

KNOWLEDGE, ATTITUDE, AND PRACTICES RELATED TO KALA-AZAR IN A RURAL AREA OF BIHAR STATE, INDIA

SHRI P. SINGH, DANDU C. S. REDDY, RABINDRA N. MISHRA, AND SHYAM SUNDAR*

Kala-azar Medical Research Center, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India

Abstract. The Indian Government aspires to eliminate Kala-azar by 2010. Success of any disease control program depends on community participation, and there is no published data about the knowledge, attitude, and practices of the community about Kala-azar in endemic regions of India. For this knowledge, attitude, and practices (KAP) study, the heads of 3,968 households in a rural area, consisting of 26,444 populations, were interviewed using a pre-tested, semi-structured schedule. Most of the study subjects (97.4%) were aware of Kala-azar. Fever (71.3%) and weight loss (30.5%) were the most commonly known symptoms. The infectious nature of the disease was known to 39.9%. The majority believed that the disease spreads by mosquito bites (72.8%). For 63.6%, the breeding site of the vector was garbage collection. Only 23.6% preferred the public health sector for treatment, and 55.9% believed that facilities at primary health centers are not adequate. Poor knowledge of the study subjects about the disease and breeding sites of the vector underscores the need for health educational campaigns if the elimination program is to succeed.

INTRODUCTION

Visceral leishmaniasis (VL), popularly known as kala-azar (KA) in Hindi, is caused by a protozoa, *Leishmania donovani*, and transmitted by the female sandfly *Phlebotomus argentipes* in India. It is endemic in 62 countries, with ~200 million people at risk.¹ It is estimated that annually ~500,000 cases of VL occur,^{1,2} with a prevalence of 2.5 million.³ More than 90% of VL cases occur in five countries: India, Bangladesh, Nepal, Sudan, and Brazil.^{2,4} It is a dreaded disease, and if left untreated, it is fatal. It is also estimated that in 2003, the worldwide deaths caused by VL was 51,000.⁵

In India, VL is a major public health problem in the state of Bihar and some adjoining districts of neighboring states like West Bengal, Jharkhand, and Uttar Pradesh.⁶ The disease is also endemic in the neighboring countries Bangladesh and Nepal. The state of Bihar accounts for > 90% of the cases in the country.^{6–8} The government of India aspires to eliminate VL by 2010 from India.⁹ For the success of prevention and control programs of any disease, the most important prerequisite is community participation. Cooperation of the affected population is essential in the implementation and use of program activities. Program implementers need to understand the disease-related knowledge, attitude, and practices (KAP) of the community, because these are the important determinants of community participation. There are no data from India focusing on these aspects, and thus this study presents the information on KAP related to Kala-azar in India.

MATERIALS AND METHODS

This study was carried out in the Muzaffarpur district of Bihar State, India. The total population of the district is 3.734 million, with 3.4 million as the rural population (census 2001). There are 14 Block Primary Health Centers (PHCs) in the district and Kanti Block, with a total population of 337,670 selected for this study. There are 48 sub-centers in this Block PHC, each catering to a population ranging from 6,000 to 10,000. For this study, a cluster of three contiguous sub-centers was selected randomly. The selected three sub-centers

cater to 14 villages, with a total population of 26,444 in 4,083 households. House-to-house survey was done to collect the data about household socio-demographic and environmental characteristics from September 2000 to March 2001.

The head of each household was interviewed to assess his KAP related to KA. The head of the household was chosen as the study subject because he/she plays the main role in any decision-making process at the household level in this part of the country. If the head of the household could not be contacted after repeated visits, another adult member of the household was interviewed. The data were collected on a pre-tested, semi-structured schedule by trained field staff with a sociology background. Of 4,083, it was possible to interview 3,968 households, giving a response rate of 97.18%. Written informed consent of the interviewee was taken after explaining the objectives and methodology of the study in detail. The study was approved by the Ethical Committee of the Institute of Medical Sciences, Banaras Hindu University.

RESULTS

Characteristic of the study population. In the study area, men constituted 53.5% of the total population, giving a sex ratio of 869 women per 1,000 men (Table 1A). Children < 15 years of age were 41.9%, and only 15.1% population was > 45 years of age. Households having per capita annual income of Indian national rupees (Rs) ≤ 5000 (US \$108.00) were 53.8%, whereas only 13.6% had > Rs10,000 (US \$216.00). Of the total households, 15.2% had less than four members and 44.6% had four to six members. The average household size was 6.8. More than one half of the population > 5 years of age was illiterate (53.2%). This is similar to the state literacy rate of 47.53%.¹⁰ Those educated up to the fifth class were 24.7%, and only 4.6% were graduates. In the population > 5 years of age, 11.6% worked in agriculture. Unskilled and skilled laborers constituted 12.5% of the population, whereas 6.1% and 4.4% were engaged in service and business, respectively.

Characteristic of the study subjects. More than one half (50.8%) of the respondents were in the age group of 26–45 years, and 43.8% were > 45 years of age (Table 1B). Most of the respondents (97.0%) were men. The majority of the respondents (52.4%) were illiterate, and only 3.18% had graduated from school.

