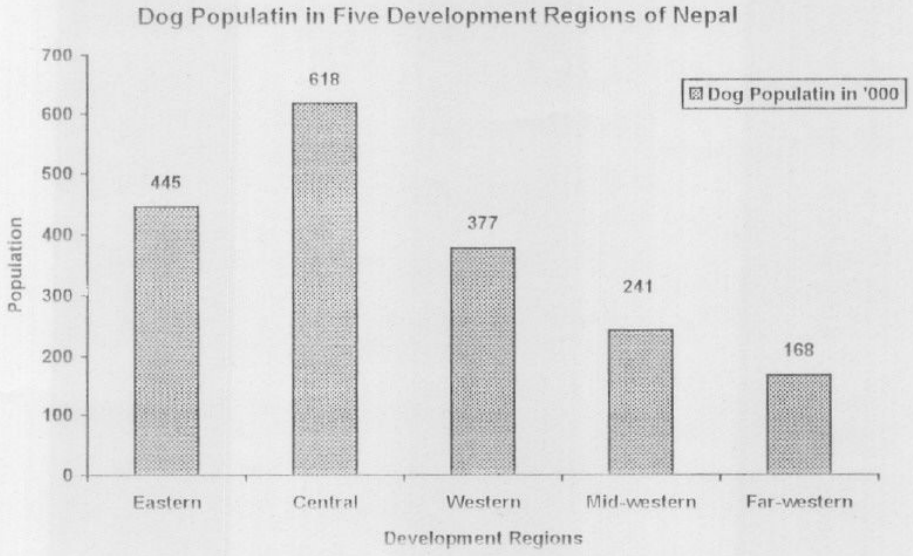

Dog Populatin in Five Development Regions of Nepal
Dog Populatin in '000
Population
700
600
500
400
300
200
100
0
445
618
377
241
168
Eastern
Central
Western
Mid-western
Far-western
Development Regions

Fig. 7


Dog Populatin in Five Development Regions of Nepal
Dog Populatin in '000
Population
700
600
500
400
300
200
100
0
445
618
377
241
168
Eastern
Central
Western
Mid-western
Far-western
Development Regions

b) Dog Population Distribution in 58 Municipalities

Survey team visited all the 58 municipalities and surveyed with 114 dog owners and house holds about the human dog population distribution in the cities (municipalities). Based on this survey the human dog population ratio was 12:1. The dog population distribution in 58 municipalities are presented in Table 54. Out of 58 municipalities the highest number is 35105 in Kathmandu municipality and the lowest dog population number is 818 in Dhulikhel municipality.

