

Evidence of Visceral Leishmaniasis (Kala-azar) in Nepal 1996 - 1997

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Abstract

Visceral leishmaniasis (Indian Kala-azar) first appeared in the Eastern Terai parts of Nepal during 1982. Dhanusha and Siraha districts were mostly affected. The present study reviewed epidemic situation with regards to Kala-azar in all 18 endemic districts of Terai for collection of morbidity and mortality statistics from different hospitals, health posts and health centres during 1996 and 1997. The kala-azar cases were tabulated age and sexwise. It has been found that children are more affected than adults, because the CFR in male child was 13% and 11% compared to female, 8% and 13%, during 1996 and 1997 respectively. Whereas CFR in male adults was 4% and in female only 3%. These cases were seen more from April to August. Kathmandu, the capital city of Nepal, which is non-endemic for Kala-azar, has shown signs of sand flies (*Phlebotomus* spp.). About 100-150 imported cases have been admitted and treated in Infectious Disease Hospital, Teku, Kathmandu during 1996 and 1997. They were infected in endemic districts of Terai before coming to Kathmandu. Sarlahi, Udayapur, Bara, Lahan and Siraha districts recorded 696 cases of Kala-azar with 11% CFR, 1160 cases with 7% CFR and 766 cases with 5% CFR during the year 1995, 1996 and 1997 respectively.

At present Aldehyde screening serology test is practised. A sensitive and specific serologic test for accurate diagnosis of leishmania should be made necessary and also for the detection of amastigotes in stained smears of aspirate from enlarged superficial lymph nodes, bone marrow or enlarged spleen. Leishmaniasis, both cutaneous and visceral, are endemic in the Terai districts. All these Terai districts are bordered with the northern districts of Bihar and West Bengal, India. Presumably, its simultaneous resurgence indicated long standing presence of visceral leishmaniasis (Kala-azar) in these areas and became source of infection to Nepal. It is a vector

borne parasitic disease and the vectors responsible are *Phlebotomus* species. Their population density increases in the month of July to September. At present no insecticide spraying is being practised for reducing vector population and controlling Kala-azar in Nepal. *P. argentipes*, fed on men, dogs, large animals and rodents, is an opportunistic feeder and shows both zoophilic and anthrophilic behaviour.

Keywords: Kala-azar; visceral leishmaniasis; Nepal.

Epidemiological Profile of Leishmaniasis

Leishmaniasis is a vector-borne zoonotic disease caused by parasites of the genus *Leishmania*, a flagellate protozoan related to *Trypanosoma*. The genus is specifically characterised by having two alternate forms of development, ie, "amastigote" form (leishmanial or aflagellate form) that occurs in man and reservoir animals and "promastigote" form (leptomonad or flagellate form) that develop in the invertebrate host, the sandflies. In both the hosts, the reproduction is by binary fission and there is no sign of any sexual cysts. There are three types of leishmaniasis: cutaneous, mucocutaneous and visceral type. Cutaneous type is caused by *Leishmania tropica major* and *L. tropica minor*; mucocutaneous is caused by *Leishmania braziliensis* and *Leishmania mexicana* and Visceral leishmaniasis is caused by *Leishmania donovani*. *Phlebotomus* spp. (sandflies) are responsible for all types of leishmaniasis. Dogs, foxes, jackals, rodents and some other wild animals are responsible reservoirs for all types. Leishmaniasis gives rise to important public health problems in Nepal. It is caused by intracellular, protozoan parasite (genus-*Leishmania*) of mammals or ectothermic vertebrates. The majority of the leishmaniasis are Zoonoses involving wild or domestic mammals (rodents, marsupials, edentates and canines) as the reservoir hosts. There are two forms of leishmaniasis (1) Visceral (Kala-azar) and (2) Cutaneous types. The transmitting vector is the sandfly.

Regarding visceral leishmaniasis, (Kala-azar) which is caused by *Leishmania donovani*, there are number of epidemics or endemic outbreaks which have been reported before the start of Nepal Malaria Eradication campaign (1958 and 1964). As a result of the massive insecticide spraying campaign for malaria eradication, both Kala-azar and cutaneous leishmaniasis almost disappeared.

Visceral leishmaniasis which had almost disappeared with the launching of Malaria Eradication Programme from three countries of the region, namely, Bangladesh, India and Nepal, reappeared in epidemic form in India in 1977. The WHO Expert Committee on Leishmaniasis which met in Geneva from 10-16 November 1982 expressed deep concern about the increasing speed and occurrence of leishmaniasis in the world and cautioned that if kala-azar were left untreated, it would result in high mortality. Migration of the population particularly between India, Nepal and Bangladesh has resulted in the spread of the disease (Joshi et al., 1984, 1985, 1986).

