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SOCIO-ECONOMIC SURVEY STUDY OF THE HUMAN PATIENTS BITTEN BY SUSPECTED RABID ANIMALS

D.D. Joshi

Director, National Zoonoses & Food Hygiene
Research Centre (NZFHRC)

&

Minu Sharma

Sociologist & Programme Officer NZFHRC

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Tel : 270667, Fax : 272694

Email: dd_joshi@npl.healthnet.org

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

Preface & Acknowledgement

Nepali Month Conversion Table

Rabies is a highly fatal viral infection of the central nervous system, occurring in humans and most warm-blooded animals. It is transmitted through the bites of infected animals and causes agonizing symptoms in man and animals prior to death. Although little information exists regarding rabies throughout the territory, it can be inferred that no district is disease free. In regions where laboratory diagnosis of rabies is carried out, the number of cases in animals is increasing. No epidemiological surveillance system has been developed in the country officially (except for a number of humans taking in Kathmandu and in few districts by this NZFHCC). No data are available regarding the number of deaths due to (confirmed clinically) rabies in animals/man, pre-exposure and post-exposure immunization in animals, stray dogs elimination, etc. The objective of the study were :

- 1) To study the socio-economical aspects of the patients bitten by suspected rabid animals.
- 2) To analyse the cost on the post-exposure treatment along with types of anti-rabies vaccine used and its availability.
- 3) To study the dog population ratio to human population in the country.
- 4) To develop the Strategies for Rabies Control Programme in Nepal

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.

Since 94% of the suspected rabid animal bite to human is from dogs (pet dogs, community dogs and street dogs). 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.

I am most grateful to the Medical Superintendents of different hospitals mainly of terai areas, Director of the Epidemiology Division, Department of Health Services, all the 565 patients 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 Ms. Minu Sharma, Mr. S.P. Bhandary and Mr. Narayan Karki for their wounderful work during survey as well as report witting.

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 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

SOCIO-ECONOMIC SURVEY STUDY OF THE HUMAN PATIENTS BITTEN BY SUSPECTED RABID ANIMALS

Summary

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}. 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.

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}.

SOCIO-ECONOMIC SURVEY STUDY OF THE HUMAN PATIENTS BITTEN BY SUSPECTED RABID ANIMALS

1. Background

1.1 Background Information on Nepal :

Nepal is a land-locked country bordered by China to the north and India to the west, south and east. Its dimensions are roughly 885 km (east to west) by 193 km (mean width) with a total land area of 147,181 km². 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 world's tallest peak, Sagarmatha (Mt. Everest) at 8,848 meters, and 8 of the world's 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 remains a permanent threat to human populations in many parts of the world. Each year more than 30,000 deaths from rabies are reported and 4 million people require post-exposure treatment in over 80 countries where the disease is present in its most dangerous reservoir, the dog. Most of these deaths occur in parts of Africa, Asia and South America; however, rabies represents an economic burden for both developed and developing countries because of the costs of human post-exposure treatment, diagnosis and surveillance, immunization of domestic animals, and control of wild animal populations. Rabies also restricts the international transfer of animals, especially pets, which in turn affects trade^{29,30,31,32}. Rabies is widespread throughout Nepal. It accounts for more than 150 - 200 human deaths per year and is responsible for 30,000 persons seeking post-exposure rabies treatment. The exact magnitude of economic losses incurred due to the loss of precious livestock is not known. The dog appears to be the main reservoir of infection. The estimated dog population is 2.2 million^{1,2,12,18,19,20} of which 30 per cent are pet and the rest stray/community dogs. In the Himalayan region and mid-hilly areas, the ratio of human to dog is 10:1 whereas in the Terai, it is 10:7. This would be a very rough estimate. More dog ecological studies are necessary to find out the exact ratios in the other regions.

2. Objectives :

- 1) To study the socio-economical aspects of the patients bitten by suspected rabid animals.
- 2) To analyse the cost on the post-exposure treatment along with types of anti-rabies vaccine used and its availability.
- 3) To study the dog population ratio to human population in the country.
- 4) To develop the Strategies for Rabies Control Programme in Nepal

3. Methodology :

3.1 Socio-Economical Survey Study :

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 (see annex 1).