**Table 54 : Dog Population Distribution in 58 Municipalities**

| S. N. | Name of the Municipality | District | Ward No. | House Hold | Human Population | Dog Population |
|---|---|---|---|---|---|---|
| 1 | Ilam | Ilam | 9 | 2718 | 13197 | 1100 |
| 2 | Bhadrapur | Jhapa | 15 | 2860 | 15210 | 1268 |
| 3 | Damak | Jhapa | 19 | 7644 | 41321 | 3443 |
| 4 | Biratnagar | Morang | 22 | 24043 | 129388 | 10782 |
| 5 | Dharan | Sunsari | 19 | 12549 | 66457 | 5538 |
| 6 | Inaruwa | Sunsari | 10 | 3382 | 18547 | 1546 |
| 7 | Dhankutta | Dhankutta | 9 | 3637 | 17073 | 1423 |
| 8 | Rajbiraj | Saptari | 10 | 4382 | 24227 | 2019 |
| 9 | Lahan | Siraha | 10 | 3622 | 19018 | 1585 |
| 10 | Janakpur | Dhanusha | 16 | 9668 | 54710 | 4559 |
| 11 | Jaleshwor | Mahottari | 13 | 2945 | 18088 | 1507 |
| 12 | Malangwa | Sarlahi | 10 | 2403 | 14182 | 1182 |
| 13 | Banepa | Kabhre | 11 | 1956 | 12537 | 1045 |
| 14 | Dhulikhel | Kabhre | 9 | 1624 | 9812 | 818 |
| 15 | Lalitpur | Lalitpur | 22 | 20630 | 115865 | 9655 |
| 16 | Bhaktapur | Bhaktapur | 17 | 9187 | 61405 | 5117 |
| 17 | Kathmandu | Kathmandu | 35 | 81139 | 421258 | 35105 |
| 18 | Bidur | Nuwakot | 11 | 3736 | 18694 | 1558 |
| 19 | Hetauda | Makwanpur | 11 | 10420 | 53836 | 4486 |
| 20 | Kalaya | Bara | 14 | 3010 | 18498 | 1542 |
| 21 | Birgunj | Parsa | 19 | 11084 | 69005 | 5750 |
| 22 | Bharatpur | Chitwan | 14 | 10918 | 54470 | 4539 |
| 23 | Pokhara | Kaski | 18 | 20273 | 95286 | 7941 |
| 24 | Tansen | Palpa | 15 | 2699 | 13599 | 1133 |
| 25 | Butwal | Rupandehi | 15 | 9195 | 44272 | 3689 |
| 26 | Siddharthanagar | Rupandehi | 13 | 6870 | 39473 | 3289 |
| 27 | Kapilbastu | Kapilbastu | 14 | 3063 | 17126 | 1427 |
| 28 | Tribhuvan Nagar | Dang | 11 | 5235 | 29050 | 2421 |
| 29 | Nepalgunj | Banke | 17 | 8232 | 47819 | 3985 |
| 30 | Birendranagar | Surkhet | 12 | 4773 | 22973 | 1914 |
| 31 | Dipayal / Silgadi | Doti | 14 | 2330 | 12360 | 1030 |
| 32 | Dhangadi | Kailali | 14 | 7240 | 44753 | 3729 |
| 33 | Mahendranagar | Kanchanpur | 19 | 9875 | 62050 | 5171 |
| 34 | Gaur | Rautahat | 13 | 3498 | 20434 | 1703 |
| 35 | Byash | Tanahu | 11 | 3708 | 20124 | 1677 |
| 36 | Tulsipur | Dang | 11 | 4168 | 22654 | 1888 |
| 37 | Mechinagar | Jhapa | 13 | | 37108 | 3092 |
| 38 | Khadbari | Shankhuwasaba | 13 | | 18756 | 1563 |
| 39 | Itahari | Sunsari | 9 | | 18547 | 1546 |
| 40 | Triyuga | Udayapur | 17 | | 37512 | 3126 |
| 41 | Siraha | Siraha | 9 | | 21866 | 1822 |
| 42 | Bhimeshwor | Dolakha | 13 | | 19261 | 1605 |
| 43 | Kamalamai | Sindhuli | 18 | | 24368 | 2031 |
| 44 | Ratnanagar | Chitwan | 13 | | 25118 | 2093 |
| 45 | Panauti | Kabhre | 13 | | 20467 | 1706 |
| 46 | Madhyapur-Thimi | Bhaktapur | 17 | | 31970 | 2664 |
| 47 | Kirtipur | Kathmandu | 19 | | 31338 | 2612 |
| 48 | Prithivinarayan | Gorkha | 11 | | 20633 | 1719 |
| 49 | Lekhnath | Kaski | 15 | | 30107 | 2504 |
| 50 | Putalibazar | Shyangja | 13 | | 25870 | 2156 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 51 | Baglung | Baglung | 11 | | 15218 | 1018 |
| 52 | Waling | Shyangja | 11 | | 16712 | 1393 |
| 53 | Ramgram | Nawalparasi | 13 | | 18911 | 1576 |
| 54 | Narayan | Dailekh | 9 | | 15738 | 1312 |
| 55 | Gulariya | Bardiya | 14 | | 30631 | 2553 |
| 56 | Tikapur | Kailali | 9 | | 25639 | 2137 |
| 57 | Amargadi | Dadeldhura | 11 | | 16454 | 1371 |
| 58 | Dashrathchand | Baitadi | 13 | | 18054 | 1505 |

*NB : Human : Dog Population Ratio is 12:1 in Municipality areas.*

c) Dog Population Distribution in 75 Districts

The survey team visited 154 villages of the rural areas to find out the human dog population ratio by interviwing 154 dog owners. On the basis of this survey findings the human dog population ratio was 10:1 and accordingly the dog population by 75 districts were calculated and present in Table 55. While interviwing 154 dog owners they were from hills and terai district of 5 development regions. Regarding the dog population ratio with human population up in the alpine districts was based on the survey findings carried out during yak population disease surveillance survey in 1996 and 1997.

