

**Current Strategies of Kala Azar Elimination – Strength,  
Weakness, Opportunities, Challenges: A Study In The Purnia  
District Of Bihar**

**Internship Training  
at  
CARE Bihar**

**By  
Tanvi Chauhan**

**Under the guidance of  
Dr. S D Gupta**

**Post Graduate Diploma in Hospital & Health Management  
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**Institute of Health Management Research**  
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**INSTITUTE OF HEALTH  
MANAGEMENT RESEARCH**

1, Prabhu Dayal Marg  
Sanganer Airport, JAIPUR - 302 011, INDIA  
Tel. : 3924700, 2791431-32  
Fax : 91-141-3924738  
E-mail : [iihmr@iihmr.org](mailto:iihmr@iihmr.org)  
URL : <http://www.iihmr.org>  
Gram : HEALTHINST

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This is to certify that **Dr. Tanvi Chauhan** student of Post Graduate Diploma in Hospital and Health Management (PGDHM) from Institute of Health Management Research, Jaipur has undergone internship training at **CARE INDIA, Purnia, Bihar** from 27<sup>th</sup> January to 30<sup>th</sup> April 2014.

The candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical. The internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.



**Dr. Ashok Kaushik**

**Dean, Academics and Student Affair**

**IIHMR, Jaipur**



**Dr S.D Gupta**

**Corporate Director**

**IIHMR, Jaipur**



**CARE INDIA**

14, Patliputra Colony

Patna 800 013, Bihar

**Tel** +91-612-2274957, 2274389, 2270464

**Fax** +91-612-2274957

[www.careindia.org](http://www.careindia.org)

The Certificate is awarded to

**Dr Tanvi Chauhan**

In recognition of having successfully completed her Internship at

**CARE India**

and has successfully completed her Project on

**Current Strategies Of Kala azar Elimination -  
Strength, weakness, opportunities, challenges  
A study in Purnia District, Bihar**

She comes across as a Committed, Sincere & Diligent person who has a strong  
drive & zeal for learning

We wish her all the best for future endeavours

**Amlan Majumdar**

**Program Manager**

**INSTITUTE OF HEALTH  
MANAGEMENT RESEARCH**

1, Prabhu Dayal Marg

Sanganer Airport, JAIPUR - 302 029, INDIA

Tel. : 3924700, 2791431-32

Fax : 91-141-3924738

E-mail : [iihmr@iihmr.org](mailto:iihmr@iihmr.org)

URL : <http://www.iihmr.org>

Gram : HEALTHINST

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This is to certify that the dissertation titled "current strategies of kala azar elimination strength, weakness, opportunities, challenges- A study in Purnia District of Bihar" and submitted by Dr. Tanvi Chauhan. Enrollment No IIHMR/PGDHM/2012-14/17 under the supervision of Dr. S.D. Gupta for award of Postgraduate Diploma in Hospital and Health Management of the Institute carried out during the period from 27 January 2014 to 30 April 2014 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

  
Signature

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## List of Abbreviations

**ACD:** Active Case Detection

**ASHA:** Accredited Social Health Activist

**AWW:** Anganwadi worker

**BCC:** Behaviour Change Communication

**DDT:** Dichlorodiphenyltrichloroethane

**IEC:** Information, Education and Communication

**IRS:** Indoor Residual Spray

**KA:** Kala Azar

**PCD:** Passive Case Detection

**VL:** Visceral Leishmaniasis

**SKAEP:** Strengthening Kala Azar Elimination Project

# **DISSERTATION REPORT**

## Section 1. Introduction and Rationale:

Kala azar is defined as a slow progressing, potentially fatal disease caused by a protozoan parasite of genus *Leishmania*. In India *Leishmania donovani* is the only parasite that causes this disease. *Phlebotomus Argentipes* (Female sandfly) is the vector which spreads the disease. Clinical Diagnosis of Kala Azar includes-

- A case of fever of more than 2 weeks duration not responding to anti-malarials and antibiotics.
- Pain abdomen (Stomach-ache)
- Splenomegaly (Enlargement of spleen)
- Hepatomegaly (Enlargement of liver)
- Loss of weight
- Anorexia (loss of appetite)

The test used for diagnosis is RK 39. In India, the disease manifests in two forms: the cutaneous (dry and wet) and the visceral (kala-azar) variety. The disease may be sporadic, endemic or epidemic. About 500 species of six genera of the female *Phlebotomus* are suspected or proven vectors transmitting the parasites from animal-to-animal, animal-to-man and man-to-man.

In India, the conditions that favour epidemics of kala-azar are rural areas more than 600 metres above sea level, heavy annual rainfall, mean humidity above 70%, a temperature range of 15°C to 38°C with a diurnal variation of more than 7°C, abundant vegetation, subsoil water and alluvial soil.

The disease affects about 3 million populations worldwide annually. According to WHO, about 1/3rd cases of Visceral Leishmaniasis are reported from Bihar itself. Notable epidemics of kala-azar have been observed in 1891, 1917 and 1933. As a consequence of withdrawal of DDT spray under NMEP from kala-azar endemic areas in 1963-64, the disease resurgence has been found to occur in late 70s because of slow build up of vector population. Currently, this disease is endemic only in Bihar, W. Bengal and eastern part of UP adjoining Bihar (Bora, 1998, Chandra, 1995 and Marwaha, 1991). Kala azar cases have been found to be reported from many hospitals in North Bihar districts from 1974 onwards. However, by 1977, several districts of Bihar has

been observed to report fresh cases and then onwards the problem has become a regular phenomenon in the entire northern districts and some districts situated South of the river Ganges in Bihar. Bihar is believed to house more than 90% of India's Kala-azar burden [7, 37] (or about 270,000 new cases per year). On the other hand, the number of reported cases (deaths) in Bihar was approximately 14,000 (200) in 2003 and 23,000 (125) in 2005. Reporting has been estimated to be between 5% and 8% of the total number of estimated cases in Bihar.<sup>15</sup> Dist. Out of 38 districts, 33 districts are endemic for Kala-Azar. 11 Districts out of these 33 Kala-Azar affected districts contributes to 65-70% cases of Kala-Azar. These 11 highly endemic districts are Araria, Darbhanga, E.Champaran, Madhepura, Muzafarpur, Purnia, Saharsa, Samastipur, Saran Sitamarhi & Vaishali.

Disease affects mostly poorest of the poor specially Mushahar Community.<sup>34</sup> 65 million population is at risk, having 11,500(approx.) villages in 429 PHCs. State has commitment to achieve National Kala-azar Elimination goal set for 2015 by GOI i.e. reducing incidence of KA by 1 case per 10,000 population at sub-district level.

In view of the above consequences, several control programs have been launched by the Government of Bihar. Various strategies has been formulated under these programs for elimination of this disease. In India under NVBDCP the major strategies are effective vector control, early diagnosis and treatment, Information education communication and capacity building .The purpose of this study was to understand the ongoing strategies in one of the endemic district (Purnia )of Bihar and their challenges.

## Case definitions

### Case definition of KA-

A person from an endemic area with a fever of more than two weeks duration and with splenomegaly should be tested for KA:

- Using a standard, quality-assured rapid diagnostic test (RDT) based on the rK39 antigen at the primary health centre (PHC)/upazila health centre (UHC) level or
- By biopsy for parasitology at hospitals with appropriate training.

#### **Box 1. Case definition of KA**

*A case of KA is defined as: a person from an endemic area with fever of more than two weeks duration and with splenomegaly, who is confirmed by an RDT or a biopsy.*

### Clinical diagnosis of kala azar

- a) A case of fever of more than 2 weeks duration not responding to anti-malarials and antibiotics.
- b) Pain abdomen (Stomach-ache)
- c) Splenomegaly (Enlargement of spleen)
- d) Hepatomegaly (Enlargement of liver)
- e) Loss of weight and Anorexia (loss of appetite)

## Line of Drug for Treatment

**Table No-1 Line of Drug for Treatment**

| Medicine       | Side-effects                                                                                     | Symptoms and clinical Signs                                                                              | Laboratory tests and ECG                                |
|----------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Miltefosine    | Gastrointestinal effects,<br>Nephrotoxicity,<br>Hepatotoxicity.                                  | Abdominal pain,<br>vomiting,<br>diarrhoea<br>Dehydration,oedema,<br>decreased urine output,<br>Jaundice. | Creatinine<br>Bilirubin,liver<br>Enzymes.               |
| Amphotericin B | Drug reaction<br>Nephrotoxicity<br>Cardiotoxicity<br>Ototoxicity<br>Any other,<br>Unanticipated. | Fever with chills and rigors<br>Oedema,<br>decreased urine output<br>Arrhythmias<br>Hearingloss, vertigo | Check renal function,<br>electrolytes,<br>hypokalaemia. |
|                |                                                                                                  |                                                                                                          |                                                         |

## Treatment outcomes in KA

Treatment outcomes in KA have to be assessed twice:

- (i) at the last day of drug treatment (initial outcome)
- (ii) six months after the last drug was taken (final outcome).

The KA elimination initiative has trained health workers to distinguish four main outcomes in KA treatment. (see Box 2)

### **Box 2. Treatment outcomes in KA**

1. **Cure:** *a patient is considered clinically cured if he/she has completed full treatment and there are no signs and symptoms of KA*
2. **Non-response:** *signs and symptoms persist or recur despite satisfactory treatment for more than two weeks*
3. **Relapse:** *any reappearance of KA signs and symptoms within a period of six months after the end of treatment*

There are more possible outcomes at each time point. These are listed below.

