

# Use of Insecticide Bed Nets in Preventing Kala-Azar Fever in Rural Bangladesh: A Field-Based Assessment

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**ABSTRACT:** Kala-azar is one of the most acute vector-borne diseases which has been identified as the second-largest parasitic killer-disease causing deadly impact on human health, and if left untreated, it can cause true fatalities. To be protected from it, the World Health Organization has very recently innovated and suggested using the insecticide-treated, dipped-in bed nets in those regions where kala-azar exists most notoriously among rural communities. This paper is an outcome of a field-based research conducted in a few affected villages in Godagari Upazila of Rajshahi District in the northern part of Bangladesh where the insecticide-treated, dipped-in bed nets are put to use as part of steps taken to prevent the disease. Based on the results, the paper finally provides a few alternative suggestions to the concerned authorities responsible for the implementation of preventive measures for kala-azar who may consider these for their own ameliorative purposes.

## INTRODUCTION

Kala-azar<sup>1</sup> or *Visceral Leishmaniasis* (VL), caused by *Leishmania donovani*, is one of the most acute vector-borne diseases in the world which is identified as the second largest parasitic killer-disease causing at least 200,000 to 400,000 new infections globally every year (see James *et al.*, 2011; WHO, 2015). Of these, around 60% of the cases occur in the Indian sub continent putting the people in a risk zone situation. Through active case detection and serologic screening, it has been learned that since the 1990s, South Asia has been experiencing a resurgence of kala-azar. The disease is most acute in India but it also occurs very frequently in Bangladesh and Nepal.

It has become most notoriously an acute problematic disease, living dormant in patients inside their skin lesion even after recovery (Farzana Nawaz, 2014). Kala-azar parasite enters human organs internally like liver, spleen and bone marrow, and if left untreated, it may cause fatal consequences. The initial symptoms of the disease include chronic fever, substantial weight-loss, fatigue, anemia, continuous swelling of the liver and enlargement of the spleen.

According to the World Health Organization (WHO) Report (2015), kala-azar has always remained an alarming pathological issue and it has now reemerged as a delicate health problem in many parts of the world. It has been learned from multifarious sources (e.g., Mondal *et al.*, 2008; Karim and Mondal, 2012; Karim and Mondal, 2014) that kala-azar has increased significantly in some parts of Rajshahi and

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the surrounding regions of north Bengal, Mymensingh and other places in Bangladesh, causing a few deaths in the rural areas (Karim and Mondol, 2012). Under these circumstances, in 2005, WHO supported a National VL Elimination Programme, a collaborative launch shared by the Health Ministries of Bangladesh, India and Nepal with a target to eradicate kala-azar fully in this region by the year 2015. Bangladesh has adopted several policies and WHO considers that the country has been moving on the right track performing excellently in this context.

To prevent kala-azar, people in the rural areas are taking a lot of measures like using bed nets to prevent mosquitoes and sandflies, avoiding sleeping on the floor and also frequently spilling hot water in the ranch room or cattle room (where cattle lives) to prevent sandfly from breeding and spreading. To be protected from these sandflies, in recent years, the World Health Organization has innovated and suggested using the insecticide-treated, dipped-in bednets. With that purpose, the ICDDR-B<sup>2</sup> has started exploring the possibility of popularizing dipped-in mosquito bed nets mixed with deltamethrin tablet (KO) with a certain amount of water along with some binding agent. This programme has also been sponsored and implemented by other national and international NGOs working in the rural areas in the country<sup>3</sup>. People in the locality however, often suspect such use of medicine as unhygienic, and express their own viewpoints on this matter. This research is therefore designed to know their feelings and reactions about the use of dipped-in bed nets.

#### KALA-AZAR OCCURRENCES

Although kala-azar prevalence has an overwhelming dominance in the Indian sub continent, it also occurs frequently in many parts of the world, particularly in Brazil and Sudan. Most recently, it also occurs rampantly in scattered forms in a few Central and South American nations like Peru and Bolivia (see Karim and Mondal, 2012). Evidently, it may also be noted here that there are hundreds of cases of kala-azar incidences in Europe every year and a few such cases are also detected in North America (see Karim and Mondal, 2014).

Kala-azar was first detected in Bengal and Burduwan in India during the British colonial period

where it was found occurring epidemically and endemically; but today, it also prevails in other parts of India like Assam, Bihar and West Bengal, and with the same pace, it is also remaining dominant in the eastern districts of Uttar Pradesh, Sikkim and to a lesser extent in Tamil Nadu and Orissa (see *Epidemiology of Communicable Diseases*, n.d; Karim and Mondal, 2014). It is suspected that the disease entered Bangladesh very swiftly across the borders of India (see *Banglapedia*, 2004). Kala-azar is now endemic in 34 districts of Bangladesh of which nine districts are severely affected (see Mondal et al., 2008; Bern and Chowdhury, 2006; Karim and Mondal, 2012).

