Chapter II

Essay

Mobilization of community health workers For early diagnosis and treatment of Leismaniasis in Nepal.

2.1 Introduction :

Leismaniasis (Visceral) is a disease of poorest of the poor. As a disease it more often debilitates than kills and makes people dependent on others. The main issue addressed here is high mortality and morbidness from Leismaniasis (Visceral) in Nepal among a large population affecting particularly children and young adults (ranging from the age of 5 -20 years).

In Nepal, Leismaniasis is also known as Kala-azar and it is a great problem of public health concern. Nepal epidemiological survey (NEHS,1995) showed a very high incidence of disease ranging from 1.5/100,000 population in 1980 to 44.60/100,000 population in 1995 and prevalence of cases were estimated at 9,360 with a high case fatality rate ranging from 0.23% in 1980 to 13.16% in 1995 (EDCD, DHS, 1995). The increas in Case Fatality Rate is because people at risk do not have enough information on transmission of the disease and its serious effects. At the same time, they do not have enough access to Health facilities after being infected with disease and even after accessing to health facilities, in the absence of facilities for diagnosing Leismaniasis at PHC with the result they contact local practitioners are not properly trained for treating Cases, which results in development of complications and death.

There are many alternative solutions for controlling the disease and reducing mortality and morbidity from Leismaniasis, such as contributing factors, a use of impregnated bed-nets, a use of repellents, developing habits of sleeping inside room, keeping cattle/cattlesheds far from living place, increasing case detection, increasing access to health facilities, provision of health education through trained health workers (WHO, 1989). Though Kala-azar looks very simple as a vector borne disease, it is very notorious, and affects the most vulnerable age groups (5-20). If not treated in time, death will occur in 2-3 months in cases of acute infection, within a year in cases of sub-acute infection and in 2-3 years in cases of chronic infection (Mansion/Bahr,1959).

To have a control over disease, it needs commitment on different levels of Health system right from the Center down to the Community level. Besides political commitment, it needs budgetary supports, establishment of laboratory set-up and treatment facilities at the community level along with IEC support to create an awareness among people at risk. But the most important commitment is to promote and provide services to people at the community level for which health workers are found responsible (WHO, 1989). In light of current Leismaniasis situation in the community and integration of Leismaniasis control activities into general health services, it is essential to develop local strategies along with global strategies for Leismaniasis control (Anuual Rep. 1995, DHS, Nepal). As a result of government decision to decentralise responsibilities for planning, implementing, monitoring and review of Leismaniasis program through PHC approach (Alma ATA, 78), CHWs' performances needs to be strengthened for their involvement in the program.

In Nepal, may be because of low socio-economic status, low literacy rate, & little active Community participation and UN-availability of doctors in the Community,

people depend more on health workers for their problem. CHWs are of the people they serve, have influence over them, live with them, work with them, rejoice with them, suffer with them, grieve with them and decide with them. They will be more effective in control of disease, if mobilized with adequate training, provision of remunerations followed by regular supervision, monitoring and evaluation of their performances.

CHWs are effective in the sense that they can affect major changes in mortalities and other indices of Health status and that in communities they can satisfy prominent health care needs which can not be met by other means (WHO, 1989). CHWs visit house to house and their regular interaction with people is important for easily identifying the disease. Since CHWs are government paid staff, it will be easier to mobilize CHWs than the others for promotion and provision of the services in developing countries like Nepal.

This essay points out the facts that providing an access to early diagnosis and treatment is an important strategy for the reduction of mortality and morbidity from Leismaniasis in developing countries. Since mortality and morbidity results from late case detection, poor referral and in adequate treatment, it could have been prevented from timely case detection, timely diagnosis and prompt medical treatment.

It is felt that though community based strategies are needed to reduce death and disabilities from Leismaniasis, they will do little good until the access to medical facilities for population is good. Various approaches for control of Leismaniasis have been discussed, and these are more or less related to each other. Early diagnosis and treatment as one of the suitable approaches consists of three important parts; (1) early detection of cases both by active and passive methods, (2) confirmation of cases by laboratory diagnosis, and followed by prompt and effective treatment, since PHC have

no such facilities, (3) there is a need to mobilize CHWs for improved referral and prompt treatment in time, so as to provide services to the people.

To prevent death and disabilities from Leismaniasis in a country like Nepal, the important thing is in which level of health system, the implementation of program for early diagnosis, and treatment should be focused. From detailed description and existing situation of the problem in Sunsari district of Koshi zone in Nepal, the Primary Health Center is the closest health facility in the community where patients can have access and problems can be tackled, stabilized, and referred. Hence, Primary health center is the strata of health system in which this program should be implemented.

2.2 The Leismaniasis :

2.2.1 Causes of Leismaniasis :

Leismaniasis is a protozoan disease caused by infection with intracellular parasites of the genus Leismania and can be transmitted to man by the being bitten by bite of infected female sand-fly (Phlebotomine). When a female sand fly feeds on blood meal of an infected human, it swallows parasites and becomes infective in 6-9 days (Mansion/Bahr, 1994).

A typical attack of Leismaniasis is characterized by chronic irregular fever, malaise, enlargement of spleen, enlargement of lymph nodes, wasting, weight loss, anaemia and thrombocytopenia, along with blackish pigmentation of face, body and hands, and so is the name Kala-azar (Mansion/ Bahr, 1963).

2.2.2 Effects of Leismaniasis :

The disease Leismaniasis though looks simple but it is very notorious in the sense. It causes many effects which sometimes appear with fatal cosequences. If care not is taken properly, it will result in development of complications like-Pneumonia, Epistaxis, Cerebral haemorrhage, Acute toxaemia,, Nephritis, Myocardial denegeneration with death.

With the disease, Leismaniasis, death occurs within 2-3 months in cases of acute infection, within one year in cases of sub-acute infection, and in 2-3 years in cases of chronic infection.

2.2.3 Epidemiology of Disease :

The concept of how disease is formed is the interaction between agent, host and environment an epidemiological triad. Historically, Leismania Donovani, causing Visceral Leismaniasis, is a rodent parasite(primary foci) which has been adapted to canids and then to man (secondary foci). Throughout most of its geographical distribution, the parasite infects man only as a dead end and maintains itself in wild and domestic candies. In India and Nepal, man is the only host, whereas in Sudan, east Africa extensive inter human transmission takes place under epidemic conditions, and in Italy, sub-clinical infection in man are common. (Manson, Bahr, 1963). There are three causative factors in the epidemiology of Leismaniasis,

1. The reservoir of infection,
2. A suitable vector,
3. A susceptible population

1. The reservoir of infection

The reservoir varies in different areas of the world. In most areas of endemic Leismaniasis, infected man is the most important reservoir. In mediterenean regions, Brazil, central and south American countries and China, infected dogs are the reservoirs of infection. Cases of PkDL (Post Kala-azar Dermal Leismaniasis) represent the inter-epidemic reservoir and pose serious epidemiological problems. Similarly, sub-clinical cases are also sources of the reservoir of infection.

2. A suitable vector

There are many species and sub-species of Leismania, but 4 species are pathogenic to man (1) Leismania donovani-causing V.L, (2) Leismania tropica, causing cutaneous Leismaniasis (oriental sore), (3) Leismania brazilliencis-causing Muco-cut. Leismaniasis (American Leismaniasis), and (4) Leismania mexicana-causing chicklers ulcer.