*At initial assessment, at the last day of drug treatment*

- **Initial cure:** a full course of drugs has been completed AND the patient has clinically improved. Clinical criteria for cure should be assessed as no fever + regression of enlarged spleen + return of appetite and/or gain in body weight.
- **Non-response:** signs and symptoms persist or recur. Switch to a second-line drug because of no response to the first-line drug.
- **Side-effects related switch:** side-effects necessitate a change of treatment.
- **Death:** any death, whether or not related to KA.
- **Default:** the patient does not complete treatment and/or does not present for assessment after treatment.

*At final assessment, six months after the last drug taken*

- **Final cure:** an initial cure patient who is symptom-free at six months after the end of treatment.
- **Relapse:** any reappearance of KA symptoms within a period of six months after the end of treatment.
- **Death:** any death, whether or not related to KA

## Vector Bionomics

### Distribution

*P. argentipes* is a small, dark brown, hairy insect about 2.5 mms. from the tip of mouth parts to the last abdominal segment. It belongs to the sub-family Phlebotominae which comprises of more than 600 species. Of about 50 species of sand flies present in India, *P. argentipes* is the only species that transmits kala-azar to man.

*P. argentipes* has a very wide distribution range, stretching from Iran to Indonesia. But the core area of its distribution range lies in the, eastern & south eastern India, where because of availability of the alluvial soil, high humidity, relatively equable temperatures, abundance of Cattle population. It is able to build up enormous population densities and transmit Kala Azar.

*In the Assam state, and adjoining plains of the north-eastern India, P. argentipes, has apparently been eliminated by continuous anti-malaria spraying. In these states no indigenous Kala-azar has been reported since the 1950.s except in year 2005 when one case has been reported from state of Assam.*

## Life cycle

### Breeding places

The life cycle of sandflies resembles that of mosquitoes in the basic pattern i.e, as comprising four stages, the eggs, four larval stages, the non-feeding pupal stage and the adult stage. However, sandflies including the vector ***P. argentipes*** breed in moist soil unlike mosquitoes which breed in water. The larvae after hatching out from the eggs, penetrate some inches below the surface of the substrate. The larval feed on decaying organic matters. The four larval stage, lead to progressive growth and last about 10 days. The larval stage is followed by the non-feeding pupal stage which lasts about 7-10 days under optimum conditions. The larvae are very small with body covered with numerous chaetae which glue substrate particles and mask them. That is the reason only older larvae and pupae can be found in soil samples after most careful searches. **No eggs or younger larvae of sandflies have ever been found in nature.** Eggs and larvae of ***P. argentipes*** can withstand immersion in water for considerable time. First stage larvae can survive immersion for 5 days, and larvae of the 4th stage for 14 days. These findings possibly explain the survival of larvae in the soil during the heavy monsoon rains when their breeding places may be flooded. Breeding places of *P. argentipes* are found within a radius of about 20 yards of a dwelling house, in dark, humid soil protected from sunlight. In the cattle sheds the favourite breeding place is the floor underneath the earthenware trough. *P. argentipes* does not breed in rodent burrows, outside or in the dwellings.

## Resting places

Adult sandflies are active after the dusk hours. During daytime they escape into their resting shelters. These shelters are protected from sunlight, excessive temperature. In the Kala-azar endemic areas of India, *P. argentipes* is entirely endophilic (indoor resting and feeding). Among thousand of *P. argentipes* collected, from Bihar and Jharkhand, only one male specimen was collected from an outdoor rodent burrow. This fact is very important from the point of view of Kala-azar elimination. A vector species with little variation in resting places can be easily targeted for residual insecticidal spraying. The presence of large numbers of *P. argentipes* on the lower margins of walls of mud houses is attributable to lot of moisture on the lower side of the dwellings. High humidities are a decisive factor in the life history of sandflies. *P. argentipes* is active in humidity range of 75-85%. This is the main reason why it is abundant during monsoon and post-monsoon seasons.

## Dispersal of sandflies and Seasonal Dynamics

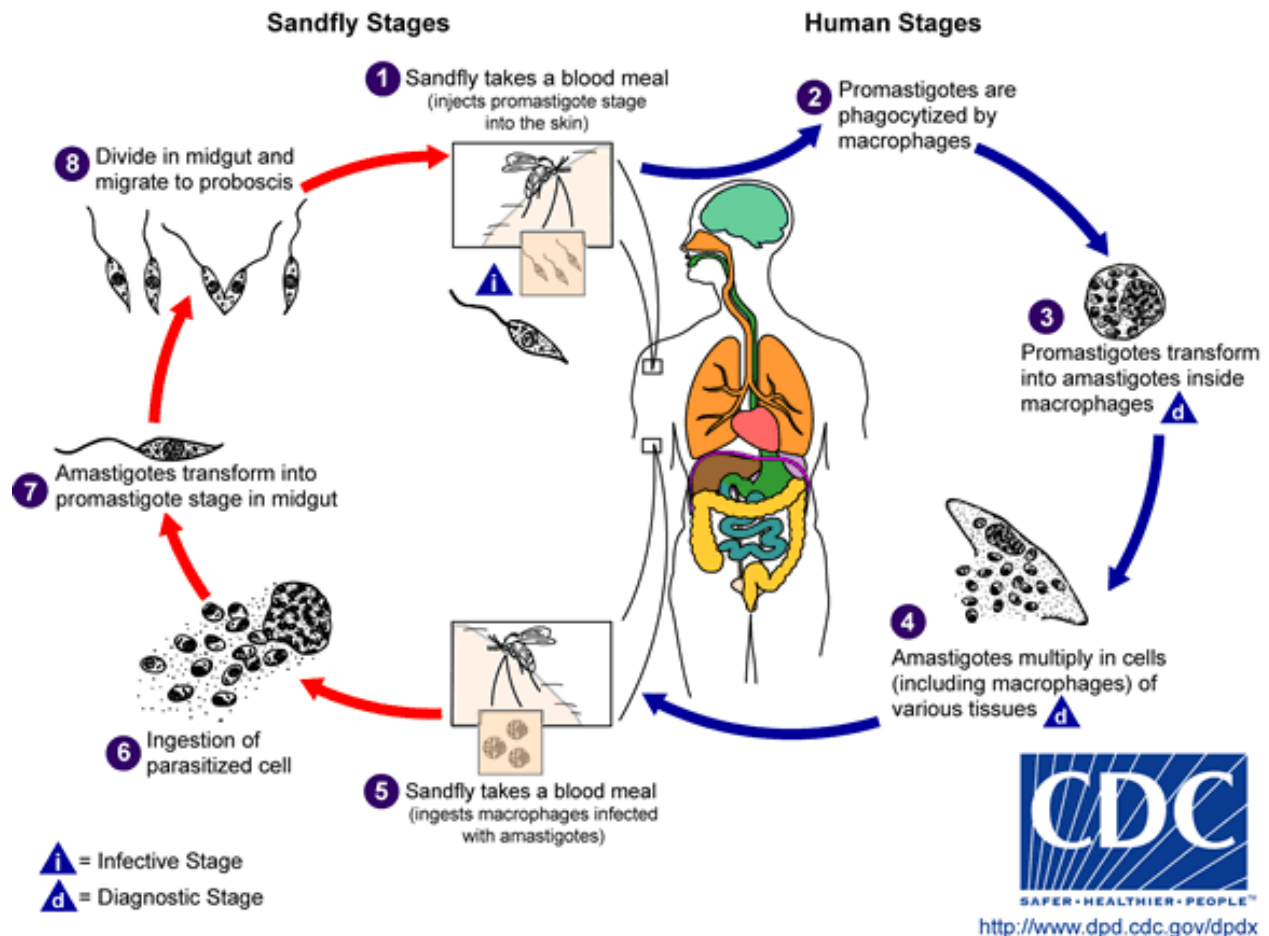
The dispersal range of *P. argentipes* is restricted to about 25 metres. It is a poor flier, moving in short hopping flights. **High densities of *P. argentipes* are a pre-requisite for Kala-azar transmission. Transmission season of Kala-azar in India is coincident with the season of the highest *P. argentipes* densities, and which is from June to October.** In the north-east India, *P. argentipes* vanishes in the cold months of December and January and reappears in small numbers in March.

The numbers shoot up dramatically after the onset of monsoon and remain high till the end of October.

## Development of Leishmania in the sandflies

Amastigote, i.e., aflagellate form of *L. donovani* found in the macrophages, are taken up with the blood meal. Amastigotes penetrate into the midgut of sandflies with blood meal taken from an infected vertebrate host. Most parasites perish in the midgut during the first hours after blood sucking due to possibly the action of substances similar to lysozymes. In the midgut the amastigotes change into promastigotes (i.e., flagellate stage) and begin intensive multiplication,

within the blood clot. At the 4th day, when digestion of blood comes to an end, slender, and long forms of promastigotes called *Nectomonads*, appear in large numbers in the midgut. They attach themselves to epithelium of the midgut by penetration of the flagellum between the membranes of two adjacent cells. The last stage of the life cycle of leishmaniasis in sandflies is connected with their penetration into buccal cavity, from where they move into vertebrate host during blood sucking by the sandfly.