3.2 Dog Population Survey :

Since 94% of the suspected rabid animal bite to human is from dogs (pet dogs, community dogs and street dogs). 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.

3.3 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. These strategies are still valued to be implemented by the government for rabies control in Nepal both in human and animal population^{6,8,9}.

4. Findings :

4.1 Socio-economic Survey Study Results of the Human Patients Bitten by Suspected Rabid Animals :

4.1.1 Areawise

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. Areawise Total Patients Interviewed During Survey by the team is presented in Table 1. Out of 565 patients interviewed 318 which is 56% were in Teku Infection Disease Hospital, Rabid Treatment Centre, Kathmandu. It has been observed that there are many cases from India also visit to the different rabies clinics in Nepal.

Table 1 : Areawise Total Patients Interviewed During Survey

S.N.	Addresses	Total Cases	%
1.	Kathmandu	318	56.3
2.	Lalitpur	80	14.0
3.	Bhaktapur	31	5.3
4.	Dhading	21	3.6
5.	Kavre	24	4.3
6.	Sindhupalchowk	9	1.6
7.	Makwanpur	2	0.3
8.	Chitwan	2	0.3
9.	Gorkha	2	0.3
10.	Nuwakot	2	0.3
11.	Palpa	2	0.3
12.	Khotang	2	0.3
13.	Bara	11	2.0
14.	Parsa	2	0.3
15.	Rautahat	13	2.3
16.	Sarlahi	11	2.0
17.	Janakpur	7	1.3
18.	Siraha	2	0.3
19.	Sindhuli	5	1.0
20.	Biratnagar	2	0.3
21.	Morang	2	0.3
22.	Kakadvita	2	0.3
23.	India	13	2.3
	Total	565	99.3

4.1.2 Sexwise Distribution :

Age and Sexwise Distribution by Places of 565 Patients Interviewed During Survey is presented in table 2. Out of 565 patients 34% (193) were children and 66% (372) adults. Out of 193 children 31% (60) were male and 69% (133) female children. Out of 372 adult patients 32% (119) were male and 68% (253) adult female. This has indicated that female both in children and adult were more in number than male.

Table 2 : Sexwise Distribution by Places of 565 Patients Interviewed During Survey

Places	Total No.	0 -15 years			15 and above years		
		M	F	Total	M	F	Total
Kathmandu	300	33	79	112	59	129	188
Bhadrapur	25	3	3	6	6	13	19
Biratnagar	25	1	8	9	1	15	16
Rajbiraj	20	2	3	5	5	10	15
Janakpur	30	3	7	10	5	15	20
Birgunj	50	8	12	20	10	20	30
Bharatpur	25	2	3	5	8	12	20
Butwal	25	2	4	6	6	13	19
Nepalgunj	25	1	4	5	8	12	20
Dhangadi	20	4	6	10	4	6	10
Mahendranagar	20	1	4	5	7	8	15
Total = >	565	60	133	193	119	253	372

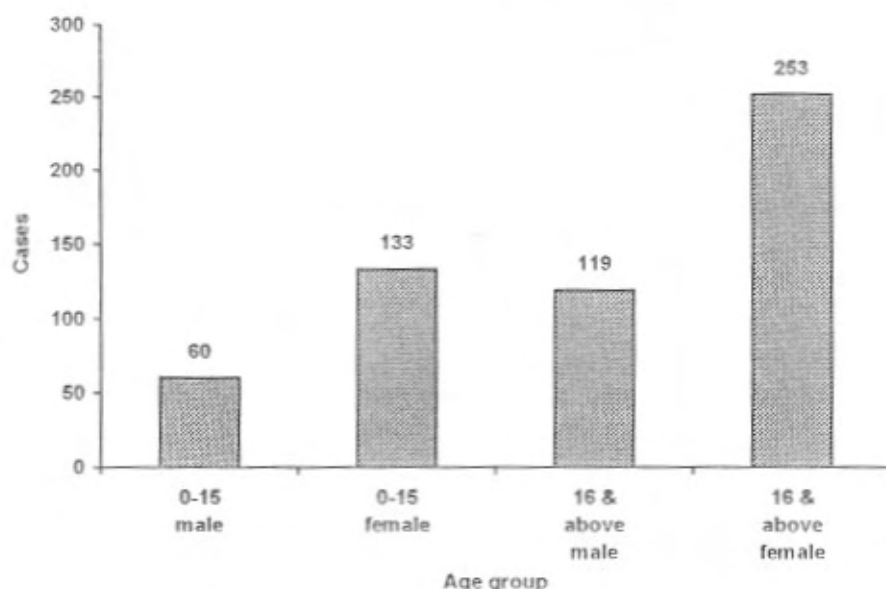
4.1.3 Agewise distribution :