**Table 55 : Dog Population Distribution in 75 Districts of Nepal**

| S.N. | Name of the Districts | House Hold | Human Population | Dog Population |
|---|---|---|---|---|
| 1 | Achham | 38934 | 198188 | 19819 |
| 2 | Arghakhanchi | 34511 | 180884 | 18088 |
| 3 | Baglung | 44371 | 232486 | 23249 |
| 4 | Baitadi | 35300 | 200716 | 20072 |
| 5 | Bajhang | 25090 | 139092 | 13909 |
| 6 | Bajura | 17542 | 92010 | 9201 |
| 7 | Banke | 49083 | 285604 | 28560 |
| 8 | Bara | 68952 | 415718 | 41572 |
| 9 | Bardiya | 41298 | 290313 | 29031 |
| 10 | Bhaktapur | 28160 | 172952 | 17295 |
| 11 | Bhojpur | 37058 | 198784 | 19878 |
| 12 | Chitwan | 65147 | 354488 | 35449 |
| 13 | Dadeldhura | 18501 | 104647 | 10465 |
| 14 | Dailekh | 33922 | 187400 | 18740 |
| 15 | Dang | 56099 | 354413 | 35441 |
| 16 | Darchula | 17617 | 101683 | 10168 |
| 17 | Dhading | 51273 | 278068 | 27807 |
| 18 | Dhankuta | 27425 | 146385 | 14639 |
| 19 | Dhanusa | 98358 | 543672 | 54367 |
| 20 | Dolakha | 35862 | 173236 | 17324 |
| 21 | Dolpa | 4968 | 25013 | 2501 |
| 22 | Doti | 31557 | 167168 | 16717 |
| 23 | Gorkha | 49311 | 252524 | 25252 |
| 24 | Gulmi | 50544 | 266331 | 26633 |
| 25 | Humla | 6160 | 34383 | 3438 |
| 26 | Ilam | 41450 | 229214 | 22921 |
| 27 | Jajarkot | 20837 | 113958 | 11396 |
| 28 | Jhapa | 110894 | 593737 | 59374 |
| 29 | Jumla | 13547 | 75964 | 7596 |
| 30 | Kailali | 60928 | 417891 | 41789 |
| 31 | Kalikot | 16041 | 88805 | 8881 |
| 32 | Kanchanpur | 40056 | 257906 | 25791 |
| 33 | Kapilbastu | 60948 | 371778 | 37178 |
| 34 | Kaski | 60403 | 292945 | 29295 |
| 35 | Kathmandu | 127196 | 675341 | 67534 |
| 36 | Kavrepalanchok | 56633 | 324329 | 32433 |
| 37 | Khotang | 40183 | 215965 | 21597 |
| 38 | Lalitpur | 45682 | 257086 | 25709 |
| 39 | Lamjung | 30559 | 153697 | 15370 |
| 40 | Mahottari | 79640 | 440146 | 44015 |
| 41 | Makwanpur | 56091 | 314599 | 31460 |

