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# Knowledge, attitudes, and practices about kala-azar and its sandfly vector in rural communities of Nepal\*

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*Reported are the results of a study of the knowledge, attitudes and practices (KAP) about kala-azar of the inhabitants of two villages (Titaria and Haraincha) situated in terai (plain) areas of Nepal. The villagers had poor knowledge about the transmission of kala-azar, with most villagers perceiving that mosquitos, instead of sandflies, were responsible for transmission of the infection. Most also failed to recognize the common symptoms of kala-azar. The majority of the respondents, 78.9% in Titaria and 48.4% in Haraincha, were aware that the condition can be treated, while fewer than 2% believed that it cannot be treated at all. More than 58% of villagers in Titaria and 36.8% in Haraincha used bednets. The residents of both villages were highly responsive to a programme to spray houses with insecticides. Fewer than 5% of respondents slept outdoors in farm outhouses and these individuals did not take any personal vector control measures. The results of this study show the importance of understanding the beliefs and practices of communities in the successful planning and implementation of kala-azar control activities in Nepal.*

## Introduction

Kala-azar (visceral leishmaniasis), caused by *Leishmania donovani*, was endemic in southern *terai* (plain areas) of Nepal during the early 1950s. However, the number of cases gradually declined over the period 1965–70, which was attributed to the spraying of insecticides by the malaria vector control programme. The DDT that was extensively used to control mosquito vectors was also effective against sandflies, the vector of kala-azar. Discontinuation of the malaria control programme led, however, to an increase in the sandfly population, and a resurgence in kala-azar.

Resurgence of kala-azar among the rural populations of the southern *terai* of Nepal in the eleven districts bordering the kala-azar-endemic areas of Bihar in India now poses a major health problem. Nearly 5.3 million people are estimated to be at risk. In Nepal, a total of 4511 cases and 166 deaths from kala-azar were documented and reported over the period 1980–92 (1). This, however, may well be an underestimate since the majority of cases are unreported, unrecognized, or undocumented.

Little is known about how individuals and communities in rural areas of Nepal that are endemic for

kala-azar perceive the disease and its management. Such information is, however, vital because successful control of any infectious disease requires a high level of understanding of the social and cultural characteristics of individuals and communities residing in endemic areas.

The objectives of the present study were two-fold: first, to elucidate knowledge, attitudes and practices (KAP) about kala-azar in two rural communities of Nepal; and second, to propose culturally sensitive and appropriate recommendations for its prevention and control.

## Materials and methods

### Study area

The study was carried out in two villages (Titaria and Haraincha) in Morang district, eastern Nepal. These villages were selected because they have a high incidence of kala-azar; both are situated in a plain areas of the country.

Titaria and Haraincha have a population of 1019 and 1178, respectively, the majority are Hindus (Titaria, 98.3%; Haraincha 93.9%), with the remainder being Muslims, Buddhists, Christians, etc. Males made up 56.4% and 54.6%, respectively, of the population in Titaria and Haraincha and farming was the main livelihood. Mostly rice was cultivated but mustard seeds and vegetables were also grown by some people in each village. Other sources of income included day-wage jobs in the private sector, and teaching and white-collar jobs in the public sec-

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tor. More than half of the people in both villages had an average annual income <NPR 10000 (<US\$ 180). The remainder had incomes in the range NPR 10000–20000 (US\$ 180–360) (29% in Titaria and 19.9% Haraincha), NPR 20000–50000 (US\$ 360–900) and >NPR 50000 (US\$ 900) (3.5% in Titaria and 1.2% in Haraincha). Most respondents (43.9% in Titaria and 55.6% in Haraincha) were illiterate. In both villages, 18–20% had received primary or secondary school education and only 0.6–1.0% a tertiary education.

### Study method

The survey had two components; first, a qualitative village study involving interviews and discussion with community groups to obtain overall information about kala-azar; and second, a quantitative study carried out by household interview using a written, structured questionnaire.

In the qualitative study the villages were visited by a team comprising all the investigators (two doctors, a microbiologist and a qualified entomologist). In each village the team met with various groups, local heads of the community, and local health teams to assess the overall situation with regard to kala-azar. In-depth analysis of the problem in each village was carried out using a household census approach, collecting data on the number of people in each house, heads of households, age, religion and occupation of inhabitants, type of house, etc; also discussions were held about people's treatment-seeking behaviour and the facilities used by the people for kala-azar, such as home treatment, traditional (ayurvedic) treatment, etc.