Agewise distribution of 565 Patients Interviewed During Survey is presented in table 3 and fig. 1. Out of 565 patients 45% (253) were 16 & above age group female and 21% (119) of 16 & above age group male, 23% (133) from 0-15 age group female and 11% (60) of 0-15 male age group. In all age group female percentage is higher than male.

Table 3 : Agewise distribution of 565 Patients Interviewed During Survey

Age & Sex	Total Cases	%
0-15 Male	60	11
0-15 Female	133	23
16 & above Male	119	21
16 & above Female	253	45
Grand Total	565	100

Fig. 1
Agewise distribution



4.1.4 Cost of Rabies Vaccine :

Cost of rabies vaccine to 565 Patients Interviewed During Survey is presented in table 4. Out of 3 types of anti-rabies vaccines available in the government hospitals and in private pharmaceuticals in the country, sheep brain BPL anti rabies vaccine is the cheapest then the other two tissue culture vaccines. The cost for total 10 doses of sheep brain BPL vaccine for full course of treatment is only Rs. 50/- where as the other tissue culture vaccine for 5 doses cost Rs. 2,000/- for full course of treatment. It has been observed that about 86% patients have bought and used sheep brain BPL vaccine. This means because of cost involvement and economical status of the people of Nepal, they can afford the cheapest one on the basis of national percapita income.

Table 4 : Cost of Rabies Vaccine to 565 Patients Interviewed During Survey

Type of Vaccine	Total Cases	%	Total Cost	Per person cost
BPL	484	86	24,200	50
Rabipur	51	9	1,02,000	2,000
Verorab	30	5	60,000	2,000
Total = >	565	100	1,86,000	330

4.1.5 Transportation Cost :

Transportation Cost of 565 Patients Interviewed During Survey is presented in table 5. Out of 565 patients surveyed 67% (377) have used public bus transportation to come from there home to the rabies clinic and back. About 17% (97) have come to the clinic on foot. only 1% (6) people came by taxi and 5% (28) by private car, 8% (46) by three wheeler, and 2% (10) by cycle. This again indicates that majority of the people have used public bus which is the cheapest way of transportation and which they can afford to pay.

Table 5 : Transportation Cost of 565 Patients Interviewed During Survey

Type of Transportation	Total Cases	%	Total Cost	Per Person Cost
Public Bus	377	67	1,24,410	330
Taxi	6	1	6,720	1120
Private Car	28	5	20,496	732
Three wheeler	46	8	9,870	210
Cycle	10	2	1,500	150 (indirect)
Onfoot	97	17	14,550	150 (indirect)
Total = >	565	100	1,77,546	314

4.1.6 Daily Wage Cost :

Daily Wage Cost of 565 Patients Interviewed During Survey is presented in table 6. Out of 565 patients 33% (187) were students that means mostly children, 18% (103) service holder, 16% (90) farmers, 9% (52) labour, 8% (45) business people and 16% (88) were unidentified group of people. Based on this types of people on an average cost for daily wages is Rs. 138. This shows that every day atleast for 10 days of the treatment 1 patient loses about Rs. 1,380 total.