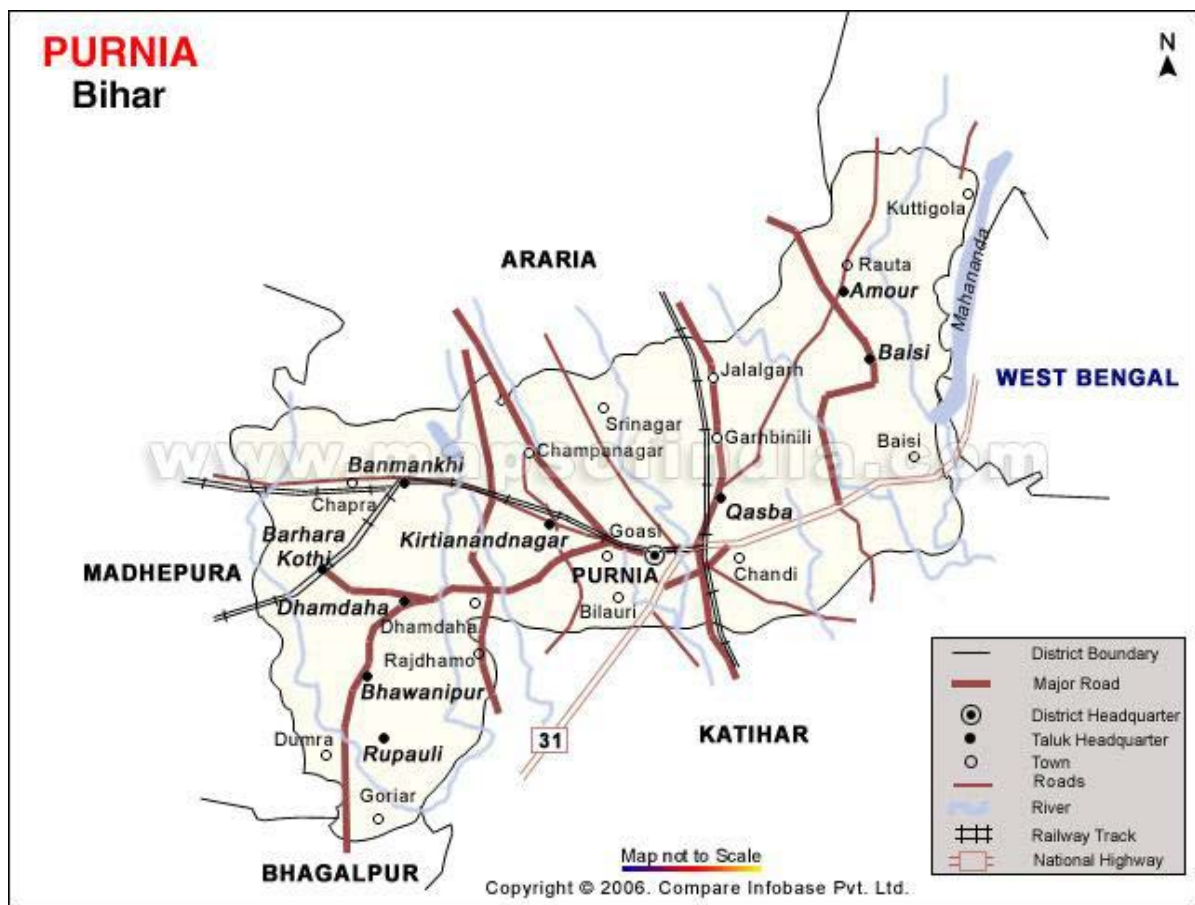
### Susceptibility to Insecticides

The susceptibility to insecticides is determined by the WHO test kit Tests carried out since the 1970.s have shown that *P. argentipes* is susceptible to all insecticides, including DDT.

## Section 2. District Profile

Purnia is the oldest and one of the most backward districts of Bihar. In 1912, Bihar and Orissa were carved as separate provinces out of the old Bengal Province and Purnia became the district of the new provincial unit. The district of Purnia, as it existed in 1951 with an area of 12784.64 sq. km. and a population of 3273127 has been pre-eminently an agricultural district. After separating the Katihar District, the area of Purnia District was 7943 sq. km. and accounts for 4.56 % of the state area. In the year 1990, the district was split into two more districts namely Araria and Kishanganj. Now the present area of the Purnia District is 3202.31 sq. kms. It lies between 25 degree 13 minutes 80 seconds and 27-degree 7 minutes 59 seconds north latitude and between 86 degree 59 minutes 6 seconds and 87-degree 52 minutes 35 seconds east longitude.

As per 2011 census, the total population of Purnia district is 3273127 of which 1695829 are male and 1577298 are female. The district is divided into 4 sub divisions, 14 Blocks, 251 Gram panchayats.



### Administrative Set-up:

Purnia district is bordered by Araria district in north, Katihar and Bhagalpur district in South, Madhepura and Saharsa district in the west and West Dinajpur district of West Bengal and Kishanganj district of Bihar in east. There are four sub-divisions in the district covering all the fourteen blocks. There are 1281 villages under 251 Panchayats in the district. Following is the name of blocks of Purnia district:

**Table no-2 Name of blocks**

|   | <b>Name of Division</b> | <b>Name of the Blocks</b>                                     |
|---|-------------------------|---------------------------------------------------------------|
| 1 | Baisi                   | Amour, Baisa, Baisi and Dagarua                               |
| 2 | Sadar                   | Purnea East, Kritiyanand Nagar, Kasba, Jalalgarh and Srinagar |
| 3 | Damdaha                 | Damdaha, Bhawanipur, Barhara-kothi (B-kothi), Rupauli         |
| 4 | Banmankhi               | Banmankhi                                                     |

Vector Borne Diseases viz. Kala-azar, Malaria and Filariasis is the major public health problems in the district. 13 blocks out of 14 blocks are affected by Kala-azar. Most of the kala-azar cases have been reported from rural areas. Following table shows the details of Kala-azar patients reported during January 2013 to December 2013 in the district:

**Table no-3 Incidence of kala azar patients till December 2013**

| <b>S.No</b>  | <b>Name</b>    | <b>Number of kala azar patient</b> | <b>Number of deaths due to kala azar patient</b> |
|--------------|----------------|------------------------------------|--------------------------------------------------|
| 1            | SADAR & P.EAST | 128                                | 0                                                |
| 2            | K.NAGAR        | 99                                 | 0                                                |
| 3            | B.KOTHI        | 88                                 | 0                                                |
| 4            | DHAMDAHA       | 87                                 | 0                                                |
| 5            | BANMANKHI      | 85                                 | 0                                                |
| 6            | SRINAGAR       | 50                                 | 1                                                |
| 7            | RUPAULI        | 44                                 | 0                                                |
| 8            | BHAWANIPUR     | 41                                 | 0                                                |
| 9            | KASBA          | 40                                 | 0                                                |
| 10           | JALALGARH      | 38                                 | 0                                                |
| 11           | DAGARUA        | 27                                 | 0                                                |
| 12           | AMOUR          | 25                                 | 0                                                |
| 13           | BAISA          | 7                                  | 0                                                |
| 14           | BAISI          | 5                                  | 0                                                |
| <b>TOTAL</b> |                | <b>764</b>                         | <b>1</b>                                         |

### **Section 3. Review of literature:**

**3.1.1) “Visceral Leishmaniasis (*Kala Azar*) Elimination from Indian Sub-continent by 2015” study by Arti Gupta<sup>1</sup>, Mukesh Nagar , Sidharth Sekhar Mishra and Chandrakant Lahariya stated that-** In India, first step that decreased the incidence of *Kala azar* was residual insecticide spray under National Malaria Control Programme in the year 1953 which lead to significant reduction in cases of *Kala azar*. India under NVBDCP is sharing these strategies as effective vector control, early diagnosis and treatment, Information education communication and capacity building. In India the mainstay of vector control is through indoor residual spraying (IRS) of DDT up to six feet height from the ground done biannually [3]. IRS has nearly eliminated *Kala azar* from north-eastern states of Assam, Meghalaya and Tripura [19]. IRS is conducted in all villages which reported *Kala azar* cases in the past five years or during the year of spraying and in villages, which are free of *Kala azar*, but are on search for cases of *Kala azar* [19]. In addition to *Kala azar* medicines and insecticides, cash assistance is also being provided

to endemic states since December 2003 to facilitate effective strategy implementation. For success of elimination, social mobilization is vital. It is required for the success of early diagnosis and treatment, for promoting treatment seeking, supporting indoor residual spraying and reducing human vector contact. The NVBDCP is exercising information education and communication system for effective behavioural change communication. More clinical research is required to develop new drugs and diagnostics. New Drugs will be required as Amphotericin B is an injectable preparation whose compliance is poorer as compared to a newer oral preparation and also in India the drug Miltefosine is not freely available.

**3.1.2) “Vector control interventions for visceral leishmaniasis elimination initiative in South Asia, 2005-2010” by Albert Picado, Aditya P. Dash, Sujit Bhattacharya & Marleen Boelaert concluded that-**

- (1) indoor residual spraying has an important impact on *P. argentipes* density when it is conducted properly, 2) LNs may provide some degree of personal protection against VL but these had a limited impact on *L. donovani* transmission in VL endemic communities in India and Nepal.

**3.1.3) “ Kala-Azar Elimination in Bihar: Adoption of Newer Evidence-based Strategies Required for Elimination” concluded by - Prashant Soni, Ragini Mishra, Ganga Kumar, Prabhat Pandey and Prashant Kumar**

Vector Control is solely done by Indoor Residual Spray using DDT. In spite of so many years of control operations, we have not been able to contain this disease in the State. Of increasing significance is the spreading of Kala-azar foci to newer districts in Bihar which were previously free from the disease. Lack of community participation has been a big lacuna in successful implementation of kala-azar Control Programme. There is an urgent need to revise the strategies used in Kala-azar Control Program with special focus on community participation in targeting areas like case detection, case reporting and referral to appropriate health facilities as well as in Vector control strategies like Indoor Residual Spray.

**3.1.4)REVIEW ARTICLE-“The lost hope of elimination of Kala azar (visceral leishmaniasis) by 2010 and cyclic occurrence of its outbreak in India, blame falls on vector control practices or co-infection with human immunodeficiency virus or therapeutic modalities?”MayilsamyMuniaraj**

Department of Health Research, Microbiology Division, Centre for Research in Medical Entomology, Indian Council of Medical Research, Madurai, Tamil Nadu, India.