#### PURPOSE OF THE RESEARCH

The major purpose of this paper is to ascertain the problems and constraints that the researchers identify in popularizing the insecticide-treated bed nets. More specifically, we have instigated the participants to maintain honest viewpoints in the discussions. Our targets are to focus on the following issues:

- a) To identify the views of the people as to why some of them are reluctant to use the insecticide bed nets;
- b) To ascertain the pre-conceived perceptions of the local people about using bed nets with the ill-conceived idea that the medicine in it has some bad effects on human health;
- c) To seek villagers' and researchers' suggestions in popularizing the use of dipped-in bed nets.

#### STUDY AREA AND METHODOLOGY

The study has two components and thus utilizes a combination of qualitative and quantitative data from the Focus Group Discussions (FGDs) and structured interviews generated from 60 kala-azar households purposively selected on the basis of random sampling from seven villages of Godagari Upazila of Rajshahi District in Bangladesh. From that perspective, the research has employed two important techniques of gathering field data: one is an interview of 60 heads of households containing 313 family members in a situation where at least one member in the family had suffered from kala-azar at least once recently. This is intended with the idea to relate the

disease with data on the sufferers' socio-cultural surrounding and economic situation which were collected in March 2015.

The paper however, heavily relies on four FGDs involving 40 participants and they were conducted in 2008, where the first author employed his personal observation having informally interviewed a few local people as well. The interviews with the 40 participants in four different FGDs were done separately for men and women of which two groups were assigned for men and the remaining two were done with the women. Each group contained ten respondents, purposively selecting five persons from those who used dipped-in bed nets, and another five persons were chosen from those who abstained from using them. It may be noted here that all these methodological technicalities and selection procedures were planned by the ICDDR-B's site office located in Godagari Upazila<sup>4</sup>. FGD respondents mostly came from the villages of Deopara Union of Godagari Upazila in Rajshahi District which are the worst affected areas in northern Bangladesh (see Karim and Mondal, 2012). The FGDs were very much informal and the respondents participated spontaneously in the conversation, expressing their views regarding the insecticide-treated bed nets.

It is reported that a sizeable number of the people in these villages are Christians, coming from the Santal community, whose main professions are herding pigs and working on other's land as manual labourers (see Godagari Upazila Report, 2015). While interviewing 60 household heads from seven villages of Godagari Upazila, it was found that 44 (73.33%) of them had suffered from kala-azar at certain times in the past and among 313 family members of these selected households, at least 87 (27.80%) persons had contracted kala-azar fever. It may be noted here that all 60 household heads are Santals, a minority ethnic community living in those regions in discrete settlements in the villages (Field data, 2015). Most of the respondents were poor, illiterate and are engaged in farming and herding activities.

#### ATTITUDINAL VIEWS OF THE FGD PARTICIPANTS

The incidence of kala-azar is rapidly increasing in Bangladesh, perhaps because of the discontinuation

of DDT spraying in a few areas of the country (Dinesh *et al.*, 2008). Medical scientists engaged in such research around the country have detected the prevalence of kala-azar in a few specific areas of Godagari Thana of Rajshahi District. As we know it, that kala-azar is transmitted through the bite of a type of sandfly, generically named *phlebotomus argentipes*; it therefore, requires protection from them. To be protected from these sandflies, the World Health Organization has suggested using the insecticide-treated, dipped-in bed nets. With that purpose, the ICDDR-B has started exploring the possibility of popularizing dipped-in mosquito bed net mixed with deltamethrin tablets (also known as K tablet) with a certain amount of water, along with some binding agent. Use of bed nets has become quite popular in Nepal where 58% of the villagers in Titaria and 36.8% in Haraincha village in the country are gaining protection from mosquito and sandfly bites due to the use of bed nets (Koirala *et al.*, '98). But in Bangladesh, people in the rural areas are often unwilling to use such dipped-in medicinal bed nets, suspecting them of being unhygienic. The villagers' discontent in this regard has been expressed in their own viewpoints narrated in this context. This research therefore is designed to know their feeling about and reactions to these issues. Information provided in this section is gathered through the conduct of four FGDs in the locality with direct participation and anchoring of the first author.