The quantitative study was carried out using household-based interviews administered via a structured questionnaire survey. The questionnaire was designed to elucidate information on respondents' KAP about kala-azar. The questionnaire permitted collection of data on respondents' knowledge about the cause of kala-azar; programmes for spraying houses with insecticides; recognition, transmission, and symptoms of the disease; use of bednets; modes of treatment and availability of health facilities; sources of health information; and utilization of health services. In addition, information was also obtained on the presence of animal sheds near houses; outdoor and indoor sleeping habits of the respondents; and water collection facilities. The questionnaires were written in Nepalese, and local people or workers who had at least high school education and who were fluent in both Nepalese and Hindi were selected as volunteers to administer these questionnaires to the male heads of households between 08:00 and 17:00. If no male head of

household was available, a female head of household was interviewed. Decisions about health and other related activities were, in any case, mostly taken by female heads of households.

## Results

### Practices and knowledge about kala-azar

The qualitative survey by field visit and discussion with groups of people of these two villages indicated that less than half of the villagers had some knowledge about kala-azar.

Analysis of the answers to the quantitative structured, questionnaire showed that the majority of people did not know how kala-azar is transmitted. A small proportion (1.0–2.2%) in both villages believed that kala-azar was transmitted by mosquitos. A few people recognized the role of the sandfly as a vector of kala-azar, while a few also mentioned that dirt, houseflies, etc., also can transmit the disease. In Titaria nearly two-thirds (73.6%) but in Haraincha only one-third (37.9%) stated that kala-azar is a communicable disease and almost the same proportions (71.3% in Titaria and 32.3% in Haraincha) suggested that cases of kala-azar should be kept in isolation. When asked what they understand by isolation and how to implement it, more than 60.2% of respondents in Titaria and 6.9% in Haraincha said that patients with kala-azar should avoid eating sour and fatty food. Other "isolation methods" mentioned by respondents are summarized in Table 1.

### Symptoms of kala-azar

The majority of respondents (63.4% in Titaria and 75.6% in Haraincha) stated that they were unable to describe either the symptoms or clinical presentation of kala-azar. Table 2 summarizes the respondents' knowledge about the symptoms of the disease or its clinical presentation.

### Treatment of kala-azar

A total of 78.9% of the respondents in Titaria and 48.4% in Haraincha were aware that kala-azar can be treated, while fewer than 2% believed that the condition could not be treated at all. The rest of the respondents in the two villages answered that they didn't know whether or not kala-azar could be treated. Most of the respondents believed that Western (allopathic) medicine is effective in treating the condition, while 2–3% stated that ayurvedic medicine and treatment by *jhankri* (local traditional health workers) are effective. In Titaria, nearly 20% of the population was not aware whether kala-azar could be treated at all.

Table 1: Methods of "isolating" cases of kala-azar suggested by the survey respondents

Method	No. of respondents in:	
	Titaria (n = 1019)	Haraincha (n = 1178)
<i>Avoid:</i>		
Eating sour, hot, and fatty food	613 (60.2) <sup>a</sup>	81 (6.9)
Eating cases' left-over food	2 (0.2)	3 (0.3)
Touching cases' clothes	2 (0.2)	5 (0.5)
Sexual intercourse with a case	1 (0.1)	4 (0.4)
Sharing clothes and food with cases	80 (7.9)	100 (8.5)
Touching urine and stools of cases	1 (0.1)	2 (0.2)
Seek advice from a doctor	1 (0.1)	112 (9.5)
Don't know	314 (30.8)	713 (60.5)
No answer	5 (0.4)	158 (13.2)

<sup>a</sup> Figures in parentheses are percentages.

Many respondents preferred to seek treatment from the nearest government health posts. Other services that were sought after were local private doctors, hospitals, and *dhamis* (local traditional faith healers), in that order. The respondents appeared to be satisfied with the treatment given at government health institutions, although they listed many of the difficulties associated with seeking treatment there. These included the long time taken to register at these facilities, the nonavailability of doctors, lack of proper attention given to patients by the doctors, lack of facilities for transporting patients to hospital, and patients' inability to pay for the services.

### Prevention of kala-azar

When they were asked about what preventive measures could be taken to avoid contracting kala-azar, 31.8% of the respondents in Tiataria and 28.9% in Haraincha said that the disease can not be pre-

vented. The preventative measures suggested by the remaining respondents are summarized in Table 3.

**Use of bednets.** Bednets were used by 58% of the respondents in Titaria and by 36.8% in Haraincha to gain protection from mosquito bites and to sleep peacefully without being disturbed by the noise made by mosquitos. The rest of the respondents did not use bednets, and of such individuals 47.4–58.5% did not possess any bednets. Other reasons given by the respondents for not using bednets were that it becomes too hot to sleep inside them especially during summer months and that it is inconvenient to use them all the time. None of the respondents mentioned that they used bednets in order not to be bitten by the sandfly vectors of kala-azar.