| | | | | |
|---|---|---|---|---|
| 42 | Manang | 1272 | 5363 | 536 |
| 43 | Morang | 126557 | 674823 | 67482 |
| 44 | Mugu | 6837 | 36364 | 3636 |
| 45 | Mustang | 3209 | 14292 | 1429 |
| 46 | Myagdi | 20696 | 100552 | 10055 |
| 47 | Nawalparasi | 72565 | 436217 | 43622 |
| 48 | Nuwakot | 45657 | 245260 | 24526 |
| 49 | Okhaldhunga | 26362 | 139457 | 13946 |
| 50 | Palpa | 41846 | 236313 | 23631 |
| 51 | Panchthar | 31452 | 175206 | 17521 |
| 52 | Parbat | 27973 | 143547 | 14355 |
| 53 | Parsa | 60630 | 372524 | 37252 |
| 54 | Pyuthan | 33323 | 175469 | 17547 |
| 55 | Ramechhap | 34766 | 188064 | 18806 |
| 56 | Rasuwa | 7195 | 36744 | 3674 |
| 57 | Rautahat | 76219 | 414005 | 41401 |
| 58 | Rolpa | 33070 | 179621 | 17962 |
| 59 | Rukum | 29290 | 155554 | 15555 |
| 60 | Rupandehi | 86650 | 522150 | 52215 |
| 61 | Salyan | 31650 | 181785 | 18178 |
| 62 | Sankhuwasabha | 26902 | 141903 | 14190 |
| 63 | Saptari | 85720 | 465668 | 46567 |
| 64 | Sarlahi | 88141 | 492798 | 49280 |
| 65 | Sindhuli | 38535 | 223900 | 22390 |
| 66 | Sindhupalchok | 51291 | 261025 | 26103 |
| 67 | Siraha | 83716 | 460746 | 46075 |
| 68 | Solukhumbu | 19232 | 97200 | 9720 |
| 69 | Sunsari | 84492 | 463481 | 46348 |
| 70 | Surkhet | 39721 | 225768 | 22577 |
| 71 | Syangja | 55497 | 293526 | 29353 |
| 72 | Tanahu | 49805 | 268073 | 26807 |
| 73 | Taplejung | 21370 | 120053 | 12000 |
| 74 | Terhathum | 18379 | 102870 | 10287 |
| 75 | Udayapur | 40570 | 221256 | 22126 |
| | Total | 3328721 | 18491096 | 1849106 |

*NB : Human : Dog Population Ratio is 10:1 in Districts of the Country.*

## 5. Strategies for Rabies Control Programme in Nepal

It is Necessary and most urgent to take actions by His Majesty's Government of Nepal and concerned institutions to implement all the RECOMMENDATIONS Made And Proposed By The FIRST NATIONAL SEMINAR ON RABIES, which was held on 17-22 November, 1985, Kathmandu.

A. H.M.G. Policy in Rabies Control Programme.

1. Existing Policy:

Human and Canine Rabies Control Project, a national document has been prepared by Ministry of Health and Ministry of Agriculture but so far no clear cut policy has been taken by the government regarding the prevention and control of Rabies.

Suggestions: Policy should be to keep rabies out. To implement this policy the following organizations are necessary.

a. National Coordinating Committee (NCC): As mentioned in national document: National Coordinating Committee is a multi-sectoral body responsible for policy and decision making concerning Rabies Control Activities.

b. Chief Programme Executor (CPE): Chief, Zoonotic Disease and Rabies Control Project, Department of Health, Ministry of Health and CPE will be the main responsible person to implement Rabies Control Programme in all development regions of the country.

c. Programme Coordinator: Chief, Rabies Control Project of the Department of Livestock Development and Animal Health, Ministry of Agriculture.

d. National Executive Committee: As mentioned in National Document.

e. Regional Coordinating Committee: As mentioned in the National Document.

f. District Coordinating Committee: As mentioned in National Document.

g. Field Coordinator: Veterinary Officer of that district.

2. Legislation Required to Implement the Programme:

The infectious disease animal act 1984; which provides power to veterinary officers to control infectious disease. In addition to this the following legislation are required to be successful.

a. Compulsory vaccination of all pet dogs.
b. Compulsory wearing of rabies vaccinated tag for identification.
c. Compulsory vaccination of imported dogs.
d. Registration of dogs and its renewal every 2nd. year.
e. Periodical elimination of stray dogs.
f. Quarantine of imported dog for sufficient length of time.

3. Allocation of Responsibilities:

Rabies is a community problem. To be successful it requires support and cooperation from all the sectors. Clear understanding between Ministry of Health, Ministry of Agriculture and Ministry of Panchayat and Local Development is needed.

I. Responsibilities of Department of Health.

a. To execute the Rabies Control Programme in the country.
b. Diagnosis of Human Rabies Cases.
c. Post exposure treatment, to check the antibody titre of the exposed individual.
d. Surveillance of rabies.
e. Administration of pre-exposure vaccinated all people working at risk area.
f. Health education.
g. Checking of antibody titre among the vaccinated human and canine population.
h. Reporting of Human and animal rabid cases to the NPD.
i. Monitoring and Evaluation of the programme.