Table 6 : Daily Wage Cost of 565 Patients Interviewed During Survey

Type of Wage	Total Cases	%	Total Cost	Per person
Student	187	33	9,350	@ 50 (indirect)
Service	103	18	20,600	@ 200
Farmers	90	16	13,500	@ 150
Labour	52	9	7,800	@ 150
Business	45	8	22,500	@ 500
Others	88	16	4,400	@ 50 (indirect)
Total = >	565	100	78,150	138

4.1.7 Total average cost :

Total average cost per person for the post-exposure treatment against rabies is presented in table 7 and fig. 2 & 3. According to our study results 34% cost is involved in purchasing anti rabies vaccine, 33% transportation cost, 16% other indirect costs like involved like attendance for children patients, 15% wages cost, 1% each syringe and needle and medicine procurement costs.

Table 7 : Total average cost per person for the post-exposure treatment against rabies

S.N.	Particulars	Cost in Rs.	%
1.	Vaccine cost	330	34
2.	Transportation cost	314	33
3.	Wages cost	138	15
4.	Syringe & needle	7	1
5.	Medicine	5	1
6.	Other indirect costs involved like attendance for children patients (193)	154	16
Total = >		948	100

Fig. 2
Cost of Treatment

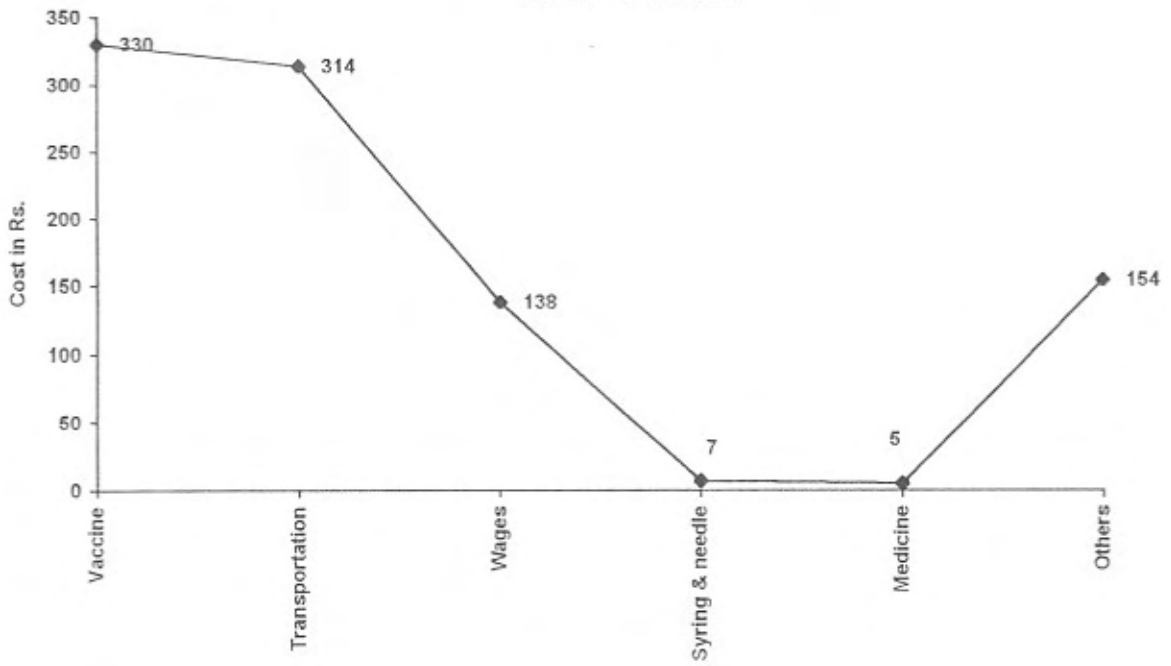
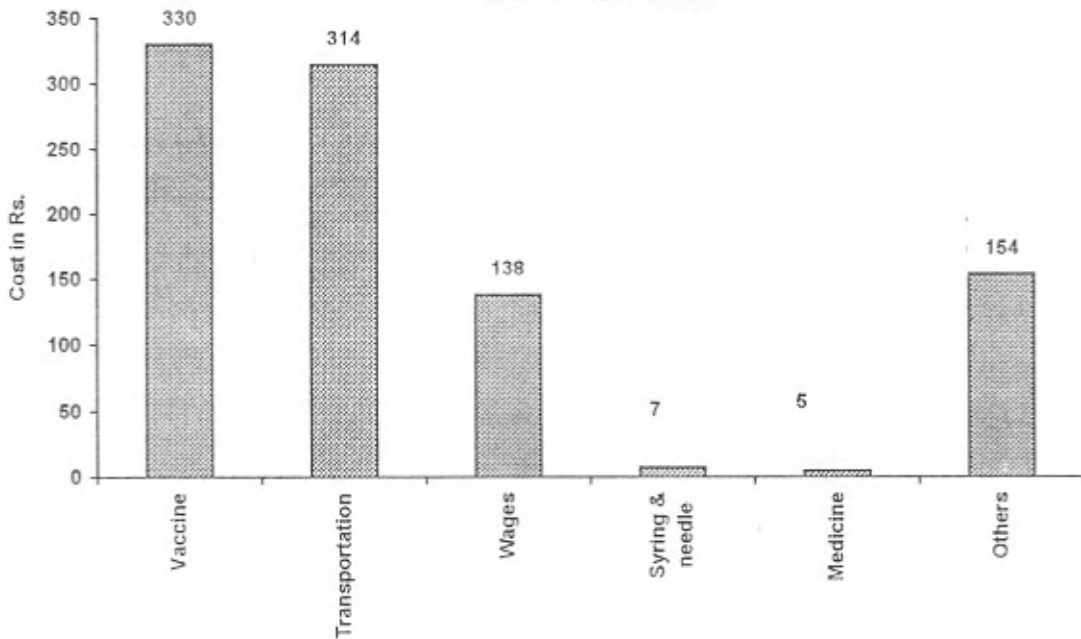