**Findings-**

It is concluded that, the vector control practices have direct impact on the incidence of VL while, the treatment modalities evolved in response to the development of drug resistance have direct impact on case fatality. The success story of elimination of VL from the once badly affected State, Tamil Nadu has to be considered. Factors responsible for the elimination of Kala-azar from Tamil Nadu includes strong political commitment, DDT spray oriented to vector ecology of sandflies, increased access to medical care, anti-Kala-azar unit with strong infrastructure (1-2 trained entomologists for each district), active search every four months and well supervised implementation of the program.

A recent TDR study suggests that, indoor residual spray (IRS) and to a lesser extends environmental vector management and long lasting insecticidal nets significantly reduced sand-fly population in the study villages.

Early diagnosis by dipstick and complete treatment, effective vector control through integrated vector management with a focus on IRS, insecticide treated bed nets and environmental management, social mobilization of the population at risk and partnership are urgently require

**3.1.5) “Newer strategies for the kala-azar elimination programme in India- (Indian J Med Res 129, January 2009, pp 102-104)” by C.P. Thakur, Amit Kumar Meenakshi Thakur & Shabnam Thakur – Conclusion-**proper strengthening of the information system between the district administration, PHC and village level is needed to bridge the gap between the outbreaks of the disease and failure to reach the information to the authority. District authorities must be more responsive to the needs of the patients, arranging for better diagnostic tests and drugs, and good housing programme for the poor. Effective antipoverty programme will help the affected families to improve their economic condition.

### **3.1.6)Monitoring and evaluation tool kit for indoor residual spraying Kala-azar elimination in Bangladesh, India and Nepal. Publication Year:**

2010 Citation:UNICEF/ UNDP/WorldBank/WHO Special Programme for Research and Training in Tropical Diseases. ISBN: 978-92-4-150036-4.

**Summary:** Integrated vector management is one of the key elements of the kala-azar (KA)/visceral leishmaniasis (VL) elimination strategy in the three target countries – Bangladesh, India and Nepal. A research programme coordinated by the Special Programme for Research and Training in Tropical Diseases (TDR) and the World Health Organization (WHO)/WHO Regional Office for South-East Asia (SEARO) has shown that indoor residual spraying (IRS) in particular but also long-lasting insecticide treated nets (LNs) and environmental management –are efficacious in reducing sandfly densities (Joshi et al. 2009; Das et al. 2010). However, in spite of enormous efforts, research has also shown that national vector control programmes need to be strengthened in order to achieve the goal of reducing vector densities to the low level required to interrupt KA transmission (Chowdhury et al. 2010).

### **3.1.7) Management of visceral leishmaniasis in rural primary health care services in Bihar,India. By- Hasker Singh, Malaviya Singh ,Shankar , Boelaert S.Sundar**

To meet the target of the VL elimination, more active case detection strategies are needed, and the existing village health worker networks could be more involved.Costs to patients remain an obstacle to early case finding.

**3.1.8)Kala azar : A strategy to bring down its consequences Blog by-B.K.Sinha** “The meeting has decided to synchronize spraying activities and share information on large movements of population from endemic areas across the borders as well as incidents of drug resistance. Coordinated action can go a long way in containing the disease. Conscious effort on the part of the affected states for effective programme implementation and continual monitoring will help in speedy eradication of Kala-azar”.

## **Section 4. Research Question:**

- 1) What are the current strategies for the control of kala azar at the district in Bihar?
- 2) What are the strengths and challenges in the current strategies in Purnia district of Bihar?

## **Section 5. Objectives :**

### **General Objectives**

- 1) To study the ongoing strategies for kala azar elimination at district/ block in Bihar State.
- 2) To analyze strengths, weakness, opportunity and threats in current strategies at block level in allotted district.

### **Specific Objectives**

- 1) To assess the preparedness of PHCs for the IRS strategy.
- 2) To find out involvement of ASHA s in VL control strategy.

## **Section 6. Methodology:**

### **Study area:**

The study was conducted in Purnia district of Bihar. The total population of the district is 3466597. There are 14 PHCs, total 297 panchayats and 1249 villages. Majority of the people speak Bengali or Surjapuri but they also understand Hindi. Surjapuri Language is common in the tribal communities of the district. The highly endemic blocks of district having kala azar are- dhamdaha, B.kothi, K.nagar and Banmankhi. The data was collected by visiting PHCs and attending ASHA diwas for interviewing ASHAs.

### **Duration of Study:**

The study was conducted from February 2014-april 2014.

### Study Design:

It was a descriptive cross sectional study. The structured questionnaire, interview schedule and checklist was used to collect data from the stakeholders of this program and from facilities. Along with it study is also being supported through some quantitative secondary data. Primary data was collected from the field through self administered questionnaires and in depth interviews. The ASHAs self administered questionnaire consists of questions regarding their knowledge and training of kala azar. The questionnaire also focused on understanding the constraints and challenges faced by ASHAs in early case detection, IEC and community mobilization.

The in depth interview of the MOIC, DMO included questions pertaining to the most effective strategy of kala azar, new strategy on roll, improvements made in program in past few years, availability of resources and challenges ahead.

### Sampling:

- a) For facility assessment 14 PHCs were chosen from the district.
- b) For indepth interview DMO and VBD were the respondent.
- c) 100 ASHAs were chosen randomly from two highly endemic blocks namely dhamdaha and Purnea East.

### Data collection:

The data was collected through structured questionnaire which includes both quantitative and qualitative data. For qualitative data, in depth interviews of above mentioned stakeholders was done through interview schedule. Secondary data was also taken from various journals and NVDCP guidelines for review of strategies.

## Section 7. Review of strategies:

**Ongoing strategies for kala azar in Purnia district are as follows-** The most important strategies used by government of Bihar are-

- a) Program management and co ordination.
- b) Effective vector control.

- c) Early diagnosis and treatment.
- d) Information education communication and capacity building.

### **A) Program management and co ordination-**

It is for effective programme implementation. The key components of this strategy are: coordination of kala azar control activities and training; planning, monitoring and supervision of activities; periodic review and evaluation of specific programme areas.

### **B) Effective Vector Control -**

For managing vector the most important strategy used is **indoor residual spraying**. It is the most important intervention in achieving the interruption of transmission of diseases transmitted by Phlebotomine sandflies. In the 1950s anti malaria spraying under the National Malaria Control Programme (NMCP) and National Malaria Eradication Programme (1958) brought about a virtual cessation of Kala-azar transmission in India. Indoor Residual spraying has virtually eliminated Kala-azar from north-eastern states of Assam, Meghalaya and Tripura, and smaller foci in Orissa and Tamil Nadu.

### **PRE-SPRAY ACTIVITIES-**

#### **Pre-spray operations include the following**

- o Selection of the areas to be sprayed
- o Development of the required quantities of insecticides & equipment
- o Hiring and training of spray squads
- o Informing the community

### **Criteria for IRS and spraying-**

Regular spray of two rounds in endemic villages under PHC in the districts.

Feb-March - Ist Round.

May-June - IInd Round.

Focal Spray – 50 houses around one kala-azar case.

- All villages within a PHC which reported Kala Azar cases in the past three years.
- All villages which reported cases during the year of spraying.
- Villages which are free of Kala-Azar, but on search are found to contain cases conforming to the Kala Azar case definition.

### Dosage-

The dosage of DDT application is the same as that for anti-malarial spraying, i.e. 1g/m<sup>2</sup> of the wall surface. The inside walls of huts and cattle shed are to be treated with the insecticide. Spraying is to be restricted to the 6 feet of the wall surface. Cattle sheds, and kala-azar positive and suspected houses are to be treated on priority.

### Insecticide Requirement-

When the insecticide spraying is restricted to 6 feet of the wall surface, in the cattle sheds and human dwellings, the requirement of the insecticide will be approximately one half of that required for anti-malarial spraying. The average surface area in a rural household in so far kala azar spraying is concerned would be about 75 sq.m.

| Insecticide | Dosage per sq. m. | Insecticide required per house (75 sq.m.) per round | Average per 5000 popn. Per round | Total per annum |
|-------------|-------------------|-----------------------------------------------------|----------------------------------|-----------------|
| DDT 50%     | 1 gm              | 150 gm                                              | 187.5 kg                         | 375 kg          |

### Manpower Requirement-

Each spray squad consists of 5 field workers plus one superior field worker working with two stirrup pumps and one superior field worker. 60-80 houses can be covered in a day.

## Equipments-

Each squad will require the following equipment, which must be available well in time before the spray operations:

- ☐ Stirrup pumps(2)
- ☐ Spray nozzle tips for spray pumps(2)
- ☐ Bucket 15 liters(4)
- ☐ Bucket 5/10 liters(1)
- ☐ Asbestos thread(3 metres)
- ☐ Measuring mug(1)
- ☐ Straining cloth-(1 metre)
- ☐ Pump washers(2)
- ☐ Plastic sheet (3x3 metres)(1)
- ☐ Register (1)
- ☐ Gheru for stencilling

Squad supervisor must have extra spray pumps, nozzle tips, washers, and asbestos threads. A set of tools for minor repairs should also be available which should include a pipe wrench, pliers, screwdrivers and a set of spanners. A good quality nozzle should be used. Each squad must also be provided with personal protection gear including masks and soap to wash.