II. RESPONSIBLE DEPARTMENT OF L.D. AND A.H.

a. Vaccination of pots
b. Diagnosis
c. Vaccine production
d. Checking of antibody litre among the vaccinated pots.
e. Surveillance of animal rabies.
f. Development of oral vaccine for wild animals
g. Publicity and mass communication through extension programme.
h. To assist the CPE and Town Panchayat in clomonation of dogs.

III. TOWN PANCHAYAT OR VILLAGE PANCHAYAT

a. Periodical Elimination of stray dogs.
b. Registration of dogs vaccinated.
c. Assist to CPE in Rabies control activities.
d. Assist in Elimination of dogs.

IV. HOME MINISTRY 1. Police implication

2. Penalties for the offenders.

4. Prevention and Control Strategies.

a. To have legislative support
b. Provide potent ARV and ARS
c. Vaccination of dogs (80%)
d. Elimination of stray dogs
e. Public awareness and Health Education
f. Establish surveillance system.
g. Establish diagnostic facilities and post exposure treatment in human.
h. Control of immigration of dogs.
i. Monitoring and evaluation of on going programme.
j. Maintenance and follow up activities.

5. Objectives and Work Plan.

Same as in National document.

6. Publicity:

The following mass communicating media will be utilized to increase the public awareness.

a. Development of posters
b. Distribution of pamlets
c. Exhibition of slides, video, films, programme in TV.
d. Radio messages
e. Press releases
f. Speech and talks

7. Conclusions;

Rabies is still a public health hazard, therefore every attempt should be made by Zoonoses disease and Rabies Control Project of DHS/MOH/HMG to keep this disease out inspite of serious cultural stigmas existing in our society. As it is community problem, no control programme of this kind can be successful without full cooperation from multi-sectorial agencies and local people.

B. Health Education and Rabies Control

Health education has been considered as an important component of any health programme and it is more vital for the control of the dreadful disease like rabies which affects both men and animals. Through proper planning and effective implementation, health education can inform and motivate the individuals the familiar and the community members to take decisions and actions for overcoming the problem of rabies.

1. There should be semi-autonomous and strong rabies control project strengthening the existing project or by creating a new on which should be represented by specialists from the Department of health Services and the Department of Livestock Development and Animal health to deal with all aspects of Rabies Control in Human and Animals.

2. Before making the public aware of the need of having anti-rabies vaccine, the vaccine should be produced in sufficient quantity and supplied to all the health and veterinary institutions.

3. Training :

a) The existing training programmes of both the Ministries i.e. the ministry of Agriculture and the Ministry of health should include specific component on Rabies.

b) As and where feasible, both the Ministries should jointly conduct specific and uniform training programme on rabies to all levels of their workers as well as to the public, specially the dog owners, community leaders, panchayat workers, etc.

c) Regular refresher training courses should be organized in order to impart the latest technical knowledge to all categories of human and animal health workers as well as to the public.

d) Training abroad should be provided along with observation tours of high officials.

e) Training provision should be made for tissue oulture vaccine production.

4. Formation of Core Group :

A case group comprising the specialists from human health, animal health and health education, should be formed for developing and implementing the detailed programme on rabies education including the development of training guides for the training of different levels of human and animal health workers.

5. Frequent workshops on Rabies should be organized.

6. Monitoring and evaluation of the total rabies cotrol programme would be regularly carried out.

7. Assistance from the interested National and International agencies such as, RONAST, UNDP, etc. as well as from Town and Village Panchayates should be sought for Rabies control Programme.

C. Epidemiological Surveillance System on Rabies Control

a) The group realised the existing surveillance system regarding rabies should be developed and strengthened in a integrate form between MOH, DHS, MOA, DL/DAM to a common format.

b) The following are integrated types of different kinds of regarding and reporting formats could be developed to use in all levels of Health/Veterinary.

c) a. Clinical Registrations for recording the post exposure treatment (Annex from No. 44) with OPD/ID cards.

b. Register for report case recording for ARV Post exposure Annex- B

c. Reporting system form the grass root levels to control level of Health/Veterinary e.g. health Post - DHD/Dist - Regional Central. In centre MOH/MOA Reporting forms should be prepared in two copies by each reporting centers of each level.

d. MOH Department of Health Services Zoonotic Disease Control Section should be as a Focal Point.

e. Zoonotic Disease Control Section should be given prime responsible for the collection compilation coding and tabulation of regular records and reports of rabies.