In Nepal, Leismaniasis is being transmitted by vector Phlebotomus argentipes, which feeds on cattles and man. Man is the only reservoir for disease. The females are hematophagus.

3. A susceptible population

People of all ages particularly between the age of 5-20, of low-socio-economic group, with or without malnutrition, are living in ill-ventilated, mud plastered huts and in close association with cattle/cattlesheds in rural areas, where there are abundance of sand-fly, are more susceptible to infection.

2.2.4 Transmission of Disease :

Leismaniasis is transmitted from person to person by the bite of female sand fly (phlebotomus argentipes). Transmission may also take place by; (1.) contamination of bitten wound, (2.) contact while being crushed during the act of feeding, and (3.) blood transfusion. After infected blood meal, the sand fly becomes infected in 6-9 days.

The behavior of population, housing condition, location of cattlesheds, and proximity of people are possible risk factors for disease transmission. Being a rural disease vectors are also attracted by the habits of rural peasants of keeping their domestic animals, eg. hens and poultry, close to their living place. Proximity of humaning to sand fly breeding sites (termite hills, cowsheds, rodent burrows, tree-holes), hot climates with less/no clothes over body, habits of keeping dogs inside house, along with low socio-economic conditions, grass thatched huts, poor hygiene, storage of fire woods, rubbish, and organic deposits around houses are the potential breeding sites for vectors to live and transmit disease.

Besides these, other conditions that favour transmission of V.L. are rural areas at less than 600m above sea level, adequate rain fall, a mean humidity above 70%, a maximum temp-38 °C and minimum 15 °C, with diurnal variation of less than 7 °C, abundant vegetation, sub-soil water, and alluvial soil.

2.2.5 Effects of Climate :

There are three climatic zones in Nepal. They are sub-tropical (plains and inner plains with 4-40 °C temp), temperate (hills and valleys with temp. 0-40 °C), and alpine

(extreme cold areas) and Himalayan regions with temp under zero scale. The average rainfall is 1500-2500 mm. with the maximum of 6000 mm.

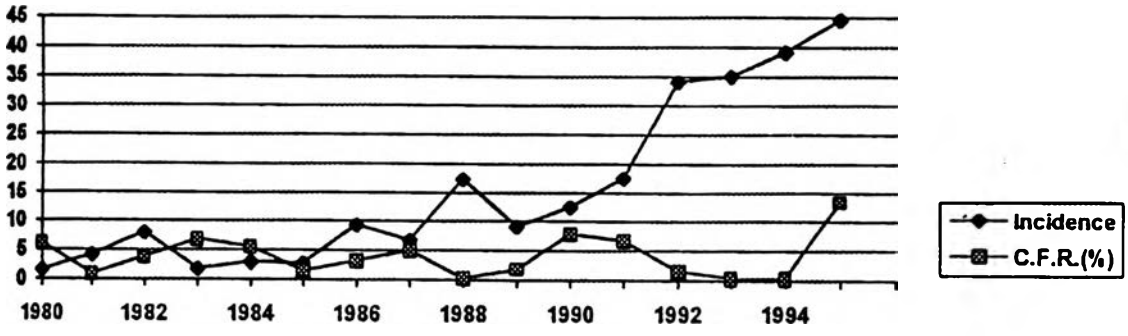
Since Kala-azar is a seasonal disease with maximum prevalence from April to November-during and after the raining season. In the winter it is absent. With the onset of warm weather, a gradual increase in density then occurs until May/June, when decline is noticed, followed by an increase with the advent of monsoon (Sanyal et al, 1979).

In south eastern plain of Terai of Nepal, where suitable temperature (20-28 °C), high humidity, adequate rainfall, riverine nature of Terai along with low socio-economic and typical cultural system of inhabitants are all climatically suitable for vector breeding and transmission of disease (Shrestha and Pant, 1995).

2.2.6 Periodic Fluctuation :

The predominant source of fluctuation in the transmission of Leismaniasis is the annual cycle of sand fly. The annual cycle is important for prediction of transmission seasons and for designing and planning of control techniques. Transmission of Kala-azar has two mazor trends.

Figure 1 : Trends of Leismaniasis in Nepal.



Incidence (per 100,000 population) and case fatality rate expressed in percentage (Source- Annual Assessment Report, EDCD, DHS, 1995)

a). Seasonal Trend

Seasonal variations in the transmission of Visceral Leismaniasis is the features of importance, because of long incubation period. It has two peaks; one in November and the other between March and April, during and after the rain.

b). Cyclical Trend

Visceral Leismaniasis, like other diseases, occurs in cycles and spread over a period of 10-20 years. Knowledge of cyclicity of disease is useful so that it may enable communities to defend themselves.

2.2.7 Population Movement :

The south-eastern part of Nepal, an endemic area for V.L. which is essentially a low lying alluvial plain (called Terai), is adjacent to three northern Indian states-an endemic area for Kala-azar. Because of open border and no passport system,

movement of people for many reasons from endemic area of India to Nepal is frequent. Extensive socio-cultural, economic and other activities are facilitated by open border between two countries. Movement of the population is regularly in the form of migrants, laborers, tourists help transmit disease from endemic to non-endemic area. Migration can not be restricted because of the political regions. Frequent epidemics of Kala-azar in adjoining states of India and migration of people during epidemic are of great concern.

At the same time, increased population growth (2.08/annum)(statistical pocket book of Nepal, 1996), migration of poor farmers in search of job/resettlements from rural to urban areas, look for more health services, which sometimes become difficult to provide and there by leads to poor health and disease.

2.2.8 Prevalence and Incidence of Disease :

Epidemiological surveys on Leismaniasis are useful to indicate geographical distribution, prevalence and incidence of infection. More or less data are available from health centers and hospitals about prevalence and occasionally incidence of the disease (WHO, 1990). A common estimate of world-wide annual incidence is about 600,000 newly reported clinical cases and an overall prevalence of 12 million cases, along with population at risk estimated at 350 million (PAHO, 1994).

In Nepal, no data is available on incidence and prevalence of the disease before 1980. Cases were recorded in 1980 with an incidence rate of 1.5/100,000 population, and since then a rising trend of V.L. case was recorded. Leismaniasis in Nepal is confined to the southern plains of eastern and central regions bordering V.L. endemic

states of India though a few sporadic cases are occasionally recorded in the western part of the country. Because of a poor surveillance system, most of the cases are un-diagnosed, un-reported. So, official statistics are of little value in determining the actual number of cases.

An overall prevalence of case was estimated at 9,360 (18.72/1000), with incidence rate estimated at 1.5/100,000 population in 1980 to 44.60/100,000 population in 1995, and the case fatality rate (CFI) varried from 0.23 to 13.16% (Report on Annual assessment of Kala-azar control activities, 1996). The total number of population at risk were estimated at about 5.5 million in Nepal.

2.2.9 Age and Sex Characteristics :

In an endemic area for Visceral Leismaniasis, the disease tends to be chronic and childrens are especially affected. In North Africa and South West Asia and Mediterranean countries, common age group affected is below 5 years, whereas in India 10-29 years of age group is affected. In southern Europe and China all age groups are affected. PKDL was commonly found in children and young adults (WHO, 1984). In Nepal the common age group affected is 5-20 years (Thakur, 1984). Males are affected more than females with the ratio of 2:1.