**DDT spraying programme.** A total of 87–96% of respondents in both villages believed that spraying with insecticides kills mosquitos. Many, however,

Table 2: Symptoms of kala-azar, as described by the survey respondents

Symptom	No. of respondents in:	
	Titaria (n = 1019)	Haraincha (n = 1178)
Fever	249 (24.4) <sup>a</sup>	111 (9.5)
Patient's skin turns black	78 (7.7)	31 (2.6)
Headache	39 (3.8)	4 (0.3)
No appetite	1 (0.1)	2 (0.2)
Measles-like symptoms	1 (0.1)	1 (0.1)
Don't know	646 (63.4)	891 (75.6)
No answer	5 (0.4)	138 (12.7)

<sup>a</sup> Figures in parentheses are percentages.

Table 3: Measures to avoid contracting kala-azar, as reported by the survey respondents

Measure	No. of respondents in:	
	Titaria (n = 1019)	Haraincha (n = 1178)
Treatment with specific medicines	348 (34.2) <sup>a</sup>	258 (21.9)
Use of bednets	14 (1.4)	23 (2)
Isolation from patients	13 (1.3)	2 (0.2)
Keep surroundings clean	8 (0.63)	0
Spraying of insecticides	0	3 (0.3)
No preventative measures are available	344 (31.8)	325 (28.9)
Don't know	292 (30.7)	611 (48.3)

<sup>a</sup> Figures in parentheses are percentages.

were not aware that insecticides such as DDT also kill the sandfly vectors of kala-azar.

In both villages 85–89% of respondents had allowed their houses, both inside and outside, to be sprayed with DDT. A much smaller proportion of respondents (1.2–2.1%) in both the villages permitted only the outside of their houses to be sprayed, for various reasons, including disruption of household activities, the pungent and bad smell of the insecticides, and lack of interest in the programme. On being asked about the need to clean their houses after insecticide spraying, only 3.7% respondents in Titaria stated that there was no need to do so. The rest of the respondents stated that they cleaned their houses at various intervals after spraying ranging from a minimum of 2 days to as long as 3 months.

In both villages 0.3–0.4% of respondents also had their animal sheds adjacent to their houses sprayed with insecticides.

### **Health communications**

The sources of information about health issues listed by the respondents included reading newspapers, listening to the radio, and watching movies. The majority of respondents (56.7–62.5%) in both the villages listened to the radio, and, of these, 40–55% of respondents listened to health programmes. Only 22.4–27.5% of respondents in the two villages read newspapers published in Nepalese, and of such individuals fewer than 3–4% read them regularly.

### **Housing, social, and domestic habits**

In Haraincha, nearly half of the houses (48.9%) were located in isolated places, while in Titaria fewer than 7.9% of houses were isolated, with the remainder being in groups or clusters. The majority of the houses were constructed of wood and bamboo and plastered with clay. The roofs of such houses were thatched and a few had tiles. Some of the houses with cemented walls had cemented roofs. A total of 68.6–74.4% of houses had sheds for housing cows, buffalos, pigs, goats, chickens or other animals. In 26.9–51.8% of these houses, the sheds were located within 3 m of the house. In Titaria, only 26%, and in Haraincha, 21% of the houses had toilet facilities, mainly temporary structures but in a few cases permanent. The rest of the houses had no toilet facilities and their inhabitants used nearby fields for this purpose. In both the villages, more than 85% of respondents slept inside their houses and of such individuals nearly 17% did so in the kitchen. Fewer than 5% slept outside their houses, such as in farm out-houses, but the proportion varied throughout the

year. A total of 97% of the respondents said that they cleaned their houses with a broom daily, while more than 68% stated that they cleaned the walls of their houses with a broom at least once a week, but that during festivals they cleaned the walls thoroughly at least twice per day.

## **Discussion**

In recent years increasing emphasis has been laid on the active participation of individuals and communities in successful disease control programmes. Many studies have been conducted to assess the knowledge, attitude, and practices of residents towards diseases such as malaria and onchocerciasis (2–4).

Kala-azar is a major public health problem in Nepal and its prevention and control are priorities. To best of our knowledge, no studies have previously been conducted to assess the beliefs and practices of communities about kala-azar in Nepal. The present study was, therefore, undertaken to study respondents' KAP towards kala-azar with the aim of using the data collected in a practical way to control kala-azar at the individual and community levels.