Fig. 3
Cost of Treatment



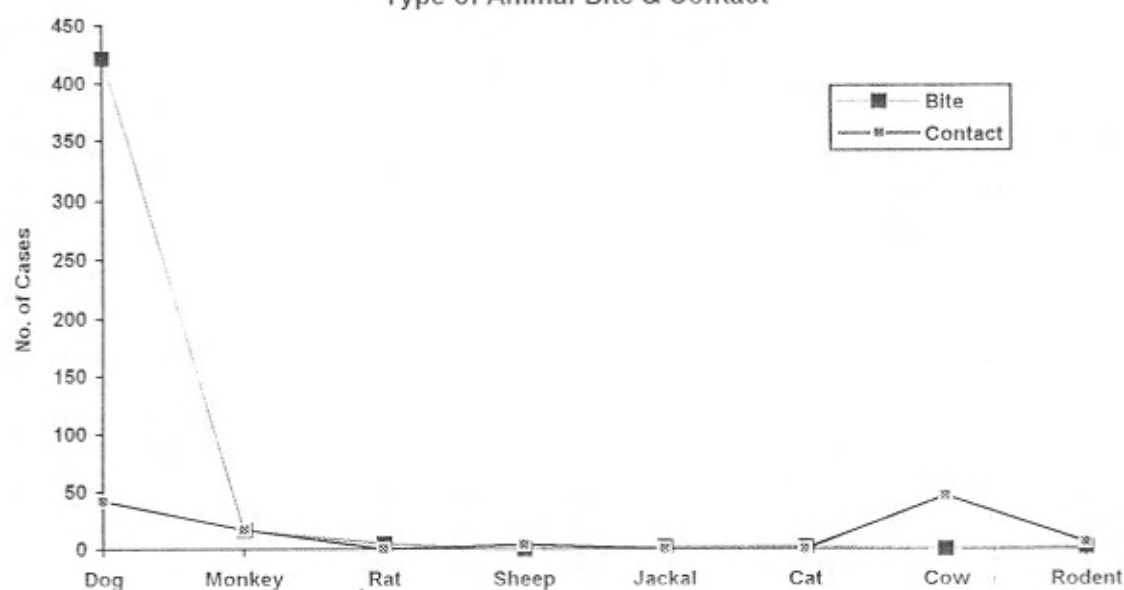
4.1.8 Type of Animal Bite :