D. Rabies vaccine production and diagnosis.

Vaccine Production

- The rabies laboratory at Tripureswor should start the manufacture of sheep brain BPL vaccine and the quality of the vaccine should be improved by making that vaccine from suckling animal brain, till this vaccine is replaced by tissue oulture vaccine.

- For the production of Tissue culture vaccine in future measures should be taken immediately to develop manpower and infrastructure.

- The manufacture of wide range flury vaccine for preexposure immunization of animals should be started as soon as possible.

Procurement of vaccine and serum

- Procurement of BPL sheep brain vaccine from India should be continued till the country becomes self sufficient and study of equivalent other type of safer and highly patent vaccine should be made.

Vaccination

- For all the staffs working in rabies laboratory and rabies clinics, Human diploid cell culture vaccine for prophylaxis should be made available to prevent the risk of exposure.

- Strict guide lines should be given to all human post exposure treatment centers.

- To reduce the large bulk use of vaccine for animal treatment, efforts should be made to pass by laws of infectious disease act to kill all the animals particularly dogs if bitten by suspected rabid dog.

Diagnosis

- Rabies diagnostic laboratory at Tripureswor should be strengthened with sufficient man power and facilities needed for it.

- In all the 5 regions a small lab. Should be established to collect and dispatch rabies sample to control laboratory. Facilities for Nogribody test should be developed in each such lab.

Incentives

- At present the working staff are scared and are reluctant to work on rabies vaccine production and diagnosis as they have to work with the rabid brain thus they should be provided with some incentives to achieve the goal otherwise the situation may remain the same.

E. Research on Rabies

Health System Research on Rabies

SurveyShould be carried out to know :

i. The incidence of rabies in the different community and to declare the highest and lowest sensitive place.

ii. Awareness about rabies at household level.

- How many families own the dog and maintain properly and vaccinate regular.

- What kind of more information they need.

- Percentage of families keeping dogs for what purposes.

iii. The awareness about the diseases of leaders of different Government and Non-Government organizations person to be consulted are :

- local leader
- Members of district panchayats
- Town Panchayat leaders
- Social Clubs and etc.

iv. Patients records :

- If a person of animal gets infection what kind of action usually they take first.
- How quickly and carefully or when.
- If a patient dies with the disease, how they dispose it.
- What short of more information they need.

A research should be carried out on :

- Traditional methods of treatments
- Homeopathic therapy
- Ayurbedic methods - to find out the effectiveness of their treatment in rabies control.

Operational Research :

i) A study should be made for how the mass vaccination of dogs could be implemented effectively in present methods are able to implement most or some new method.

ii) Immunological study of dogs and patens should be made to insure effective use of vaccine.

iii. A study should be made for public awareness and then community participation.

iv. Inspect of dog control in regards to rabies control in human and animal should be analysed.

Dog Ecology

i. Population census of dogs and ratio of households to dog should be calculated.

ii. Growth rate, habitat and migrational system should be found out.

iii. Disease prevalence.

iv. Elimination of unvaccinated dog (by using most safest poison or other suitable methods.)

v. Populations of dog should be controlled by permanent sterilization or by using some suitable family planning devices.

Search for Funds

The expected sources for funds are :

1. International level WHO/UNDP/FAO
2. National Level RONAST/NMRC/NEST
3. Other bilateral agencies like USAID, SATA, IDRC etc.

The funds should be available for :

i. Man power development
ii. Physical facilities
iii. Other research activities.

- There should be a research as to identify the strain of the virus of the Neplease rabies virus by the monoclonal antibodies method.

- There must be checking of the efficacy of the vaccine of dogs with a Nepalese vaccine by antibody titration.

- A study should be performed to find out the cheapest and best vaccine for Nepalese conditions.

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