2.3 Statement of Problem :

- **Geographical distribution :**

It is difficult to accurately plot the geographical distribution of Leismaniasis and determine its prevalence in man. Environmental and other changes may eliminate the disease in some highly endemic foci, or may increase its prevalence in others. The disease has long been confused with Malaria. The first outbreak-epidemiologists and medical historians are sure that it was Kala-azar-had its epi-center in Jessore in 1824, when it took about 75,000 lives.

2.3.1 Global Problem :

Leismaniasis is prevalent both in developed and developing countries. The number of cases, that go unreported or are undiagnosed, is so large that official statistics are of little value for estimating the true incidence of the disease. It has many species, out of which some of the species are of epidemiological importance- like- Leismania Donovani-causing Visceral Leismaniasis and found in Nepal, India and Bangladesh, whereas Leismania tropica, Leismania chagasi, and Leismania Infantum are confined to Mediterenean countries and in USA, where it has created a great threat in the field of Public health.

It is endemic in several parts of Africa, the Indian sub continent, Latin America, andsporadically in China, the Mediterenean basin, south-west Asia and southern part of the former Soviet Union. Except Kenya and Ethiopia, cases in west part of Saudi Arabia, Somalia and wide spread in Sudan, Uganda and Yemen (WHO, 1990). In China (1950), Visceral Leismaniasis was rampant in several provinces covering an area of 1200 km, and threatened health and life of about 4 million people, mainly older children and young adults. Dogs were the main reservoir.

In American regions, it is estimated that for each reported case, 4-5 more actually occur. In 1993, around 1,000 new cases were recorded in Costa-Rica, Guatemala, Honduras, Nicaragua, Panama and, in Brazil 20,000 new cases were reported. The annual number of new cases in this region is estimated at 100,000. VL is reported from Mexico to Northern Argentina. It is a rural disease of domestic or peri-domestic origin, although there are some urban foci.

In 1993, WHO estimated the over all prevalence of Leismaniasis at 12 million, and population at risk at 350 million. Out of which 90% of all reported cases of Visceral Leismaniasis have been found occurred in India, Sudan, Bangladesh and Nepal, and 90% of cutaneous Leismaniasis, have been found occurred in Iran, Afghanistan, Saudi Arabia, Syria, and Peru and Brazil. The annual incidence of Visceral Leismaniasis is 600,000 new cases per year, whereas that of cutaneous Leismaniasis is 1-1.5 million new cases per year (Pan American Health Orgn, 1994).

2.3.2 Regional (distribution) Problem :

In Asian regions, the problem is mainly confined to India, Bangladesh, and Nepal. Sri-Lanka and Burma had disease during the thirties. In Pakistan, about 100 cases were reported from north sector (WHO, 1979). In 1970, an explosive epidemic of Kala-azar occurred in North-Bihar, India the area that has not beensubjected to insecticide spraying since 1964, resulting in 70,000 cases of Kala-azar with 4,500 deaths. From India disease was found spreading to Nepal due to migration of people for new settlement, for seeking new jobs through open border between two countries.

2.3.3 Problem in Nepal :

Nepal is a small land-locked country between two giant neighbors : China in the north and India in the southwest and eastern side. It extends from latitude 26°22'N and 30°27'N to longitude 80°12E. The disease was even presented before 1958. There were very few medical facilities in existence mostly concentrated in capital. By 1980, the Department of Health services made the disease notifiable (Joshi, 1984).The most affected district found-Morang, Sunsari, Saptari, Siraha, Dhanusha, Jhapa, Mahottari, (most endemic area in eastern part of the Nepal) and others, (Joshi, 1985). Out of 75 districts of Nepal, Kala-azar has been found in 10-11 districts of south-eastern Terai of Nepal. In which, low incidence was found in Jhapa district, whereas the incidence was high in Sarlahi district, ranging from 21.29--86.16/100,000 population.

The disease in Nepal, is mainly confined to southern plains of eastern and central Terai regions, bordering Visceral Leismaniasis endemic districts of Bihar state of India. A total of 9,360 cases with 246 deaths were recorded during 1980-1995, and the Case Fatality rate varied from 0.23-13.16 percent. Few sporadic cases are also recorded in western part of country. Visceral Leismaniasis cases, recorded in 1980, had the incidence rate of 1.5 per 100,000 populations, whereas incidence rate recorded in 1995 was 44.60 per 100,000 population, there by showing a rising trend of the disease. The population estimated at risk is 5.5 million. (Population of country-20.32 million (annual increase by 2.1%, CBS, Nepal,1996). The details of cases from 1980 to 1995, with incidence rate, and case fatality rate is listed below :-

Table 1 : Visceral Leismaniasis Profile

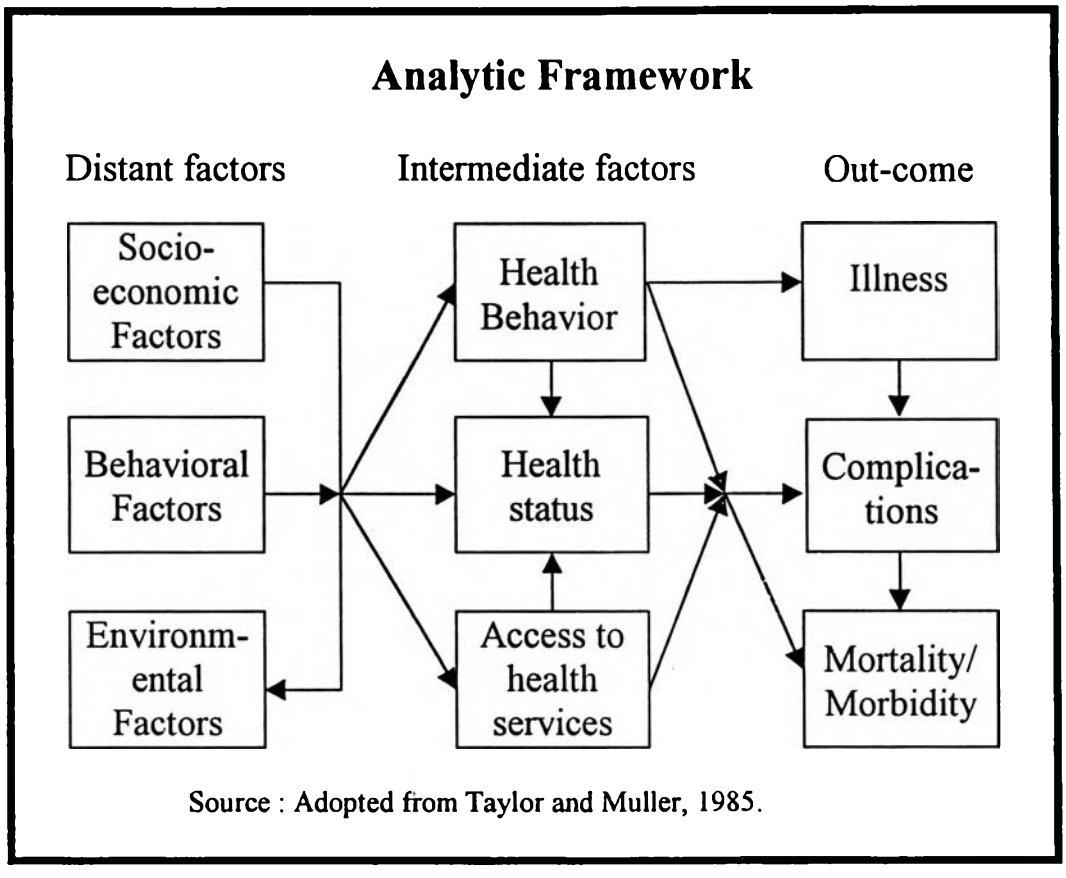
Year	No. of Cases	Incidence/100,000, population.	Case fatality rate/100
980-1985	782	1.5-2.80	5.88-6.67
1986-1990	567	9.27-12.50	3.02-7.62
1991-1995	7695	17.45-44.60	6.44-13.16