Type of Animal Bite of 565 Patients Interviewed During Survey is presented in table 8 and fig. 4. Out of 565 cases 450 were bite cases and 115 were contact cases. Out of 450 bite cases 94% (422) were dog bite cases and out 115 contact cases 36% (42) were again dog contact, but there was 40% (46) contact from the consumption of raw-milk of cow who died later on due to rabies.

Table 8 : Type of Animal Bite of 565 Patients Interviewed During Survey

Type of Animal Bite	Total bite Cases	%	Total Contact Cases	%
Dog	422	93.8	42	36
Monkey	17	3.6	17	15
Rat	5	1.2		
Sheep			4	4
Jackal	2	0.4		
Cat	2	0.4		
Cow			46	40
Rodent	2	0.4	6	5
Total =>	450	100	115	100

Fig. 4
Type of Animal Bite & Contact



4.1.9 Site of Bite :

Site of Bite of 565 Patients Interviewed During Survey is presented in table 9. Out of 565 cases 34% (191) patients were bitten in right leg, 27% (152) left leg, 21% (119) right hand and 12% (66) left hand. This shows majority of the people get bites in hand and legs.

Table 9 : Site of Bite of 565 Patients Interviewed During Survey

Body Site	Total Cases	%
Hand :		
Left hand	66	12
Right hand	119	21
Leg :		
Left leg	152	27
Right leg	191	34

Nose	6	1
Chick :		
Left chick	7	1
Right chick	6	1
Chest	7	1
Back body	11	2
Total = >	565	100

4.1.10 Type of Vaccine

Type of Vaccine Used by 565 Patients Interviewed During Survey is presented in table 10. Out of 565 cases 86% (485) have use BPL - inactivated sheep brain anti rabies vaccine which is produced locally as well as imported from India.

Table 10 : Type of Vaccine Used by 565 Patients Interviewed During Survey

Type of Vaccine	Total Cases	%
BPL - Inactivated sheep brain	485	86
Rabipur	51	9
Verorab	29	5
Total = >	565	100

4.1.11 Transportation used :

Transportation used of 565 Patients Interviewed During Survey is presented in table 11. Out of 565 patients 66% (374) have used bus.

Table 11 : Transportation used of 565 Patients Interviewed During Survey

Type of Transport	Total Cases	%
Bus	374	66
Taxi	6	1
Tempo	50	9
Personal vehicle	28	5
Cycle	10	2
On foot	97	17
Total = >	565	100

4.1.12 Type of Occupation :

Type of Occupation of 565 Patients Interviewed During Survey is presented in table 12. Out of 565 patients 33% (187) were students.

Table 12 : Type of Occupation of 565 Patients Interviewed During Survey

Type of Occupation	Total Cases	%
Student	187	33.0
Service	104	18.3
Farmers	91	16.0
Labour	52	9.3
Business	45	8.0
Others	86	15.4
Total = >	565	100

4.1.13 Patients Belonging to Different Ethnic Group who came for Post-exposure Treatment Against Rabies

Patients with different ethnic groups numbered from 1 to 4 are listed here such as :