In Nepal, cases of Visceral leishmaniasis (VL) have been reported since 1980. The affected area of Nepal is in the eastern part of the country. Siraha, Dhanusha and Mahottari districts are considered endemic with the disease. Sporadic cases have been reported from other district of the country. Currently no detection system exists in the kingdom and information available is mainly based on hospital reports. However, due to lack of therapy, patients with symptoms of the disease are reluctant to visit hospitals. Therefore the disease is underestimated. The VL cases reported in Nepal were 70 in 1985, 166 in 1986, 127 in 1987, 398 cases in 1988, 500

cases in 1989 and 900 cases in 1990. These reported cases were based on hospital reports. There are more than 10 folds increase of cases in 1990 when compared to 1985/86. There is no active case detection programme in the country. Studies on the vector and serological aspect is very limited in Nepal. In Nepal no study has been done to identify the vector(s) in the heavily infected areas in recent outbreaks. Attempts for vector identification, biology, bionomics and insecticide susceptibility are required to be carried out for effective planning of a disease control. The cost of the drug is beyond the reach of most Nepalese due to long recommended therapy and the unavailability of the drug as well. Additionally, the possibility for drug resistance exists and some patients may need repeated treatment. Second line drug eg, pentamidine isethionate is not manufactured in any country of the region.

In the 1970s, an explosive epidemic of Kala-azar occurred in North Bihar, near the border of Nepal, an area not subjected to insecticide spraying since 1964. Control measures were begun only from 1977. Since then, the disease has spread to adjoining areas in the districts of Nepal such as Dhanusha, Mahottari, Siraha, Saptari, Morang, Jhapa and Ilam districts. During 1981, for the first time, the incidence of disease and recorded cases of Kala-azar have been reported from these district hospitals to the Zoonotic Disease Control Section, Epidemiology and Statistic Division of the Department of Health Services (Joshi 1985). A research proposal was developed in 1983 to conduct a baseline epidemiological study on visceral leishmaniasis in Dhanusha district as a pilot project. This was approved by Nepal Medical Research Committee, Ministry of Health, HMG. This project was supported by UNDP/World Bank/WHO special programme for Research and Training in Tropical Diseases (TDR) (Joshi 1985). Eastern parts of terai are endemic areas and foci of Kala-azar. On occasions, the disease has reached epidemic proportions in Dhanusha, Siraha, Saptari and Morang districts. From the epidemiological study, the morbidity and mortality of Kala-azar cases were reported from 15 different hospitals during the year 1984/85 and aggregate cases and death for the years 1980/81 to 1984/85. Altogether 557 cases were reported and 47 died. This is now an alarming situation for the country and time to take necessary action against this disease. A study was conducted in Morang District, Eastern Nepal, to determine the prevalence and disease spectrum of visceral leishmaniasis. The results showed that out of 183 cases, visceral leishmaniasis occurred in 154 cases in 1988 and out of 85 cases, 60 cases were found to be so in 1989. When the cases were grouped together on the basis of age and sex, there was no significant difference in the positive rate among different age groups or between sexes. In the community the most important factors affecting prevalence of leishmaniasis infection were socio-economic status, living conditions, environmental sanitation and the behaviour and practices of the population (Joshi et. al. 1990). A study conducted in Siraha District showed 83% of infection rate in those below 30 years. The sex ratio between the male and female was 2.2:1. General disability, malnutrition, epidemic of malaria, outbreak of influenza are some of the conditions which make the population more susceptible to the disease. In 1988, there were 177 cases detected after screening 451 individuals who were initially suspected of Kala-azar. There are many imported cases of kala-azar admitted and recorded in Infectious Disease Hospital, Teku, Kanti Children Hospital, Maharajgunj and TU Teaching Hospital, Institute of Medicine, Maharajgunj, Kathmandu (Shrestha 1982, Chand 1989 and Joshi 1995).

Methodology

Epidemiological study on VL outbreaks was carried out in all terai region of Nepal during and after the outbreaks of 1996 & 97. Information and statistic with regard to vector responsible, morbidity and mortality of the cases recorded in different hospitals were collected. Present constraints with their solutions and future activities in the endemic areas were also planned.

Results

Age & sexwise VL kala-azar cases recorded in all terai zonal hospitals of Nepal were collected and tabulated in table I. Case fatality rate is higher in children, 8 to 13% compared to adult male and female which ranged 1 to 5 CFR during 1996 & 97 respectively. This is also shown in fig. 1 and 2.