## Training-

Hiring of squads should be done well in time so that training of spray squads is completed prior to the due date of spray operations. The training of the MPWs and the supervisors should be completed two weeks prior to the start of the spray operations. Training should cover each aspect of the spray operations. The following topics should be covered:

- Preparation of suspension
- Various parts and operation of the pump
- Regulation of the flow from the nozzle tip
- Regulation of the speed of application including movements of the lance and the spray

- men
- Care and maintenance of the spray equipment
- Safety precautions in spraying and handling of insecticides
- Disposal of insecticide suspension remnants and containers

### Spray Programme-

A spray programme in a given PHC area must be drawn up village-wise so that the entire area to be sprayed is covered within the recommended period. The schedule of village-wise visits by date must be communicated to the Gram Panchayat and other village leaders 7 to 10 days prior to the expected date of visit so that the community is well informed. They should be reminded a day before the commencement of the spray operations.

|            |                     |               |          |
|------------|---------------------|---------------|----------|
| BOX-3      | PHC SPRAY PROGRAMME |               |          |
| SUB CENTRE | VILLAGE             | DATE OF SPRAY | SQUAD NO |
|            |                     |               |          |
|            |                     |               |          |

In addition to the date of the spray, the following information should be provided, to the community leader:

- Reason for the spray, i.e., a deadly and an economically crippling disease kala-azar will be controlled by spraying houses with DDT. If all areas are not sprayed, sandflies will rest on these surfaces without any harm to them.
- Food items should be protected from contact with insecticides.
- Outer walls and eaves of dwellings need not be sprayed.
- Mud plastering of walls should be avoided for 6-10 weeks after each spray cycle, as plastering will reduce the effectiveness of the insecticides.

## DURING IRS ACTIVITIES-

### Preparation of Spray Suspension-

The preparation of the spray suspension is made just before the start of the spray operations every day. It is important that the suspension is made correctly so that the correct dosage is applied on the sprayed surfaces. As in anti-malarial spraying 1kg of DDT 50%, powder (500 gms DDT in 1 kg. of powder) is mixed with 10 litres of water and total suspension sprayed on 500 meters of wall surface to achieve a dosage of 1gm/m<sup>2</sup>. The 10 litres suspension will be sufficient to cover 6-8 houses in case of anti-kala-azar spraying as against 3-4 houses in anti-malarial spraying. The required quantity of the insecticide is measured with a plastic mug and poured into a 15-litre bucket. A paste is made with a small quantity of water. The remainder of the 10 litres of water is then poured slowly into the bucket, and the insecticide-water mixture is stirred vigorously to obtain a uniform suspension. The suspension is then poured into another bucket through a cloth sieve to remove any particulate matter that might clog the nozzle of the spray pump. 1000 sq meter.s can be sprayed with 10 liters of the suspension. The average surface area of a rural house is 150 sq. meters; the 10 liters will be sufficient for more than 6 houses.

### Spray Technique-

The barrel of the stirrup pump is put in the bucket containing the spray suspension. One man operates the pump and the other man sprays. The spray lance is kept 45 cms (18 inches) away from the wall surface. The swath should be parallel. Spray is applied in vertical swath of 53 cm (21 inches) wide. Successive swaths should overlap by 7.5 cm (3 inches). Spray is done from top of the wall to the floor, using downward motion, to complete one swath; then stepping sideways and spraying upwards from floor to top. Spray should not be allowed to drip to the floor. The discharge rate should be 740 to 850 ml per minute. To obtain the above discharge rate, the pump man should give 20 to 26 strokes per minute with 10-15 cms plunger movement at a pressure of 10 pounds per square inch (PSI) (0.7kg/sq.cm) at the nozzle tip. Spraying into a bucket for one minute and measuring the quantity of the suspension in a graduated mug enables check of the correct discharge rate (740 to 850 ml/minute). The nozzle tip should be discarded if the discharge rate exceeds 850 ml per minute.

A good quality spray should lead to uniform deposits on walls and other sprayable surfaces. This is easy to verify in case of DDT as the deposits of DDT are clearly visible. The supervisor through physical verification should check the quality and coverage of spray. It takes about 3 minutes to spray area of 150 sq. metres. This is the average surface area of a dwelling unit in rural areas of India.

## POST-SPRAY ACTIVITIES-

Post spray activities include stock taking of the daily spray operations, maintenance of equipment and disposal of insecticide remnants, and safety measures. This is essential for assessing the actual coverage of spray operations, consumption and requirement of insecticides.

### Routine Maintenance of equipments and minor repairs-

The pumps and other equipments are subject to wear and tear, because of the corrosive action of the insecticide. Hence it is very essential that spray equipments are maintained with due care. Following actions should be ensured, every day in the evening.

The discharge line should be disconnected at the delivery outlet at the end of the spraying

- The bucket and the discharge line should be emptied.
- The spray pump should be thoroughly rinsed with clean water.
- Filter assembly should be rinsed and cleaned. Filter should be removed from the valve by grasping it at its screen and slightly twisted on pulling it out.
- Reassemble all clean parts except the nozzle. Put clean water in the tank, seal the tank and pump air into it. Open the control valve and let the water flow from the lance to flush the hose, filters, control valve and lance. Remove the tank cover and dry the inside of the tank.
- Clean the nozzle tip by washing thoroughly with water. Remove any dirt from the orifice with a fine bristle/ a brush. **Never use metal wire or nail.**

### **Transportation, safe handling and storage of insecticides-**

Transportation need to be done separately in well sealed, labeled containers, boxes or bags. Not be carried in vehicles used for food items.

#### **Disposal –**

Washing of sprayers and emptying the waste water into pit latrines or pit dug away from source of drinking water. Make only sufficient suspension for the day. Never pour the remaining insecticide into rivers, pools or drinking water sources. All empty packaging to be disposed safely. Never reuse empty insecticide containers.

#### **Storage –**

Labeling as hazardous material, indicating the mark of poison, name of chemical, name of manufacturer and date of expiry. Should be stored in a well ventilated room at ambient temperature away from sunlight. Containers or sacks should be well stacked to avoid possibility of breaking open or spillage. Stock and issue registered should be kept up to date. Store room should be displayed mark of caution used for poison and should be locked.

#### **Handling and spraying –**

Wash hands thoroughly each time of spray. Use personal protective gear such as goggles, gloves and apron. Avoid direct contact and Do not eat, drink or smoke during spray.

### **EARLY DIAGNOSIS AND TREATMENT-**

For early diagnosis and case detection two main strategy are Active Surveillance and involvement of ASHA.

- **Active Surveillance**-health-care personnel go to the community and screen the population to find cases of KA. ACD is an essential component of the elimination strategy. Several possible approaches are defined below.

- *House-to-house search (or blanket screening)*: a medical team visits every house in a community in an endemic area and screens every household member for KA/PKDL.
- *Index-case approach (also called snowballing)*: an index case is defined as a person who is currently suffering or has suffered from KA or PKDL during the past 12 months. A focused search in which all households in a certain perimeter around an index case are visited and screened for KA/PKDL.
- *Camp-based approach*: a medical camp is organized in a central place in an endemic village and the community is actively encouraged to participate. It is particularly important that patients with fever of more than two weeks duration or with skin lesions after past KA treatment present for a simple medical check-up that screens for KA/PKDL.
- *Incentive-based approach*: a financial or other incentive/award is provided to health volunteers or village health workers who detect suspected cases of KA and motivate these cases to report to health facilities where they are then diagnosed with KA/PKDL.

#### Active case detection by organizing health camps-

Community information: social gathering and house to house information dissemination through ANM / ASHA (information given to those patients with fever history of more than two weeks).

Camp site: Respective PHC, SubCentre, Referral Hospital, school, dharmshala. One team (Team Consists of One medical Officer, One laboratory technician, One MI / BHI, One 4th Grade Staff from the concerned health institute, & one study team members) Total 5 members in each Camp twice in a month. In camp site clinically suspected cases to be examined. KA suspected cases with fever more than 2 weeks tested with rK -39. Positive cases referred to the concerned PHC, district hospitals for the treatment with oral Miltefosine, /Ampho-B whereas rest of the patients to be provided with symptomatic treatment with relevant advices.

## **D) IEC and CAPACITY BUILDING-**

IEC involves increasing the knowledge, creating awareness, removing myths and changing the attitude of people about kala azar and spraying of IRS. It includes advocacy for kala azar as a public health priority among politicians, partners and civil society; innovative IEC initiatives that raise individual, household and community awareness of kala azar and promote positive behavioural change in terms of personal protection, treatment seeking behaviour and community participation; strengthening community-based mechanisms and exploiting entry points that can be used by the communities to take action on kala azar issues. The various activities that are planned under IEC at district level presently are-

- General information for Public awareness before IRS activity by Press Communique.
- Involvement of NGOs.
- NGOs & other organization involved for supervision for enhancement of better IRS activity.
- Distribution of IPC cards by squads during IRS round.

## **CAPACITY BUILDING-**

It is about increasing the capacity of ASHA and ANMs regarding kala azar so that they can aware village people and detect cases of Kala azar for early diagnosis and treatment. It is done through organizing timely training sessions for them.

## Section 8. RESULTS and FINDINGS

The facility assessment using checklist was done for 14 PHCs in district to understand the preparation of pre-spray activities at block level.

|             | <b>Table No-4 (Assessment Of PHCs for Pre-spray activities)</b>                                            |                |
|-------------|------------------------------------------------------------------------------------------------------------|----------------|
| <b>S.No</b> | <b>INDICATORS</b>                                                                                          | <b>RESULTS</b> |
| 1.          | No. of PHCs having microplan made for the IRS round (45 days before IRS).                                  | 0              |
| 2.          | No. of PHCs identified spray activities dates for endemic villages(15 days before IRS).                    | 0              |
| 3.          | No. of PHCs informed ASHA for date of spraying in the village(15 days before IRS)                          | 0              |
| 4.          | No. of PHCs having availability of insecticides, pumps and other supportive equipments(15 days before IRS) | 0              |
| 5.          | No. of PHCs completed training of squads(15 days before)                                                   | 0              |
| 6.          | No. of PHCs had awareness campaign 7 days before IRS                                                       | 0              |
| 7.          | No. of PHCs had IEC material(hand bills,posters,IPC cards) available 15 days before IRS                    | 0              |
| 8.          | No. of PHCs planned IEC activities(advocacy,spreading messages) 30 days before IRS.                        | 0              |
| 9.          | No. of PHCs having monitoring and supervision team formed 7 days before IRS                                | 0              |

From Table No-1 it can be interpreted that there is total lack of microplaning at PHC level. Out of 14 PHCs none had availability of material (pumps,buckets,PPE) atleast 15 days before IRS. The spray dates are not identified even 15 days before for the kala azar endemic villages. Non involvement of ASHA for IEC, lack of training of squads and absence of IEC materials like leaflets, posters and cards at PHCs can be seen. There are no meetings and advocacy at PHC

level in co ordination with HSc,ANMs,ASHAs which shows the complete lack of awareness and IEC campaigns for endemic villages.