Adhikari = 3, Aryal, Adam, Acharya = 4, Ansari, Baniya = 3, Bhandary = 2, Bhushal, Bhujel = 2, Basnet = 4, Banu, Bista, Bhatta, Bhattarai, Bidari, Chaulagai = 2, Chitrakar, Chaudhary = 3, Chapagai, Chhetri = 3, Devkota, Dangal = 4, Dhungel = 2, Dhakal = 2, Darji, Ekwal, Ghimire = 4, Giri = 2, Ghorasaini, Gurung = 2, Gyawali, Humagai, Jaiswal = 2, Joshi = 2, Khatri = 4, Khadki, KC = 2, Kalwar, Kuwar, Kafle, Khatun = 2, Kandel, Karmacharya, Limbu, Lamichhane = 2, Lohari = 3, Mashkey = 3, Majhi = 2, Mandal = 3, Mahato = 3, Mahat, Mainali, Mukhiya, Mangrathi, Nepal = 2, Neaupane = 2, Nagarkoti, Parajuli, Paudel, Panta = 2, Pokhrel, Pathak, Prajapati, Pradhan = 2, Rijal = 3, Rai = 3, Raya, Regmi = 2, Roka, Rangitkar, Sunuwar = 2, Suwal, Shaha = 3, Subedi, Shahu = 2, Singh = 3, Sherpa = 3, Sigdel, Shakya = 3, Sahi = 4, Tripathi = 2, Thakuri, Timalisina, Yadav = 2

Patients who were more than 5 in one ethnic group are tabulated in table 13.

Table 13 : Patients who were more than 5 in one ethnic group are tabulated below

Name of ethnic group	Total patients	%
Ahamad	5	3
Dahal	5	3
Gupta	8	6
Karki	15	11
Khadka	12	8
Khan	7	5
Lama	14	10
Maharjan	22	16
Magar	5	3
Manandhar	5	3
Shrestha	25	18
Sharma	5	3
Thapa	8	6
Tamang	6	4

4.2 Dog population ratio to human population :

While carrying out dog population census study it has been 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, masjid, 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, restaurants 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.

4.2.1 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 14 and fig. 5 & 6.

Table 14 : 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. 5

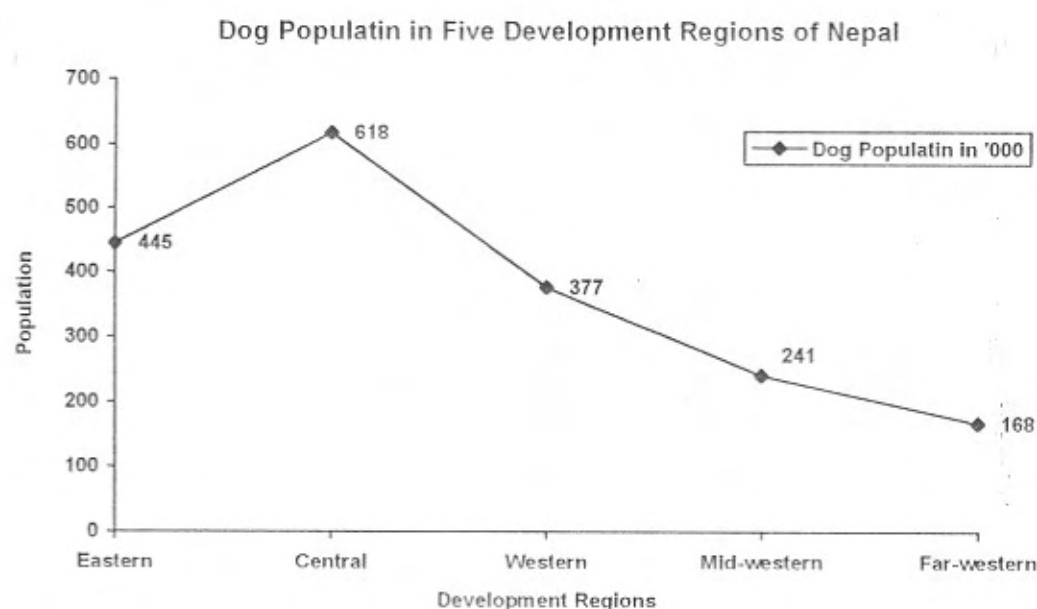
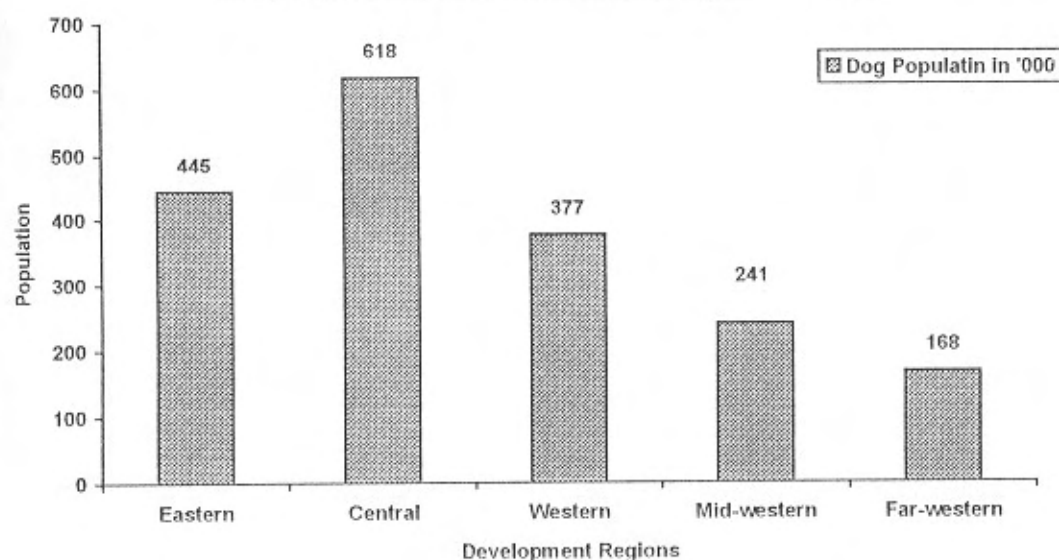