Table I: Age & Sexwise V.L. (Kala-azar) Cases Recorded in Terai Zonal Hospital of Nepal

<i>Age & Sex</i>	<i>1996</i>			<i>1997</i>		
	<i>Total Cases</i>	<i>Death</i>	<i>CFR</i>	<i>Total Cases</i>	<i>Death</i>	<i>CFR</i>
0 - 15 Male	32	4	13	38	4	11
0 - 15 Female	13	1	8	8	1	13
16 & above Male	75	4	5	48	2	4
16 & above Female	37	1	3	32	1	3
Total = >	157	10	6	126	8	6

Fig. 1: Age & Sexwise VL (Kala-azar) Cases Recorded in Nepal 1996

Fig. 2: Age & Sexwise VL (Kala-azar) Cases Recorded in Nepal 1997

Seasonal Occurance

Monthwise V.L. (Kala-azar) Cases Recorded in all Terai Zonal Hospital of Nepal for the year 1996 & 97 are presented in Table 2 and fig. 3 & 4. It has been observed that the VL cases are recorded throughout the year. However, more cases are recorded during summer and rainy season.

Table II: Monthwise V.L. (Kala-azar) Cases Recorded in Terai Zonal Hospital of Nepal

Month	1996					1997				
	Male	Female	Total	Death	CFR	Male	Female	Total	Death	CFR
Jan	8	5	13	1	8	-	-	-	-	-
Feb	1	1	2	-	-	-	-	-	-	-
March	3	1	4	-	-	-	-	-	-	-
April	17	7	24	2	8	19	13	32	2	6
May	17	7	24	2	8	20	8	28	2	7
June	3	0	3	-	-	12	9	21	1	5
July	8	7	15	1	7	13	4	17	1	6
Aug	11	3	14	1	7	2	8	10	1	10
Sept	12	7	19	1	5	6	3	9	1	11
Oct.	10	6	16	1	6	4	4	8	-	-
Nov.	13	4	17	1	6	0	1	1	-	-
Dec.	4	2	6	-	-	-	-	-	-	-
Total	107	50	157	10	6	76	50	126	8	6

Fig. 3: Monthwise VL (Kala-azar) Cases Recorded in Nepal Year of 1996

Fig. 4: Monthwise VL (Kala-azar) Cases Recorded in Nepal Year of 1997

Animal Reservoir

Cutaneous leishmaniasis has been observed in dogs and in some human cases but not like kala-azar. VL is seen more in human cases transmitted from man to man via vectors. However, no study has been conducted so far in Nepal regarding zoonotic aspects of transmission. Although in other parts of the world beside India dogs, foxes, jackals, rodents and some other wild animals are responsible reservoirs for all types.

Vector Responsible

Sandflies were collected from one endemic area particularly from human and animal dwellings, sheltered places, tree hollows, animal burrows with the help of aspirator tubes. Different types of sandfly species were collected and identified. Mostly *Phelbotomus papatasi*, *P. argentipes* and *P. sergenti* have been recorded and identified.

Present Constraints and Future Activities

- Inadequate epidemiological information on Kala-azar cases, animal reservoirs and entomological information.
- Lack of funds available for detailed epidemiological study.
- Inadequate laboratory facilities both at centre as well as peripheral level.
- Lack of trained manpower.
- Unavailability of specific drug for Kala-azar cases.
- Detailed epidemiological surveillance study should be conducted in close collaboration with Epidemiology Division of The Department of Health and all the medical colleges established in Nepal as early as possible for the result:
- morbidity and mortality figures
- geographical distribution of Kala-azar

- animal reservoir
- entomological study-sandfly collection and identification
- serological surveillance
- others.
- Establish laboratory diagnosis facilities both in the centre as well as periphery at Government and Non-government level.
- National Zoonoses & Food Hygiene Research Centre (NZFHRC), Tahachal, Kathmandu, Nepal must work as a national focal point for Leishmaniasis surveillance, diagnosis, public health awareness and research activities to control the disease in Nepal.
- Chemotherapy research work must be carried out in the country.
- Treatment and case management and drug availability should be made.
- Training of manpower for all types of health personnel involved.

Discussion

At present, the parenterally treatment of Kala-azar includes use of sodium antimony gluconate, pentamidine isethionate and amphotericin B. There is an increase in the incidence due to resistance to pentavalent antimonials groups of drugs. The use of these treatment is limited because of side effects which can be very severe and may cause quite a high level of morbidity and mortality. Therefore, there is an urgent need to develop an orally active drug against leishmaniasis that can be administered without any side effects. Regular epidemiological surveillance in all terai districts is warranted in view of migration of Kala-azar cases from endemic districts coupled with the presence of high vector density, animal reservoirs ambient environmental and ecological factors, susceptible population and absence of regular insecticidal spraying in Nepal by the concerned institutions.

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