(Source :- Nepal Leismaniasis Profile, EDCD, HMG, Nepal, 1980 -1995).

2.4 Analytical Framework :

With disease and deaths from Visceral Leismaniasis, as with most health problems, the cause can be viewed either narrowly or broadly. A narrow view would be to concentrate only on medical diagnosis. A broader view would take into account the socio-economic, behavioral and environmental factors which contribute to the disease, its complications and deaths from. Figure 2 shows the framework that depicts the major determinants of Leismaniasis.

Figure 2 : Analytical Framework of Leismaniasis



Source : Adopted from Taylor and Muller, 1985.

Many of its components can be further sub-divided for example, socio-economic factors comprises-demographic explosion, unplanned urbanisation, deforestation, industrial development, improved transport facilities, un-employment, labor force movement, resettlement, and other factors as well. One of the benefits of this Analytic framework is that it compels us to specify the chain of events by which a program might reduce the incidence of disease, or reduce mortality from Leismaniasis to protect population at risk. So, let us consider, for example, a proposal to reduce incidence of Leismaniasis or deaths from Leismaniasis by improving socio-economic status (Canning and Wright, 1972). Socio-economic status must have an effect on at

least one of the intermediate factors-health behavior, health status, or access to health services.

Furthermore, the chain of effects, extended to one or more of three outcomes in the model: illness, complications, and death or disabilities. These three outcomes are sequential, e.g. One can not die from Kala-azar without being sick from other diseases. The model depicts that an improvement in more distant factors must be operated through close factors. When thinking about a particular activity to prevent disease, or deaths from the disease, some of the questions that come in mind are :

1. will it really decrease incidence of disease,
2. will it reduce the complications among affected populations, and
3. will it reduce mortality.

Unless the answer to one of these questions is yes, then the proposed activities can not reduce the incidence, complications, or death from the disease - Leismaniasis.

There are many factors which contribute to transmission of the vectors sand fly, leading to disease Visceral Leismaniasis. Because Nepal is one of the most poor country, and since Visceral Leismaniasis is the disease of the poorest of the poor, the factors, which are the risk factors or determinants of the disease Visceral Leismaniasis, are of importance and should/must be taken into consideration while dealing with the disease.

The different factors discussed in the Analytic framework are : Socio-economic factors, Behavioral factors, Environmental factors, and distant factors. Similarly, Health behavior, Health status, and Access to health services are taken as intermediate factors, which are directly or indirectly contributing to the transmission process, disease

formation, producing complications, and leading to death and disabilities as well. These factors, are well discussed in the Analytic framework.

Similarly, approaches to reduce, the effect of transmission produced as a result of these factors, and the formation of disease leading to complications in the absence of early detection of cases and prompt treatment, along with no, or inadequate, treatment, resulting in death and disabilities with a great burden to the community are matters of great concern, and need to be taken into consideration effectively and promptly. The components of the model are discussed briefly below.

2.4.1 Out-come :

a) Illness

By definition, "illness" is a pre-condition for death from Leismaniasis, thus anything that reduces illness or promotes well-being will reduce mortality from Leismaniasis in the population.

b) Complications

Death from Leismaniasis is firstly due to complications of the disease (Bronchopneumonia, Epistaxis, Cerebral haemorrhage, Severe dysentry, Myocardial degeneration, Acute toxaemia, Septicaemia and Renal failure). Secondly it is due to existing poor medical conditions which can not help reduce the complications.

2.4.2 Intermediate factors :

There are 3 intermediate factors : health behavior, health status and access to health services; and all these are affected by socio-economic status. Health status is influenced by behavior and access to services (WHO, 1994).

a) Health Behavior

Affects mortality from Leismaniasis through Health status, Illness and complications. The things that people do or do not do for their health are influenced by many forces including various aspects of socio-economic status (what actions are taken when a person develop complications from Leismaniasis) For example, if a person with disease stay at home, because there are no facilities in PHC or because they do not have faith on hospital doctor, their chances of dying increases.

b) Health status

Health status is influenced by distant factors and by other intermediate factors such as behavior and health care; e.g., disease can be the result of lack of money to buy mosquito nets, or of poor living habits (living in huts). Health status may affect mortality by influencing the likelihood that a person develop complications and by influencing the likelihood that a person with complications will survive.

c) Access to Health services

Preventing most Kala-azar deaths is not an invention of new technologies (medical), but a better access to services and availability of existing technologies.

1. Access to Information

To make effective use of medical resources, patients need to know when to seek help. This knowledge is lacking in Nepal due to low literacy rate and weakness in information system.

2. Financial Accessibility

Once people find a family member sick, they will take on almost any expenses to get help they consider it's appropriate. The rising cost of medical care in developing countries like Nepal place it beyond reaches of many people.

3. Physical Accessibility

Even if people and family recognises the seriousness of the disease, they may be unable to reach appropriate medical facility in time to avail treatment and get cured to save life.

2.4.3 Distant factors :

a) Socio-economic status

For most diseases, mortality is higher among the poor and more disadvantaged than among the rich. People have posited various ways in which components of SES may influence Leismaniasis mortality rates. SES affects deaths by working through intermediate factors. For example, literacy affects health behavior of people, and occupation, nutrition and living style also affects the health status of people.

b) Behavioral status

Behavioral status is an important element of health, and influences health directly and indirectly. Behavior such as knowledge, attitude and practice are the risk factors. An aspect of personal behavior deaths by working through intermediate factors, such as lack of knowledge on disease, affects health status of people.

c) Environmental status

Components of environmental factors influence Leismaniasis. Poor-ventilated rooms, congested living, being close to cattlesheds and organic debris (breeding sites) all affect health status of an individual to carry disease.