## SWOT ANALYSIS

**Table no-5 For vector control strategy – (Indoor residual spray)**

|    | <b>STRENGTH</b>                                                                                                                             | <b>WEAKNESS</b>                                                                                                                |
|----|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 1. | Decentralisation of vector control activities to the districts.                                                                             | 1.Insufficient human resource-<br>Only 4 KTS for 14 PHCs and (squads for spraying-155 on papers but in field only 75 present). |
| 2. | Availability of financial budget sanctioned to district for April-May 2014( Rs 9664468).                                                    | 2.Lack of micro planning,IEC, awareness campaign at PHC level.                                                                 |
| 3. | Sand fly still susceptible to DDT in Bihar.                                                                                                 | 3.Lack of monitoring and supervision.                                                                                          |
| 4. | Availability of IRS guidelines at district malaria office.                                                                                  | 4.Lack of trained squads for spraying.                                                                                         |
|    | Availability of health infrastructure.                                                                                                      | 5.Non involvement of ASHA in awareness campaign for IRS and in IEC.                                                            |
|    |                                                                                                                                             | 6.Lack of political commitment.                                                                                                |
|    |                                                                                                                                             | 7.Lack of ownership and accountability among govt.officials.                                                                   |
|    |                                                                                                                                             | 8.Corruption in government system.                                                                                             |
|    | <b>OPPORTUNITIES</b>                                                                                                                        | <b>THREATS</b>                                                                                                                 |
| 1. | Availability of monitors through Care for improving coverage and quality of IRS.                                                            | 1.Development of resistance to DDT.                                                                                            |
| 2. | Mapping tools like GIS and satellite remote sensing for identifying high risk areas for improving coverage of IRS ( <b>kishore et al</b> ). |                                                                                                                                |
| 3. | Possibility of kala azar elimination due to changing epidemiology.                                                                          |                                                                                                                                |

### For IEC and Community Mobilization-

To understand the strength, weakness and challenges of IEC and community mobilization strategy a sample of 100 ASHAs was taken randomly from total 368 study subjects 50 each from

two highly VL endemic blocks namely dhamdaha and P.East in Purnia district. The respondents were interviewed using structured questionnaire.

The structured questionnaire contained questions exploring knowledge about VL on presenting signs and symptoms, mode of transmission and diagnostic and treatment procedures along with incentives provided for detection of kala azar patient. I was able to interview all 100 ASHAs sampled, all respondents were women.

**Table No-6 Training, experience and knowledge of ASHAs related to VL**

| <b>S.no</b> | <b>Indicator</b>                                                                                                                                      | <b>percent</b>                                  |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>1.</b>   | Percent of ASHAs correctly replied about transmission of disease.                                                                                     | <b>40</b>                                       |
| <b>2.</b>   | Percent of ASHAs given training on kala azar in past one year.                                                                                        | <b>15</b>                                       |
| <b>3.</b>   | Percent of ASHAs knowing about 1 <sup>st</sup> line drug of kala azar.                                                                                | <b>10</b>                                       |
| <b>4.</b>   | Percent of ASHAs aware about clinical symptoms of kala azar<br>a) Fever of 2 weeks<br>b) Splenomegaly<br>c) Weight loss<br>d) Not knowing any symptom | <b>94</b><br><b>53</b><br><b>70</b><br><b>5</b> |
| <b>5.</b>   | Percent of ASHAs detected any kala azar case in past 6 months.                                                                                        | <b>17</b>                                       |
| <b>6.</b>   | Percent of ASHAs received any incentive for case detection in 6 months                                                                                | <b>12</b>                                       |
| <b>7.</b>   | Percent of ASHAs ever referred case to health centre                                                                                                  | <b>32</b>                                       |
| <b>8.</b>   | Percent of ASHAs having IEC materials(flipbooks,IPC cards,charts) for awareness campaign                                                              | <b>0</b>                                        |

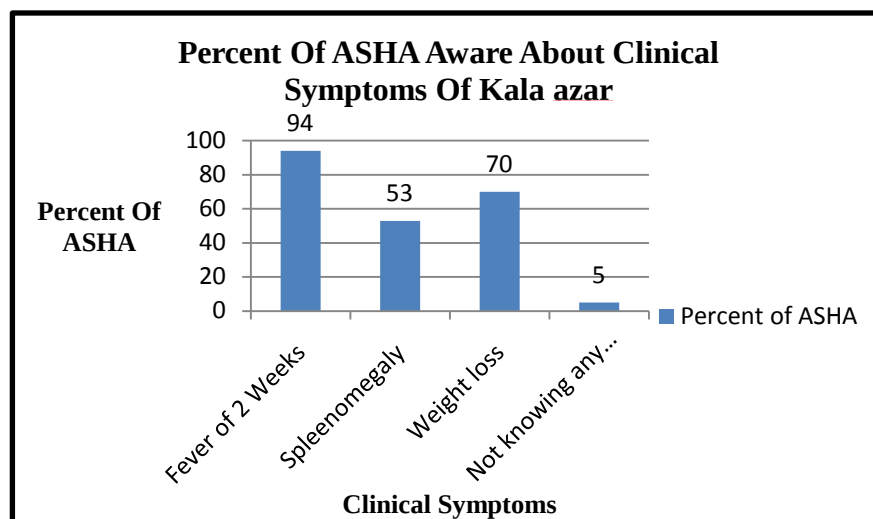
### **Interpretation-**

From table no-6 it can be seen that percent of ASHA aware about disease transmission is only 40 percent who mentioned correctly sandfly as a transmitting agent whereas 30 percent said it spreads through mosquito. On asking treatment of kala azar only 10 percent ASHA were able to reply miltefosine as first line of drug. Hardly 15 percent ASHA has received any specific training

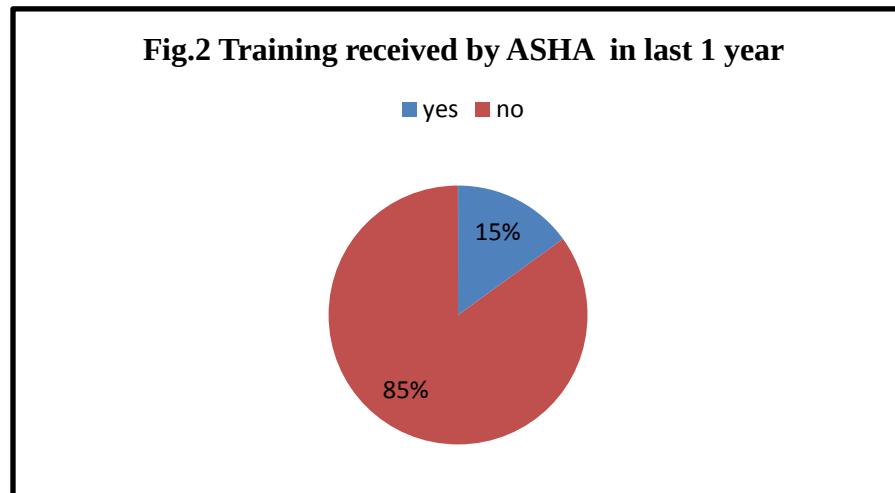
on kala azar in last 1 year. Only 17 percent ASHA were those who detected any new case among them not even single ASHA had got any incentive till now.

32 percent ASHAs ever referred any case to health centres. Not a single ASHA had any IEC material for counseling or awareness campaign. Among the presenting signs of VL fever is mentioned by 94 percent of ASHA other symptoms reported were splenomegaly 53 percent of ASHA, loss of appetite and weight 70 percent. 5 percent ASHA reported not knowing any sign of VL.

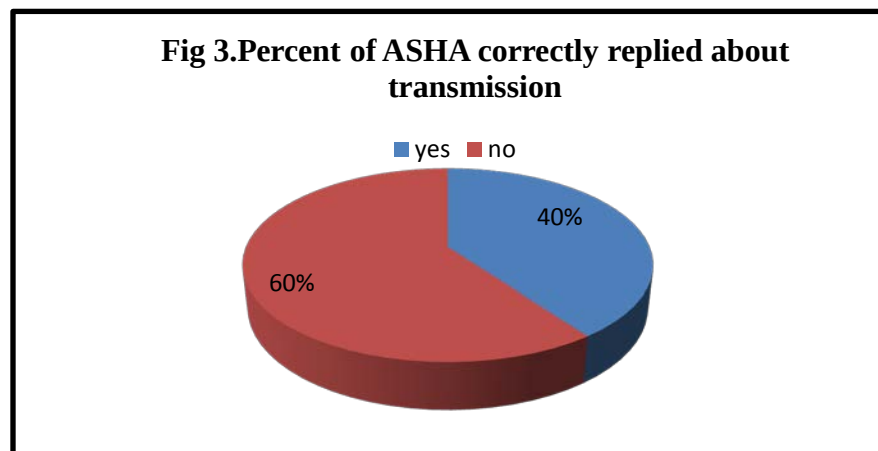
**Fig 1. Percent of ASHAs aware about clinical symptoms of kala azar**