The results of our study show that villagers' knowledge about transmission of kala-azar was poor. Most of the villagers perceived that mosquitos rather than sandflies were responsible for transmission of the disease. Only a few villagers recognized the role of sandflies in the transmission of kala-azar, but when these individuals were asked to identify and describe sandflies many failed to do so correctly. This finding is important, since if sandflies are not perceived to be important in the transmission of kala-azar villagers may not take appropriate measures to protect themselves against their bites. This attitude needs to be corrected because related studies have demonstrated that if villagers do not perceive mosquitos to be responsible for diseases such as malaria they do not take enough measures to protect themselves against the vector (4, 5). If the villagers in our study received proper health education they could be told that sandflies are the sole vectors of kala-azar and would subsequently be more receptive to the use of insecticide sprays to control them.

Noteable in the study was that most of the villagers failed to recognize the common symptoms of kala-azar; only a small proportion of respondents recognized fever and blackening of the skin as symptoms. However, it is encouraging that more than half of the villagers believed that through proper treatment kala-azar can be cured as well as prevented. The majority of villagers sought treatment at local health facilities, although they stated that the quality

of health services offered by these centres needs to be improved considerably.

More than 58% of villagers in Titaria and 36.8% in Haraincha used bednets. Many studies on the use of bednets to control malaria have shown that individuals living in malarious areas prefer bednets because they provide privacy as well as a barrier to mosquitos (6, 7). In our study many individuals used bednets to protect themselves from the bites of mosquitos and to sleep without being disturbed by the noise made by the insects. By building on this knowledge, health workers might be able to reinforce further the use of bednets by explaining that they can also prevent biting by sandflies, since none of respondents were aware of this.

It was encouraging to note that villagers in Titaria and Haraincha were highly responsive to the house spraying programme. Spraying coverage was 87–96%; moreover, two-thirds of respondents had their homes sprayed inside and out. The main reason respondents gave for allowing their houses to be sprayed with insecticides was the resulting reduction in the number of mosquitos; however, the villagers did not know that insecticides such as DDT also kill sandflies. Therefore, the villagers need to be informed about this, which would probably encourage other villagers also to have their houses sprayed. Many villagers cleaned their houses immediately after they had been sprayed with insecticides. This practice needs to be discouraged by health workers and villagers should be informed that by doing so they are interfering with the residual properties of the insecticide and rendering it ineffective against sandflies.

Fewer than 5% of respondents slept outdoors in farm outhouses, and of those respondents sleeping indoors a small proportion did so in the kitchen. These groups sleeping outdoors or the kitchen did not use any bednets or any personal vector control measures such as mosquito coils, repellents, etc. This therefore, constitutes an important group of hosts susceptible to sandfly bites and hence at risk of acquiring kala-azar. There is a need, therefore, for health workers to make such people aware that sleeping outside without taking appropriate personal vector control measures exposes them to infection from the bites of sandflies.

The data obtained in studies such as the present can be very useful for planning or evaluating kala-azar control activities. The results of the study indicate that a serious and consistent effort through public health activities is essential to educate villagers about kala-azar, its transmission, and treatment. Female volunteers, who receive training in basic activities such as midwifery and often are the first to detect cases and refer them to nearby health centres,

form an important group of health workers in rural areas of Nepal. These volunteers could be used effectively to provide health education on kala-azar, its transmission, use of bednets, and insecticide spraying programmes to villagers. Low utilization of these workers at the grass roots health cadre in the villages might adversely affect control of kala-azar (8, 9). Optimal use of local health volunteers should encourage the active participation of villagers and the community in the kala-azar control programme in this part of Nepal.

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### Résumé

#### Connaissances, attitudes et pratiques au sujet du kala-azar et de son phlébotome vecteur dans des communautés rurales du Népal

Les auteurs exposent les résultats d'une étude sur les connaissances, les attitudes et les pratiques (CAP) des habitants de deux villages (Titaria et Harainchal) de plaine (*terai*) du Népal au sujet du kala-azar. Les villageois n'ont pas une idée très claire de la transmission de la maladie et la plupart s'imaginent que ce sont les moustiques et non les phlébotomes qui propagent l'infection. Ils sont le plus souvent incapables de reconnaître les symptômes habituels de la maladie. La majorité des personnes enquêtées, soit 78,9% à Titaria et 48,4% à Harainchal, se rend compte que cette maladie peut être traitée et moins de 2% pensent qu'elle est totalement incurable. Plus de 58% des habitants de Titaria et d'Harainchal utilisent des moustiquaires. Les villageois sont très favorables au traitement de leurs habitations par des insecticides. Moins de 5% des personnes enquêtées dorment dans les communs sans prendre de précautions particulières pour se protéger des vecteurs. Cette étude montre combien il est important de connaître les croyances et les pratiques des communautés pour organiser avec succès la lutte contre le kala-azar au Népal.

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