2.5 Control Measures :

Since there is no vaccine for Kala-azar, its prevention and control has been taken into consideration very strongly. These measure are discussed below:-

2.5.1 Preventive Measures :

a) Early case detection:

Early case detection is the pre-requisite for assessing the magnitude of problems and for undertaking control measures through prompt treatments. It is of two types : a) Active case detection, and b) Passive case detection.

i. Passive case detection:

This is done by health staffs of the peripheral health institutions (VHW, MCHW, and volunteers) in an endemic areas. The staff are being trained to recognize Kala-azar cases, and refer them to higher center for confirmation of diagnosis and prompt treatment. In Nepal, till date passive case detection mechanism was initiated for detection of Visceral Leismaniasis. Only those cases were recorded, who presented themselves to hospital, health posts and private clinics. Passive case detection relies upon awareness among people with early symptoms and importance of early treatment.

ii. Active case detection

This can be done by regular, systematic screening of the population at risk. Screening is being done by selecting suspects on the basis of clinical symptoms, which is a case with h/o irregular fever for more than 15 days, not responding to antimalarials, and with enlarged spleen must be treated with aldehyde, and if positive should be sent at higher center for serological/parasitological confirmation to treat the case properly. Village health worker is the right person who visits house to house, and is accountable to the community he works for If motivated a little will be of great value in conducting active case detection.

b) Control of reservoir :

i. Human reservoir :

Since man is the only reservoir of Kala-azar in Nepal, India, and Bangladesh, early case detection along with treatment is the right answer for controlling man as the reservoir.

ii. Animal reservoir :

Dogs and rodents are the source of animal reservoir. So mass screening of domestic and peri-domestic dogs by serological examination, elimination of stray dogs, registration of dogs, and noting health status of canine populations, especially with community participation, can help control these reservoirs.

iii. Sand fly control :

Through residual spraying especially in domestic and peri-domestic condition, DDT still remains the insecticide of choice for its low cost, high efficiency, and long action. Two rounds of DDT should be sprayed : first in February-March, and second in May-June, on inner walls of houses upto a height of 6ft. from the ground

level, in a dose of 1-2 gm./square meter, which remains effective for 6 months. If resistance for DDT in vector is noted, the second line of defense with BHC/Malathione should be taken. In Nepal, spraying is neither regular, nor adequate due to the lack of budget and poor information of cases.

iv. Environmental sanitation :

Improved sanitation has good effects on relative abundance of vector and level of transmission. Active/potential breeding sites, such as garbage, cracks in mud/stone wall, rodent burrows, location of cattle, poultry sheds, which close to living places encourages transmission of infection.

v. Reduction of Man-Vector contact

Indoor contact

It can be reduced by using protective measures like fine mesh screens on doors/windows, use of impregnated bed nets, mosquito coils, electric heated fumigation mats, and electric fans as well. Sleeping on a first floor also gives protection since a sand fly seldom flies high.

Outdoor contact

Application of repellents cream (Diethyl toluamide cream) on exposed surface of body, or well covering body with clothes, protects from sand fly bite. Similarly, to avoid, sleeping out side, camping, and to avoid travelers and tourists visit endemic areas during the season of transmission.

vi. Health awareness program

A massive health awareness program should be organized to provide health education to the community for different aspects of Kala-azar. The role of

Health education to the people is vital for effective implementation of vector control measures since the problem revolves mainly around man and their environment.

Aim of Health education :

It is to familiarize and motivate people by imparting health education and highlighting the following aspects of the disease :

- causation and transmission of disease,
- awareness about early signs and symptoms of disease,
- educating rural mass to co-operate with public health professionals for early diagnosis of disease by clinical examination and laboratory tests.
- usefulness of taking proper treatment of the disease,
- knowledge about breeding, feeding, resting behavior of sand fly,
- personal prophylactic measures -use of bed nets, repellents etc,
- to restrain people from mud plastering of walls of their houses, cattlesheds and sleeping on floor.

Health education for creating awareness in the community can be imparted using mass media like radio, television, cinema slides, newspapers, posters and film shows. Social workers, teachers, health workers, and village development committee officials have to be involved in disseminating the above given information by holding village meeting or by personal communication (Sharma SK, 1993).

2.5.2 Curative Measures :

This consists of, Clinical examination, Laboratory diagnosis and Treatment of Leismaniasis.

a) Clinical Diagnosis ;

Depends on clinical signs and symptoms of Kala-azar. These are irregular, gradual onset fever, malaise, chills, weight loss, loss of appetite, discomfort in left hypochondrium, cough/diarrhoea, wasting, and darkening of face, hands, and feet/abdomen. **PKDL** (Post Kala-azar dermal Leismaniasis) ;

Post Kala-azar dermal Leismaniasis appears one to several years of cure from Kala-azar in the form of multiple nodular infiltration of skin with/without ulceration, containing numerous parasites in the lesions, and may act as potential reservoir of infection.

b) Laboratory Diagnosis :

i. Indirect Evidence

Hematological Findings

Characterized by, Anaemia:-Hb.level-6-8mg/100ml/blood, Leucopenia with WBC:RBC ratio-1:1500-2000, raised ESR.,Thrombocytopenia-50,000-100,000mm and increased globulin level-6-12gm/100ml.

Aldehyde test

Aldehyde test of Napier is a simple, non-specific test used mostly in periphery though of less importance due to its positivity in most of chronic infection, e.g. TB, Leprosy, and Malaria, and becomes positive only after 2-3 months of the onset of disease. So, it is out of date now.

ii. Direct evidence

Parasitological diagnosis

Most conclusive evidence in the diagnosis of Kala-azar is the demonstration of parasites in spleen, bone marrow, liver, skin and lymph nodes of the

patients through smear, culture, or animal inoculation methods. It is done by microscopic examination of stained film and by culture examination of blood, bone-marrow, spleenic puncture, liver biopsy, skin smear, and puncture of lymph nodes to find out L.D.Body, the causative organism of V.Leismaniasis. This is the most confirmatory and authentic test (Ruth Leventhal, Russel cheadle, 1996).

ii. Immunological evidences (Serological Tests)

Direct Agglutination Tests (DAT Test)

It is highly specific, reliable tests for diagnosis of kala azar. In Nepal, efforts are being made to introduce DAT test at PHC level. It is a test of practice in field, in which blood is collected on a filter paper (Whatmann chromatography paper-no. 3) and sent to laboratory.

Other tests which are of little importance in the field are : Elisha Test, IFAT-Test, Complement Fixation Test, Montnegro and Haem-Agglutination Tests

2.5.3 Treatment of Visceral Leismaniasis :

Treatment of Kala-azar needs hospitalization or supervision of medical personnel because of drugs, its administration and toxic effects.

i. Objectives of treatment

1. To cure patient of intracellular organism.
2. To prevent relapse and resistance to drugs.
3. To minimize hospital stay.
4. To minimize treatment cost.

2.5.4 Drugs Used :

i. First Line Drugs

Sodium stibo-gluconate (Pentavalent Antimony compd.) in a dose of 20 mg/kg of body weight daily through intramuscular route for 30 days to a maximum of (850mg). For PKDL, 10 mg/kg body wt. through intramuscular route. Then the need is to review the case clinically and parasitologically on 29th day. If found normal, label them cured. If not, 10 more injections of sodium stibogluconate is required and again the case is assessed. If still abnormal, it is advised to switch on to second line of drugs and again the case is assessed for L.D. Body in smear examination to give more injections or to label it cured.

ii. Second Line of Drugs

Pentamidine Isothionate : 4/kg/every alternate days for 14 days, not exceeding to 35 injections.

Amphotericin B : in doses of-0.5mg/kg/body wt,given IV/IM in 5% dextrose in 6hours of time for 14 days.

Allupurinol : 20-30mg/kg/body wt for 6 weeks.