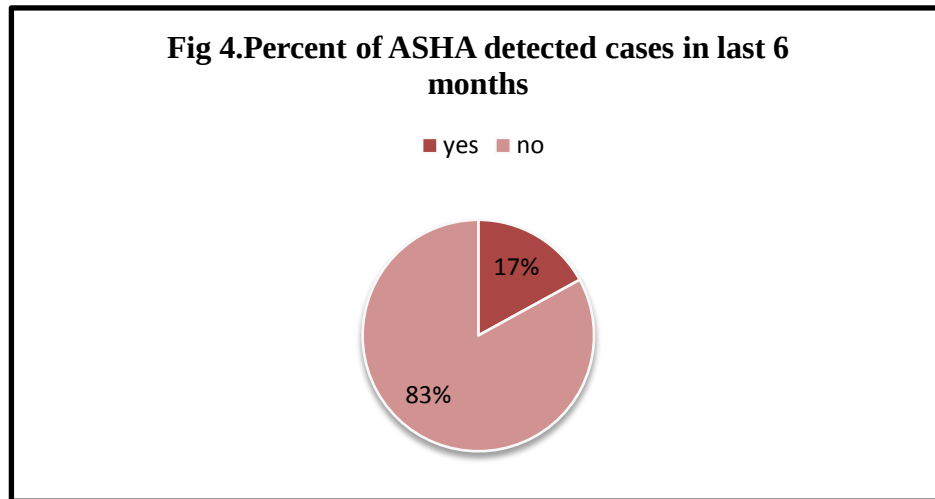
Total 100 ASHA were taken from two blocks their knowledge about symptoms is quiet good. More than 90 percent know about fever for more than 2 weeks, 53 percent know about splenomegaly and only 5 percent were who didn't knew about any sign and symptom. But while asking question it was observed that this much they know due to cases they have seen in villages as such no technical training imparted to them.



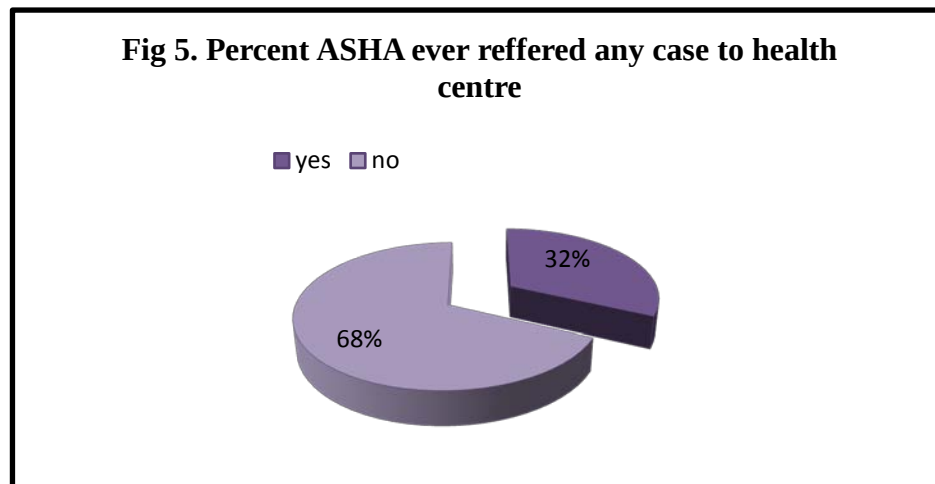
Out of 100 ASHAs hardly training is given to 15 percent that too not of any specific on VL. Some of them told that during their training at district for ANC,PNC they have been only briefed few points on VL nothing specific was told during sessions.



In fig 3.when they were asked about transmission of disease 60 percent mentioned it spreads through sandfly whereas 40 percent includes answers like mosquitos,dirty water.



From Fig 4. It can be interpreted that hardly 17 ASHAs out of 100 has detected any new case in past 6 months. For successful elimination of kala azar it is necessary to involve ASHA rigorously in VL program for early case detection and treatment completion.



Whereas 32 ASHA were who had ever reffered any case of kala azar to health centres among 100 who were interviewed.

## Discussion-

Most of the ASHA were aware of presenting sign and symptoms of kala azar whereas first line of drug used for treatment was apparently not known by many. Hardly ASHAs were given any specific training on kala azar. Among those who detected cases only 2 ASHA received incentives. This demotivates them and one of the constraint in case detection and community mobilization other than this they are also not having any IEC material available on kala azar for counseling. The ASHAs, who are volunteer workers, do expect to be paid some incentive, but the amounts mentioned were certainly not exorbitant. Moreover, an earlier study in the same region showed that paying incentives to ASHAs worked well in increasing early case detection of VL (Singh et al. 2011).

**Table-7 Swot Analysis For IEC and Social Mobilization**

|                        | <b>STRENGTH</b>                                                                                                                                                           | <b>WEAKNESS</b>                                                                                                                                                                                                                                                        |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1.</b>              | Availability of kala azar advocacy and communication strategy.                                                                                                            | <b>1.</b> Non availability of IEC material.<br><b>2.</b> Lack of involvement of ASHA into VL program.<br><b>3.</b> Untrained village health worker on kala azar.<br><b>4.</b> Incentives not paid for case detection and treatment completions (only 2 got out of 20). |
|                        | <b>OPPORTUNITIES</b>                                                                                                                                                      | <b>THREATS</b>                                                                                                                                                                                                                                                         |
| <b>1.</b><br><b>2.</b> | Existence of community structures such as the Village Development Committee (VDC) and Village Health Committees (VHC).<br>Engaging existing Community Based Organisations |                                                                                                                                                                                                                                                                        |

### Qualitative analysis-

The in depth interview was done with MOICs and DMO the outcome of which is as follows-As per DMO the major strategy of kala azar which is most focused is IRS. Thus it remains the most effective strategy for the disease.

DMO told “the resource available with district for IRS is enough but not utilized optimally since in government system nobody wants to work”.

On interviewing 14 MOICs at PHC all of them mentioned that for strategies like case detection, community mobilization, IEC major drawback is ASHA lacks involvement in program. They lack training on kala azar.

According to MOICs, VBD and DMO the major improvement that had occurred in last few years is the tremendous decline in case incidence of kala azar patients, it was 2644 in 2011 where as of now it is only 764 to this they added weather it's a cyclic pattern or actually decreasing due to IRS its tough to say yet.

“DMO mentioned that co ordinating with external partners like NGOs can be of great help in improving the quality of spray by strict monitoring and for other strategies too like in IEC or for capacity building of ASHA.”

The MOICs in their interview mentioned that one of the major gap is that PHCs are not involved in micro planning of any strategy rather they feel for streamlining the program it is very much necessary.

As per DMO the new strategies on roll are-

- a) For line listing of kala azar patient HMIS system is developed which will be piloted soon(supported by care).
- b) Improving the monitoring of IRS round (ICR ROOM)created in DMO office for daily reporting on coverage of villages.
- c) skilled Health workers with case detection kit (rk-39) will be sent in fields for testing patients.

The external factors that may affect strategies are (DMO) - Political influence, climatic conditions hampers IRS activity, active surveillance.

## Section 9. Conclusion

*Kala-azar* can be prevented and controlled by early detection and prompt treatment of cases along with adoption of preventive measures. The prevention of *kalaazar* should be given emphasis or the risk of infection can be reduced through health education, patient education and counselling, regular spraying of insecticides such as DDT. From the above study it can be concluded that there is an urgent need to focus on strengthening IRS strategy by streamlining microplanning at block level and ensuring monitoring and supervision during IRS activities. In VL control, ASHAs provide a so far largely untapped resource that can make a major contribution. They need to be motivated for case detection and IEC by involving and ensuring their incentives. ASHAs, being the interface between community and health staff, should be utilized and motivated towards active case detection. There should be orientations of ASHAs before each IRS possibly in the months of January and April since these months correspond to those when IRS operations preparation begins. The subsequent months (February and May) should be utilized to inform community regarding the sprays and their co-operation needs to be sought. Efforts to improve quality of IRS operations and further research on alternative and integrated vector control methods need to be promoted to reach the VL elimination target by 2015. Community cooperation is to be gained for indoor residual spraying.

## Section 10. Suggestions-

The most benefit can be expected from strengthening vector control effects- IRS with DDT will be the main control tool for reducing the vector and human contact.

**Following are few suggestions after analyzing gaps-**

- A) Strengthening micro planning for IRS at district level.
- B) Incentivization of sprayers.

- C) Community involvement in the IRS through local advocacy, involvement of community-based volunteers from most-affected populations, developing patient support groups, and raising KA awareness in the community by mass media and social mobilization.
- D) Strong monitoring of spray workers during IRS.

**For early diagnosis and treatment-**

- A) Capacity building of ASHA about kala azar and involvement in community mobilization by streamlining incentives which are to be paid to ASHA on case detection and completion of treatment.
- B) Active search through khoj camps.
- C) Ensuring provision of loss of wages & free food for patient & attendant.

**For IEC and BCC-**

- A) Tin Plate for Drug schedule in all affected PHC.
- B) Banner, Posters, Hording about kala azar.
- C) TV Telecasting & Radio Broadcasting:- Frequent Awareness programme telecast by Bharat Nirman & Kalyani Programme of National Doordarshan, Bihar Channel.
- D) News paper advertisement for KA programme & IRS activity.
- E) ASHA, AWW, PRI Members, NGOs, FBOs, CBOs & school teacher introduced in awareness programme.
- F) ASHA/Aaganwadi – With support from ICDS. Letters to all concerned PHCs.
- G) Rogi Kalyan Samiti – Members to be briefed and involved.
- H) Village Health and Sanitation Committee- To conduct meeting in each village.
- I) Public Relation Department- Network to be used for dissemination of information through film show/ Miking.
- J) Song & Drama Division of Govt. of India – To organise Nukkar Natak, Sangeet Mandali.

**Ethical consideration:**

Confidentiality of respondents will be maintained and informed consent will be taken.