Fig. 6
Dog Populatin in Five Development Regions of Nepal



4.2.2 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 15. Out of 58 municipalities the highest number is 35105 in Kathmandu municipality and the lowest dog population number is 818 in Dhulikhel municipality.

Table 15 : 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	Jaleswor	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	Bhimeshwar	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.

4.2.3 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 interviewing 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 16. While interviewing 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 16 : 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	Darchhula	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.

4.3 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. These strategies are still valued to be implemented by the government for rabies control in Nepal both in human and animal population^{10,11}.

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 established 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, Ministry of Agriculture and CPE will be the main responsible persons to implement Rabies Control Programme in all development regions of the country.
- c. Programme Coordinator: Chief, Rabies Control Project of the Department of Livestock Services, 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 Local Development and some responsible NGOs and INGOs is needed.

3.1 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.

3.2 Responsibilities of the Department of Livestock Services

- a. Vaccination of pets
- b. Diagnosis
- c. Vaccine production
- d. Checking of antibody titre among the vaccinated pets.
- e. Surveillance of animal rabies.
- f. Development of oral vaccine for street dogs and wild animals like jackals
- g. Publicity and mass communication through extension programme.
- h. To assist the CPE and Municipalities in dogs population control.

3.3 Responsibilities of Municipalities and Village Development Committees

- 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.

- 3.4. Responsibilities of Home Ministry
 - 1. Police implication
 - 2. Penalties for the offenders.

3.5 Responsibilities of National Zoonoses & Food Hygiene Research Centre (NZFHRC), Tahachal, Kathmandu, Nepal

- a. Liaison office for rabies control programme in between Ministry of Agriculture and Ministry of Health
- b. Responsible in disease surveillance, monitoring and evaluation of the control programme
- c. Publish zoonoses and food hygiene news and its dissemination
- d. Help to CPE in rabies control programme activities
- e. Assist in vaccination of dogs.

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 pamphlets
- c. Exhibition of slides, video, films, programme in TV.
- d. Radio and television 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/ and Ministry of Agriculture, 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 culture 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 control programme would be regularly carried out.
7. Assistance from the interested National and International agencies such as, RONAIST, UNDP, etc. as well as from Municipalities and Village Development Committees 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 from 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^{21,22,23,24,25,26,27}

Vaccine Production

- The Rabies Control Project and its laboratory at Veterinary Complex, 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 culture 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 Nognibody 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

Survey Should 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
- Ayurvedic 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 Ecology²⁸

- 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 RONA/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 Nepalese 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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