Hospitalization is a must for treatment of Kala-azar due to toxic effects of drugs. In Nepal, no such facilities are available at community level. So, CHW should be mobilized for early identification of case and for referral to the district hospital equipped with required technologies (NICD, 1993).

2.6 Emergency Measures for prevention/control of Epidemics :

Factors such as socio-ecological changes, population movements to and from high risk endemic areas both inside and outside the country, weakness of surveillance mechanism in the control program, refractory behavior of a vector species, drug resistance and other factors enhance the potential for occurrence of focal epidemics. Measures adopted are the following:-

1. Epidemic prone areas and population groups be identified.
2. Release of funds for purchase of drugs, reagents, insecticides, transport.
3. Involvement of infrastructure-health personnel.
4. Prompt and effective treatment of patients.
5. Training of health staffs-for taking samples, transport of samples, sero-diagnosis etc.
6. Rapid availability of basic supplies- drugs, eqipments, reagents etc.
7. Standardization of recording/reporting system.
8. Sensitization of opinion by all means-press, television, handouts, radio etc.
9. Implementation of control measures, e.g. Indoor/outdoor insecticide spraying.
10. Involvement of international body of technical expertise-whenever needed.

Summary of Control Measures

Epidemics are characteristics of Leismaniasis. Long standing foci can errupt into epidemics. Where there is an epidemic, it is a matter of first priority to determine the identity of the causative agent in order to delimit the affected area to initiate control

measures. At the same time, fears of local residents can be allayed and through their co-operation obtained by health staffs working close to them.

The existing health infrastructure serves as an instrument for implementing these measures. Control methods may have to be created by legislation or by other administrative means. Population movement should be restricted. Insecticidal spraying should be promoted. Once epidemics has subsided and data are compiled, it is important to investigate the factors that contribute to epidemics. A minimum surveillance system is to warn of further epidemics and monitor the effects of control measures.

2.7 Situation Analysis of Nepal :

An annual report of fiscal year 1995/96, prepared by the Department of health services, Epidemiology and disease control division, Government of Nepal, claimed overall prevalence of Visceral Leismaniasis at 9,360 with a high incidence rate of 44.60/100,000 populations and case fatality rate at 13.16 % (CFR) and population at risk estimated at 5.5 million, though most of the cases are undocumented, undiagnosed and unreported due to a lack of effective and viable surveillance system in Nepal (Annual report, 1995/96, DHS, EDCD, Nepal).

Region wise, the incidence rate for Kala-azar was estimated at 54.30/100,000 populations in the eastern developmental region, 15.44/100,000 populations in central regions, whereas case rate in west and mid-western region were estimated at 0.5-2/100,000 populations, which is quite low in comparison with eastern and central region, but no cases of Kala-azar have been found reporting from far-western region.

This way Eastern developmental region stands number one for prevalence of Kala-azar, where as central region is number two for the disease.

District wise distribution of Kala-azar in Nepal have been found covering 11 districts of eastern and central regions. Analysis of district wise (see Appendix A) data revealed that the highest incidence of Kala-azar was recorded in Sarlahi district of Nepal (58/100,000 populations), whereas it is lowest in Jhapa district (0.34/100,000 populations). Other districts also have fairly high incidence (Ranging from 21.29-56.16/100,000 populations). In Sunsari district, district of programs implementation, the incidence rate of disease is quite high (38.24/100,000 populations).

Sunsari district is in eastern developmental region which is full of industries, improved transportation facility, farming land and low literacy rate. People in this region are more dependent upon agriculture and practices for agricultural development like making sheds for cows/buffallows, hens-poultry, collection of dung, rubbish close to their houses are enough among farmers, which help vector breed and transmit disease. At the same time, district is adjoining to Indian borders and there is no pass-port system, making access very easy, movement of labor force in search of job inside and out side of the country promotes transmission of disease.

For preventing and controlling Kala-azar, insecticidal spraying of ICON/Malathion is done every year in the affected districts of Nepal. But spraying is neither regular nor adequate to cover the entire population at risk due to lack of donor support for purchasing of insecticide, and due to lack of transport facility to carry it to the place of spraying in time. So, paucity of insecticides, adequate coverage of

populations under risk by insecticidal spraying has become a problem for control of infection (Annual assessment report, 1995, DHS, EDCD, Nepal).

A though health facilities in Nepal are found at every level right from center to community level, these health facilities are developed only at central, zonal and to some extent to district level to provide diagnostic and treatment facilities for Kala-azar patients. Health facilities at community level are not much developed and not well staffed for diagnosis and treatment of Kala-azar. Referral service at community level; is not functioning properly, and is rather not reliable and effective to make patients access easy to district hospital for diagnosis and treatment in time for control of the disease.

Case detection of V.L. disease in Nepal, which is an important aspect of disease to plan for its control and for reduction of mortality and morbidity, has been found hampered by: in adequately training of field health personnel, along with their irregular supervision, monitoring and evaluation, to recognize symptoms of disease; lack of field diagnostic technologies; the rural focus of disease, and the reported wide, spread use of local practitioners (licenced/unlicenced) by the local population, resulting in no or less routine recording of suspected cases at the health center level within the existing health information system. Although cases at the health center level may be sporadically referred to district hospital, there is no specific recording of these events in routine morbidity register due to lack of proper recording and reporting system.

Nepal is a country of villages. Majority of people live in rural areas. Literacy rate in rural area is very low (45% in men and 20-25% in women), and illiteracy rate is also low (46-50% in men and 73-74% in women) (Population distribution, Ministry of health, 1996). Information on disease is lacking in rural mass due to inactiveness and

irregular contacts of CHWs. So, for intersectoral co-ordination is concerned, no effective program for intersectoral collaboration along with community participation has been found working effectively, thereby hampering the prevention and control of disease.

2.8 Government Policy for Case detection and Disease control :

Government is committed to provide health care to the people in a more effective manner upto the village level for prevention and control of diseases by making services easily accessible for them. Disease control service has been given priority in the preventive health services of the present national health policy. The objective is to reduce mortality rate at least by 50%, to reduce the incidence rate by 50%, and to increase the case detection rate from 18.1% to 25-40% by the year 2000-2010 (Epidem. and disease control division, 1994). The disease control policy has emphasized that the methods for controlling the diseases will be made available to the population at risk.

Priority has been given to the concept of : (1.) Disease management-such as improvement of early diagnosis and treatment, and being able to manage complicated cases and refer them to equipped facilities; and (2.) Disease prevention such as use of bed-nets, repellents, sleeping on cot inside house, living far from cattlesheds, and promoting mass protection measures like Insecticidal spraying (2 cycles of ICON) (EDCD, 1996).

The staffs of government health services at various levels should provide effective diagnosis and treatment and be able to manage complicated cases and refer

them to equipped facilities. Government has emphasized on provision of enough information on disease to the community people so that they can identify disease in time and find out the effective measures.

Therefore government policy is intended to provide full supports for disease control program. In addition, political support has also appeared as strong means for program success. Despite no rules and regulations to affect the availability of services, dissemination of information on disease, and self protection measures, the case detection is low in Nepal.

Thus, to achieve the target of an increase in case detection rate of 50% by 2000-2010 AD, it requires more effective information. For this purpose, mobilization of community health workers through adequate training for early case detection and treatment to people at risk will be one of the appropriate interventions.