## REFERENCES:

- Mathers CD, Ezzati M, Lopez AD. Measuring the burden 1. of neglected tropical diseases: the global burden of disease framework. *PLoS Negl Trop Dis* 2007; 1 : e114.
- Narain JP, Dash AP, Parnell B, Bhattacharya SK, Barua S, 2. Bhatia R, *et al.* Elimination of neglected tropical diseases in the South-East Asia Region of the World Health Organization. *Bull World Health Organ* 2010; 88 : 206-10.
- Alvar J, Vélez ID, Bern C, Herrero M, Desjeux P, Cano J, 3. *et al.* Leishmaniasis worldwide and global estimates of its incidence. *PLoS One* 2012; 7 : e35671.
- WHO. 4. *Update on the status of visceral leishmaniasis (kala azar) in the SEA region.* New Delhi: WHO SEARO; 2010.
- Singh SP, Reddy DC, Rai M, Sundar S. Serious underreporting 5. of visceral leishmaniasis through passive case reporting in Bihar, India. *Trop Med Int Health* 2006; 11 : 899-905.
- Sacks DL, Kenney RT, Kreutzer RD, Jaffe CL, Gupta AK, 6. Sharma MC, *et al.* Indian kala-azar caused by *Leishmania tropica*. *Lancet* 1995; 345 : 959-61.
- Swaminath CS, Shortt HE, Anderson LA. Transmission of 7. Indian kala-azar to man by bites of *Phlebotomus argentipes* Annandale & Brunetti. *Indian J Med Res* 1942; 30 : 473-7.
- WHO. 8. *Regional strategic framework for elimination of kala-azar from the South-East Asia region (2005-2015).* New Delhi: Regional Office for South-East Asia SEA-VBC-85 (Rev-1). World Health Organization; 2005.
- Croft SL, Sundar S, Fairlamb AH. Drug resistance in 9. leishmaniasis. *Clin Microbiol Rev* 2006; 19 : 111-26.
- Dinesh DS, Ranjan A, Palit A, Kishore K, Kar SK. Seasonal 10. and nocturnal landing/biting behaviour of *Phlebotomus argentipes* (Diptera: Psychodidae). *Ann Trop Med Parasitol* 2001; 95 : 197-202.
- Picado A, Das ML, Kumar V, Dinesh DS, Rijal S, Singh SP, 11. *et al.* *Phlebotomus argentipes* seasonal patterns in India and Nepal. *J Med Entomol* 2010; 47 : 283-6.
- Ostyn B, Vanlerberghe V, Picado A, Dinesh DS, Sundar 12. S, Chappuis F, *et al.* Vector control by insecticide-treated nets in the fight against visceral leishmaniasis in the India.

## Annexure I

### Checklist for pre-spray activities at PHC level

Name of PHC: .....District.....

Spray year: \_\_\_\_\_

Spray Round: First / Second (Tick)

Date of filling this form:.....

| No.                  | Topic area/component                                                                                       | Yes / No | Timeline for completing the task | Remarks |
|----------------------|------------------------------------------------------------------------------------------------------------|----------|----------------------------------|---------|
| <b>1. Micro Plan</b> |                                                                                                            |          |                                  |         |
| 1.1                  | Has the microplan for this round been made?                                                                |          | Before 45 days of each IRS round |         |
| 1.2                  | Has it been submitted? If submitted then mention the date of submission.....                               |          | Before 30 days of each IRS round |         |
| 1.3                  | Does the PHC have the updated and complete list of villages having any KA patient in the last three years? |          | Update every month               |         |
| 1.4                  | Is the PHC planning to spray all the villages which                                                        |          |                                  |         |

|                      |                                                                                              |  |                                  |  |
|----------------------|----------------------------------------------------------------------------------------------|--|----------------------------------|--|
|                      | had cases in the last three years in this IRS round                                          |  | Before 45 days of each IRS round |  |
| 1.5                  | Are all line listed patients' houses in the villages identified by LWs / KTSs                |  | Before 45 days of each IRS round |  |
| 1.6                  | Has the date of spray activities been decided for all endemic villages?                      |  | Before 10 days of each IRS round |  |
| 1.7                  | Has the ASHA / village level workers been informed of the date of spraying in their village? |  | Before 7 days of each IRS round  |  |
| 1.8                  | Has a preparatory meeting been held at the PHC for IRS?                                      |  | Before 15 days of each IRS round |  |
| <b>2. Equipments</b> |                                                                                              |  |                                  |  |
| 2.1                  | PHCs have submitted requisition for insecticide, pumps, equipment?                           |  | Before 30 days of each IRS round |  |
| 2.2                  | Insecticide available in PHCs?                                                               |  | Before 15 days of each IRS round |  |
| 2.3                  | Pumps available at PHCs?                                                                     |  | Before 15                        |  |

|                                     |                                                                                       |  |                                        |  |
|-------------------------------------|---------------------------------------------------------------------------------------|--|----------------------------------------|--|
|                                     |                                                                                       |  | days of each IRS round                 |  |
| 2.4                                 | Sufficient supportive equipment (buckets etc) available at PHCs?                      |  | Before 15 days of each IRS round       |  |
|                                     |                                                                                       |  |                                        |  |
| 2.5                                 | Are the stirrup pumps in working order<br>Total working _____ out of Total Pumps_____ |  | Check Before 30 days of each IRS round |  |
| 2.6                                 | Are the supportive equipment in working order                                         |  | Check Before 30 days of each IRS round |  |
| <b>3. Training &amp; monitoring</b> |                                                                                       |  |                                        |  |
| 3.1                                 | Training / Sensitization of spray squad completed?                                    |  | Before 15 days of each IRS round       |  |
| 3.2                                 | Monitoring duty roster of MO and other staff made?                                    |  | Before 15 days of each IRS round       |  |
| 3.3                                 | Monitoring and supervisory teams formed?                                              |  | Before 15 days of each IRS round       |  |
| <b>4. IEC &amp; BCC</b>             |                                                                                       |  |                                        |  |
| 4.1                                 | Villagers informed of dates of spray?                                                 |  | Before 7 days of spray                 |  |
| 4.2                                 | IEC activities (advocacy, meetings and spreading messages) planned?                   |  | Before 30 days of each IRS round       |  |

|     |                                                                                                                 |  |                                  |  |
|-----|-----------------------------------------------------------------------------------------------------------------|--|----------------------------------|--|
| 4.3 | IEC material like hand bills, posters, cards etc available at PHC?                                              |  | Before 15 days of each IRS round |  |
| 4.4 | Is IEC / BCC / Awareness campaign being done for the IRS in the villages. (Mention percent of villages covered) |  | Before 7 days of spray           |  |

## Annexure II

### QUESTIONNAIRE FOR ASHA

Name

Age

Sex                      Male .....(1)                      Female.....(2)

Name of block PHC .....

Q1) Have you heard of kala azar disease?

- a) Yes .....(1)
- b) No .....(2)

Q2) Are you aware that kala azar spreads by sandflies ?( any remarks -)

- a)Yes..... (1)
- b) No .....(2)

Q3) What are the major clinical symptoms for the suspected case of kala azar?

- a) Fever of two weeks not responding to anti malarial and antibiotics..... (1)
- b) Splenomegaly..... (2)
- c) Anemia .....(3)
- d) Loss of appetite and hair .....(4)
- e) All of the above..... (5)
- f) None..... (6)

Q4 ) Drug of choice for kala azar is ?

- a) Miltefosine
- b) Chloroquine
- c) Amlodipine
- d) None of them

Q5) Have you been trained about kala azar in last 1 year?

- a) Yes..... (1)

b) No ..... (2)

Q6) Did you detected any patient of kala azar in past 6 months?

a) Yes .....(1)

b) No..... (2)

SKIP Q5.1 if answer is NO to Q5.

Q6A) If, yes have you received any incentive on detection and follow up of treatment?

a) Yes..... (1)

b) No..... (2)

Q7) Have you ever referred any suspected case of kala azar to health centre?

a) Yes

b) No

Q8) Do you have any book, cards or posters available to aware community about kala azar and IRS activity?

a) Yes..... (1)

b) No..... (2)

Q9) What are the constraints in early detection of new cases ?

a) Non compliance from community

b) Non payment of incentive

c) No problem

Thank You

## Annexure III

### Questionnaire for Government Officials-DMO\VBD\MOIC

Name

Age

Gender                      male .....(1)                      female..... (2)

Address

Q1) What are the major strategies for kala azar at district?

- a) Effective vector control(IRS)..... (1)
- b) Early diagnosis and treatment .....(2)
- c) Active case detection.....( 3)
- d) Community mobilization.....(4)
- e) IEC and capacity building.....(5)
- f) All of the above.....(6)

Q2) Which is the most effective strategy among following helping in eliminating kala azar in district?

- a) IRS( indoor residual spray).....(1)
- b) Early case detection and treatment.....(2)
- c) Active surveillance.....(3)
- d) Community mobilization.....(4)

Q3) What resources does the programme has access to under following strategies-

- a) IRS-
- b) Case detection and treatment-
- c) Community mobilization-
- d) IEC and capacity building-

Q4) Are the available resources optimally used (human and financial resource)?

- a) Yes..... (1)
- b) No.....(2)

Q5) What improvements have been made over past few years?

Q6) What do you see as the strengths of ongoing strategies?

Q7) What challenges does the following strategies have-

- a) IRS-
- b) Early case detection and diagnosis-
- c) Community mobilization-
- d) Active surveillance-
- e) IEC-

Q8) what areas could be improved?

Q9) Has the programme done everything possible to overcome the challenges that were identified previously?

- a) .....Yes
- b) ..... No

SKIP Q8.1 If answer is YES to Q8.

Q9.1) If not then why?

Q10) What are the opportunities for various strategies that will facilitate the programme to perform its mission?

Q11) Which partners are ready to work with you?

Q12) What new strategies are being on roll in future?

Q13) What are the external factors that affect the ability of ongoing strategies to perform its mission?

Thank You.