#### *Participants' Attitudes Towards Using Insecticide-Treated Bed Nets*

(i) It has been learned from our data, that people in the rural areas are very much aware of the bad effects of kala-azar fever, and for that reason, they are ready to accept any sort of prevention prescribed by the relevant authorities. But in regard to the use of deltamethrin medicine-filled bed nets, the villagers have demonstrated some negative reaction and reluctance because they suspect this medicine is a kind of poison, which according to them might cause some bad effects on human health. Many of the female respondents, especially the young mothers, are reluctant to use it as they think it is unsafe for their children. Pregnant mothers even think that if they inhale the unbearably bad smell of the medicine, it is

TABLE 1

*FGD 1: Female respondents who have used and not used insecticide-treated dipped-in bed nets*

Name of respondent	Village	Age (yrs)	Ethnicity	Religious background	Type of living	Economic standing	Status of dipping
Nasreen Begum	Ishordipur	30	Bangalee	Islam	Mud house	Poor	Yes
Shefali Soren	Barshapara	26	Adibashi <sup>5</sup>	Christianity	Mud house	Poor	Yes
Alberita Tudu	Nabai Battala	33	Adibashi	Christianity	Mud house	Poor	Yes
Asanta Tudu	Gonokadai	33	Adibashi	Christianity	Mud house	Poor	Yes
Feroza Begum	Imamgonj	35	Bangalee	Islam	Mud house	Poor	Yes
Alena Khatun Bobi	Imamgonj	24	Bangalee	Islam	Mud house	Poor	No
Anwara	Bangail	40	Bangalee	Islam	Mud house	Poor	No
Rahima Khatun	Bangail	40	Bangalee	Islam	Mud house	Poor	No
Nazma	Bangail	22	Bangalee	Islam	Mud house	Poor	No
Kohinoor Begum	Imamgong	40	Bangalee	Islam	Mud house	Poor	No

TABLE 2

*FGD 2: Male respondents who have used and not used insecticide-treated dipped-in bed nets*

Name of respondent	Village	Age (yrs)	Ethnicity	Religious background	Type of living	Economic standing	Status of dipping
Krishno Marandi	Nimgutu	40	Adibashi	Christian	Mud house	Poor	Yes
Paresh Tudu	Dhoriangi	55	Adibashi	Christian	Mud house	Poor	Yes
Md. Kenan Hossain	Palpur	55	Bangali	Islam	Mud house	Poor	Yes
Md. Abdur	Ishoripur	52	Bangali	Islam	Mud house	Poor	Yes
Md. Abdul Aziz	Fullbari	45	Bangali	Islam	Mud house	Poor	Yes
Amin Hasda	Nimgutu	55	Adibashi	Christian	Mud house	Poor	No
Ader Ali	Deoapara	65	Bangali	Islam	Mud house	Poor	No
Amirul Islam	Bangail	25	Bangali	Islam	Mud house	Poor	No
Adhin Sing		35	Bangali	Hindu	Mud house	Poor	No
Jatin Kiruk	Nimgutu	55	Bangali	Hindu	Mud house	Poor	No

TABLE 3

*FGD 3: Female respondents who have used and not used insecticide-treated dipped-in bed nets*

Name of respondent	Village	Age (yrs)	Ethnicity	Religious background	Type of living	Economic standing	Status of dipping
Runa Laila Begum	Kharijagati	25	Bangali	Islam	Mud house	Poor	No
Majeda Begum	Bijoynagor	35	Bangali	Islam	Mud house	Poor	No
Majurunnessa Rekha	Kharijagati	35	Bangali	Islam	Mud house	Poor	No
Anwara	Bangail	25	Bangali	Islam	Mud house	Poor	No
Boyshaki	Jamdaho	25	Bangali	Hindu	Mud house	Poor	No
Sheuli Begum	Fullbari	24	Bangali	Islam	Mud house	Poor	Yes
Julakha Khatun	Kharijagati	35	Bangali	Islam	Mud house	Poor	Yes
Monika Marandi	Bangapara	30	Adibashi	Christian	Mud house	Poor	Yes
Molada Khatun	Hatibanda	45	Bangali	Islam	Mud house	Poor	Yes
Rozina	Patorgata	30	Bangali	Islam	Mud house	Poor	Yes

TABLE 4

FGD 4: Male respondents who have used and not used insecticide-treated dipped- in bed nets

Name of respondent	Village	Age (yrs)	Ethnicity	Religious background	Type of living	Economic standing	Status of dipping
Shuresh	Nabai Battala	35	Adibashi	Christian	Mud house	Poor	Yes
Anjulyam Marandi	Patorgata	25	Adibashi	Christian	Mud house	Poor	Yes
Raton Pramanik	Dhamila	75	Adibashi	Hindu	Mud house	Poor	Yes
Vola Mumu	Patorgata	50	Adibashi	Hindu	Mud house	Poor	Yes
Jalal Uddin		38	Bangalee	Islam	Mud house	Poor	Yes
Md. Azizul Haque	Bangail	58	Bangali	Islam	Mud house	Poor	No
Md. Altaf Hossain	Imamgong	45	Bangali	Islam	Mud house	Poor	No
Abdur	Mollapara	35	Bangali	Islam	Mud house	Poor	No
Md. Tuslem Ali	Imamgong	55	Bangali	Islam	Mud house	Poor	No
Hassan	Imamgong	26	Bangali	Islam	Mud house	Poor	No

quite logical that it would eventually cause sickness of their babies in their wombs.