2.9 Strategies for prevention and control of Leismaniasis :

Some of the approaches like insecticidal spraying, health education to the community people, diagnosis of cases at hospital and providing them first line treatment for prevention and control of VL have been applied so far to solve the problems of high incidence, high mortality and morbidity from VL. These approaches are considered as an important issue for program managers who want to enhance services, increase case detection and minimize mortality and morbidity at service point.

The reason for poor case detection and high mortality suggests some of the strategies to improve the situation such as need of formation of a task force group to develop strategies at different level for prevention, control and monitoring of VL.

Ideally, the task force should be comprised of physicians and public health officers from the affected districts/regions/central as well as key figures from private sectors. The epidemiology and disease control division would seem to be the logical source of local leadership in the formation of such task force.

The objective of such task force should be to develop a long term strategy and action plan for prevention and control of VL in Nepal. Specific objectives should address a co-ordinated approach towards enhancing the national capacities in 9 critical areas: (1.) Early case detection, (2.) Improving laboratory diagnostic technologies, (3.) Improving treatment and case management, (4.) Vector control, (5.) 0perational research to understand the epidemiology of disease, (6.) Development of an epidemiological surveillance system. (7.) Protection of risk groups with two rounds of insecticide spraying, (8.) Promotion of health education for community awareness targeting at early diagnosis and treatment. (9.) Initiating field research on epidemiology of vector control and effect of drugs in treatment of VL. Training of Medical personnel will be required in all areas.

However, the task force will need to conduct a thorough resource assessment to determine what requisite resources are needed for such program in terms of existing manpower, essential drugs, laboratory equipments and reagents, insecticides and other vector control materials, and particularly, what external technical assistance and resources will be required. An epidemiological surveillance system should be developed based on improved case detection, diagnostic and treatment regimens, and monitoring. (External assessment of VL control program, 1994, HMG/WHO/USAID).

The task force should consider the potential benefits (in terms of improved case detection) of making VL a noticeable disease in endemic districts. It should also

explore the possibility of obtaining new drug for treatment of VL, such as Liposomal Amphotericin B (Liposome technology ltd, Menlo Park, CA, USA).

2.10 Health Management and Information System (HMIS) of Leismaniasis in Nepal :

Important aspect of the program is a well developed information system. The main concern here is re-orientation of program resources. HMIS is oriented to deal with Kala-azar as a disease problem in a decentralized manner, so that information is available to those who need it to adapt anti-leismanial activities to local conditions.

Such the decentralization requires training for peripheral and district staffs data collection, recording, and reporting is needed for proper disease treatment, prevention/program management. Particular attention is needed to the definition of Kala-azar case taking local conditions into consideration.

In Kala-azar areas, diagnosis through microscopy is desirable to confirm the parasites in sick patients, and to identify (failures in treatment) treatment failures or relapses. Information about all aspects of the disease is called "Surveillance". Information collection is required to: (1.) identify nature, size, risk and prioritize problems; (2.) determine actions needed for planing/decisions; and (3.) Allocate resources and evaluate impact of control measures.

So, HMIS, which involves collection, analysis, storage, retrieval and use of information in planning, policy and decision making is an essential element in the control of Kala-azar. It assists in the assessment of ongoing control activities and in the selection of appropriate measures. At the present, there is no viable HMIS in place to

enable MOH, and to monitor current or future out-breaks of morbidity from health posts to district level does not include detail references of suspected cases of V.L.

Also there is no mechanism in place to obtain case reports from private sectors. Also there is no mechanism in place to asses the extent of cases imported from neighboring India. Similarly, there is a lack of laboratory diagnostic technology at government hospitals (community level) in Nepal, which makes it impossible to confirm clinically diagnosed case and to asses potential treatment failure to Sodium stibogluconate-a serious problem.

Surveillance of VL. in Nepal is aimed at early diagnosis and prompt treatment of cases. At the present, only passive case detection is functioning, where as active case detection is not functioning properly. For active case detection, it is the CHWs who needs to involve in the program since they visit house to house and collect blood smears from fever cases and report to health center for microscopy examination (External Assessment, WHO/USAID/HMG, 1994, Nepal).

This HMIS consists of periodic surveys at regional sentinel sites which is closely linked to regional hospitals and regional disease control sections. National HMIS functions are to develop the capacity to deal with :-

1. Kala-azar as a disease and in a decentralized manner, so that information is promptly available,
2. essential information for control of Kala-azar which is collected, analyzed at appropriate level.
3. forms for recording, reporting information
4. Kala-azar introduced in the monthly disease profile reporting system,

5. data analysis which should be focused on Kala-azar mortality (clinically diagnosed, laboratory confirmed, treatment failures) and mortality data. So, HMIS for Kala-azar is aimed at early diagnosis and treatment of cases of Leismaniasis (External assessment of Kala-azar control program in Nepal, HMG/WHO/USAID assessment team, 1994).

2.11 Identification of Level-Where Service Can Be Provided :

The World Health organization addressed this issue in a publication entitled "Leismaniasis control" at first referral level, to reduce mortality and to protect population at risk from Kala-azar. The first referral is defined as "The district or sub-district hospital or primary health center to which a patient is sent for diagnosis/treatment, when they become sick." Early diagnosis and treatment of Leismaniasis includes capability to : (1.) carry out early case detection, (2.) create community awareness, (3.) provide effective diagnosis and prompt treatment, and (4.) Prevent complications.

Unfortunately, in Nepal, these functions are performed only at teaching hospitals, central hospitals, zonal hospitals and only at few district hospitals to which most people with disease do not have access. Even if it is not possible for primary health center to carry out serological and parasitological diagnosis and to provide prompt treatment , there is still much that could be accomplished at this level. Most important health center could provide service to diagnose case and to help treat patients through CHW, and through a good referral system.

This measure would mean that patients would be diagnosed and treated in time, and thus have more chances of survival. A health center is a good point where if required, transportation can be organised. In Nepal, PHC is the closest fascility in the community where diagnosis/treatment can be tackled. If not, referral could be made possible in time to district hospital for better management whenever required. Availability of good quality service results in good cure rate, and can prevent many deaths even if complications have arisen. At the same time, it helps reduce incidence/prevalence of disease and protects population at risk

2.12 Integrated Approach :

Health service includes availability of related health care and services for control of diseases. Integrated approach of VL control service will improve case detection and treatment, and thereby reduc mortality and morbidity among risk group of people. VL control services are provided through clinics, which is not enough for increased case detection, and so it should be incorporated with other health programs such as Malaria control program, formal/non formal education program, Encephalitis control program, Rabies control program and Agricultural development program. Spraying insecticide for Malaria control program is found reducing Leismaniasis transmission dramatically.

The occurrence of Leismaniasis can be an added incentives in the control of dogs (Rabies control program) and rats/rodent pests. It can be useful to include Leismaniasis in health education program, especially in training medical practitioners

in endemic areas and those dealing with imported disease in non-endemic areas (WHO, 1990).

2.13 Mobillisation of community Health Worker in Nepal :

Reasons for mobilization of CHWS

There are several reasons for mobilizing CHWs in a control program.First of all, it is because of past weakness or poor delivery of services, with is based on health centers to provide adequate coverage for whole populations for their principal health problems at a cost they could afford.

Second, because of the fact that simple medical and nursing care and use of medicaments alone can have little effects on the environmental, social and cultural factors that cause disease and disabilities, CHWs services that go beyond these functions are one way of influencing these causes of illness.

Third, because CHWs are in a position to offer health services to population, otherwise denied access to treatment for life threatening or disabling illness. They are agents of community participation in health, which is essential for bringing under control the disease cause of illness.

Fourth, because CHWs can effect major changes in mortality and other indices of health status, and can satisfy prominent health care needs which can not be met by other means.

The momentum in mobilization of such workers is increasing as it becomes generally accepted that in most countries their wide deployment is essential for the

achievement of health for all. Mobilization of CHW is a way of bringing services to the people in places where the official health services cannot reach. So the aim is to train CHWs and help then to work in community to bring out changes that strike at the cost of disease and illness in a community, and at an acceptable cost. Community health worker is a link between the community and PHC system.

Reasons of Inactiveness

Community Health Workers, however, may be inactive for several reasons such as :

1. Weakness in selection,
2. Weakness in Training,
3. Lack of support,
4. Weakness in supervision, monitoring and evaluation,
5. Poorly defined functions - overloaded with work (WHO, 1989).

The main role of CHW is to provide health services (preventive and curative) and to promote health services to the community people. At the same time they work to identify the problems and look for their causes that need intervention. In Nepal, VHWs are selected through a system, provided with an initial of three-month basic training followed by time to time refresher trainings. They are full time paid government staff (also called bare footed doctor in the rural communities Chinese concept) used to visit house to house and collect information, identify problem, help community people in

providing adequate information about health and disease and help them referred to district hospital for better management.

Community health worker is the people they serve. They live with them, work with them, rejoice with them, suffer with them, grieve with them and decide with them. CHWs are concerned with preventive, promotive, and curative functions along with mobilization of community for health development. At the same time they are also responsible for good record keeping. In Nepal, though these CHWs are the back bone of health services in the community, they are found inactive due to problems in their placement, frequent transfer, training, logistic support, supervision, monitoring and proper evaluation of their performances, resulting in poor delivery of health care service to the community people. (Tabibzadesh/Redsi-Espagnet, community involvement, WHO, Geneva, 1989).

2.14 Problems and constraints :

Because much research has not been done on Leismaniasis in Nepal, some problems and constraints for conducting programs are as follows :

Available information on Leismaniasis does not cover all epidemiological and entomological aspects of the disease. In Nepal, though information are provided through I.C.E. Division, but it is found not covering every aspects of disease, which may be of little help in applying control measures for the disease.

Similarly, surveillance is the backbone for control strategies of Vector borne disease, Leismaniasis. In Nepal, at the present, there is no viable surveillance system in place to enable Ministry of Health to monitor current and future outbreaks of

Leismaniasis in endemic areas. The limited surveillance mechanism in Nepal has jeopardized the control management operations of VL.

In Nepal, it is found from a report (Annual report,1995) that resurgence of Leismaniasis took place after withdrawal of insecticidal spraying. Although, in Nepal, insecticidal spraying is done these days also, but its spraying is neither regular nor adequate to cover the entire risk group population due to less or no donor support. This has created a big problem for control of Leismaniasis.

The District Public Health Staffs need specific training on VL control, and medical officers of the affected district hospital need specialized training on management of VL cases. In Nepal since adequate training to health staff is not available, management of cases are sometimes troublesome problems for them .

Laboratory diagnosis and treatment facilities are not available in community level, and so the Community people who do not have access to district hospital is facing life threatening challenges.

Health workers are very important person in the community. But since they are overloaded with many health problems in the community, it becomes difficult to concentrate on a particular problem.

Second line drug is sometimes found very important whenever first line is not responding, but in Nepal second line drugs are not available in many health facilities, which may create some problem in non-responding and resistant cases.

2.15 Conclusions :

Leismaniasis is a globally prevalent disease, of which 90% (of Visceral Leismaniasis) occurs in Asian sub-continent, e.g. India, Bangladesh and Nepal. It is of serious public health concern in developing countries like Nepal, endangering thousands of lives of children and young adults (5-20 years) each year. This age group is much vulnerable in Nepal because of rural focus of disease and the fact that majority of this age group live in rural villages where there is more prevalence of disease, and health facilities for diagnosis and treatment of Kala-azar is not available. The major cause of death from Leismaniasis in this age group is because cases are not detected early and treated in time (MOH, 1995).

At the same time, poor or delay access to health facilities, due to : lack of information to people at risk by community health workers on serious aspects of disease, lack of transport facilities, poor and unreliable referral process, and un-affordability for treatment and transportation cost by the poor community people, has been felt as one of the major causes of fatal results of the disease (Vaughan, 1989).

Studies on community health workers have clearly described that if the performance of CHWs are strengthened , it will increase case detection by providing enough information of the disease and by helping them refer, when required, to district hospital for early diagnosis and treatment in time, thereby reducing mortality from disease (WHO, 1989).

Community health workers are assigned to visit villages and go door to door, contact people suffering from fever, examine them and find out suspected cases in their register or family folder provided for case recording, and report to health center.

The frequency of contacts between people at risk and CHWs is the most important factor in determining the increase or decrease in case detection. Through these contacts, community health workers provide enough information on different aspects of disease to the people and make their access easy to health facilities when needed.

The proportion of young children with disease being properly diagnosed and treated prompt varied with the knowledge they possessed about the disease. Increase in detection of cases also varied with the knowledge of health workers about the diseases and their timely identification and treatment (Steinmann/Devkota, 1996).

Besides, their frequent report on local situations to district health office help them in planning programs in their working area and arranging the proportion of CHWs for making household visits in order to disseminate health informations.

Alternative methods to increased case detection would be the identification of high risk group, increasing regular contacts and provision of support to sick people for early and easy access to health facilities for diagnosis of case and prompt and effective treatment in time, where the role of an effective and reliable referral system is of much importance. A regular and frequent contact of CHWs with people at risk is essential for increased and early identification of cases. For this, adequate training of CHWs, supervision, monitoring and evaluation of their performances, either from PHC level or from district level is very essential.

Since Leismaniasis is a disease of rural community, where service is being provided through CHWs who is a link between community and district health system and are much accountable to the community they work for, mobilization of CHWs will

be more effective in rural community. It would not be much applicable to the urban community people, where services are provided through hospital.

Diagnosis and treatment of Kala-azar is only possible and is provided in district hospital more than district level hospitals and that is also under supervision of trained medical personnel because of toxicity of drugs. So, in the absence of these facilities at health center we can not expect more than identification of cases by CHWs and promotion of them being referred to district facilities for diagnosis and treatment in time, for which CHWs activities need to be strengthened.

A massive health education for creating awareness about diseases in the community should be imparted using mass medias such as radio, television, news-paper, cinema slides, posters and film-shows for prevention/control of disease and to increase case detection. At the same time, social workers, teachers, health workers, village development committee officials, have to be induced in disseminating the health information for transmission, prevention and control of the disease, Kala-azar, by holding village meeting or by personal communication, thereby, contributing to an increase in case detection.

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