(ii) Many female respondents categorically mentioned that the medicine smells bad and its odor is extremely intolerable; they think it could be harmful to human beings.

(iii) While preparing the medicine, the Field Research Assistants (FRAs) in the villages usually use gloves creating suspicion among the villagers. From a practical point of view, it is quite justified that the FRAs mix the deltamethrin tablets in water and they continuously do this type of work from door to door. But it creates suspicion among the villagers who argue that the FRAs would certainly not use the gloves, if the medicine is not injurious to health. Some people further mentioned that they observe that when used water is thrown outside, it looks colorful and foamy which creates further suspicion among the bed net users.

(iv) A few respondents were of the view that they would not use the bed nets as during the hot summer it becomes unbearable to sleep inside them which corroborates with the viewpoint of Koirala *et al.* ('98) who mention of a similar situation in regard to the use of bed nets in two villages in Nepal.

(v) Many of the respondents who use the deltamethrin tablets for their bed nets mentioned that they do not kill the flies; instead, they kill other insects, cockroaches and mice. The villagers argue that if the medicine could not kill the sand fly, why then should they use it?

(vi) Many of the participants convincingly admitted that although initially they were a little hesitant in using the dipped-in bed nets, later on, they realize their usefulness and would use them without any hesitation.

#### CONCLUSION

Based on the earlier analytic discussion, it can be clearly concluded that motivating and convincing the rural people may popularize the use of insecticide-treated mosquito bed nets. Social mobilization techniques should make it clear that the dipped-in mosquito bed nets are not harmful; rather, they protect the people from the sand flies named *Phlebotomus argentipes*.

It is apparent that many of the participants complained that the medicine could not kill the sandflies; rather, their numbers are increasing day by day. Clearly, this indicates that the sand flies find comfortable breeding grounds in the environment which is polluted by people living there, so preventive measures should be taken by the community and monitored by the authorities. In this context, we suggest that these measures should be taken hand in hand with the advocacy programme that popularizes the use of dipped-in mosquito bed nets. Simultaneously, the villagers should also be provided with objective knowledge on personal hygiene and sanitation as clean and hygienic environment may eventually help reduce the spread of sand flies. It may further be noted that since the people in the region

are complaining about the medicine, the pharmaceutical part of it should be tested further to gain the confidence of the people.

It may be noted that the Barind region is inhabited by a number of tribal people and since they rear pigs in large numbers, it is quite likely that the sandflies can find a conducive environment to grow further. Preventive measures should thus be taken; otherwise, the villagers will blame these minority ethnic groups as polluters of the environment creating misunderstanding among the people living in those communities. In the concluding statement, the second author of this paper reminded us about the existence of a similar type of severe fever prevailing in Chittagong Hill Tracts in Bangladesh, which require clinical testing for authenticity. Both of us have desires to gather a comparable line of data on this issue in a further socio-anthropological investigation on Chittagong Hill Tracts to be materialized soon.

#### NOTES

1. The word 'kala-azar' comes from Hindi language of India meaning black fever; it is also known as Indian *leishmaniasis* in which a patient initially suffers from fever associated with appetite loss, anorexia and fatigue, enlargement of the liver, spleen and lymph nodes. The word 'black fever' is clinically named as *leishmaniasis*, and in the past, this fever was also often called 'dumdum fever', because it can trace its origin to that particular region of West Bengal in India (see Mondal *et al.*, 2008; Karim and Mondal, 2012; Karim and Mondal, 2014).
2. ICDDR-B, is the abbreviated word for International Centre for Diarrhoeal Disease Research-Bangladesh, which works as an international health research institution locating in Dhaka and having been expanded to its catchment laboratory areas at Matlab in Chandpur District. ICDDR-B was first established as the SEATO Cholera Research Laboratory (CRL) in 1960 and so far, it has the record of saving over 50 million lives, mostly the children under five through oral rehydration solution (ORS) and zinc therapy.
3. World Vision has recently started frequent spraying of protective medicine in the kala-azar affected areas of Bangladesh to prevent the spread of sand flies (based on field data 2015).
4. Apart from assisting the ICDDR-B project in Godagari Upazila, the first author of this paper conducted the FGDs

on his own through his personal initiatives in 2008; this paper is the outcome of those FGDs.

5. 'Adibashi' is a word used by the local people to designate the ethnic minorities who have been living in the areas of the Barind Tract for many years. The word does not mean that they are the original settlers in the land which is still a debatable issue. A group of *orang asli* (etymologically, *orang* means people and *asli* means original) in Malaysia is also named in that perspective, but it has never been recognized that these *orang asli* are the original settlers in Malaysia.

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