* Address correspondence to Shyam Sundar, Department of Medicine, Institute of Medical Sciences, Banaras Hindu University, Varanasi 221 005, India. E-mail: drshyamsundar@hotmail.com

TABLE 1A
Characteristics of the study population in Kanti Block, Muzaffarpur district

Characteristics (n = 4,083)	Categories	Study population	
		Number	Percentage
1. Sex (n = 26,444)	Male	14,160	53.5
	Female	12,284	46.5
2. Age (years) (n = 26,444)	0-4	4,198	15.9
	5-14	6,882	26.0
	15-44	11,371	43.0
	45+	3,993	15.1
3. Household per capita annual income (in Rs)	≤ 2,400	687	16.7
	2,401-5,000	1,510	37.1
	5,001-10,000	1,330	32.6
	> 10,000	556	13.6
4. Total members in the household	≤ 3	622	15.2
	4-6	1,820	44.6
	7-9	1,066	26.1
	10+	575	14.1
5. Educational status (age > 5 years) (n = 22,246)	Illiterate	11,835	53.2
	Up to 5th class	5,489	24.7
	Up to 12th class	3,898	17.5
	Graduation and above	1,024	4.6
6. Occupation of the population (age > 5 years) (n = 22,246)	Agriculture	1,267	5.7
	Agriculture labor	1,322	5.9
	Service	1,363	6.1
	Business	969	4.4
	Unskilled labor	2,358	10.6
	Skilled labor	420	1.9
	Others*	14,547	65.4

* Includes housewives, students, and elderly persons unable to do anything.

Knowledge about the disease. This study revealed that 97.4% of the respondents were aware of the disease, and 16.1% had no idea of the signs and symptoms of the disease (Table 2). Fever and loss of weight were the most common symptoms, known to 71.3% and 30.5% of the respondents, respectively. Liver enlargement (9.9%), splenic enlargement (5.8%), and black pigmented skin (5.7%) were the other clinical features acknowledged by a minority. The fact that KA is an infectious disease and can be transmitted from one person to another was known only to 39.9% of the respondents, whereas 93.2% knew that a complete cure of the disease is possible. Approximately three fourths (72.8%) of the respondents said that the disease spreads through mosquito bites, followed by an insect bite (9.6%) and sandfly bites (2.8%). All three responses as modes of transmission of the disease were considered correct answers (85.2%).

Knowledge about vector. According to the interviewee, the breeding sites of the vector were cattle sheds (63.5%), polluted water (63.6%), dark places in the house (39.0%), and

TABLE 1B
Characteristics of the study subjects selected from the households for KAP study

Characteristics (n = 3,968)	Groups	Number	Percentage
1. Age	i. ≤ 25 years	214	5.4
	ii. 26-45 years	2,016	50.8
	iii. 46+ years	1,738	43.8
2. Sex	i. Male	3,847	97.0
	ii. Female	121	3.1
3. Education	Illiterate	2,081	52.4
	Up to 5th class	921	23.2
	Up to 12th class	840	21.2
	Graduation and above	126	3.2

garbage collection sites (12.1%) (Table 3). For the biting time of the vector, 46.8% thought that it bites during dusk, whereas 39.7% and 12.5% said midnight and anytime whether day or night, respectively. The fact that family members could be protected using bed nets was known to most of the study subjects (92.8%), whereas only 16.7% and 17.3% knew that the same was possible using insecticides and repellents, respectively.

Kala-azar-related attitude and practices. More than 70% (71.0%) of respondents believed that KA is a more serious disease compared with malaria, whereas 19.8% thought it to be an equally serious disease (Table 4). Private doctors were the first choice for treatment by 47.6% of the respondents if a suspected case of Kala-azar occurred in the household, followed by non government organizations (NGOs)/charitable hospitals (24.0%), district hospital/medical college (13.1%), and PHCs (10.5%). That DDT spray can control the disease was believed by 53.7% of the subjects. Only 12.9% were of the opinion that PHCs are well equipped to manage the cases of KA, whereas 55.9% did not believe this. Only 23.9% of the households had at least one usable bed net.

DISCUSSION

In this study, heads of the households were chosen as the study subjects because they have the decision-making capacity for the household. In the traditional Indian social setup, in most situations, the eldest male member of the household holds this responsibility. To seek household and community participation to make a disease control program successful, understanding of such local customs and traditions is very important. Understanding the KAP of the community regarding Kala-azar can be the key to the success of an elimination program launched by the Government of India.

Most of the respondents (97.4%) had heard the name Kala-azar, and most of them (93.2%) knew that the disease is completely curable. These are not strange findings, because Muzaffarpur is one of the districts with the consistently highest endemicity in the state for > 30 years,^{6,11} and can be considered to be the epicenter of the kala-azar epidemic. Awareness about the signs and symptoms of a disease prompts patients to seek early treatment. However, in the study population, the knowledge about the signs and symptoms of the disease was very poor despite the fact that the disease has been endemic for such a long time, and fever and splenomegaly are present in almost every patient with kala-azar in India.¹² In contrast to this finding, Ahluwalia and others¹³ reported that people from Bangladesh had accurate knowledge about symptoms.

Lack of knowledge about the involvement of humans in the transmissibility and infectious nature of the disease in the majority of the subjects (60.1%) is a matter of concern for adoption of preventive measures against the disease. It is important for the people to be aware of these facts.

There was a complete lack of knowledge about the transmitting vector, the sandfly, although 85.2% attributed it to sandfly/mosquito/insect bites. Even this knowledge at the community level is encouraging because preventive measures against the disease will remain the same (use of mosquito nets, insecticide spray, mosquito repellent, etc.).

It is important for the community to know the breeding

TABLE 2
Knowledge of respondents about Kala-azar in Kanti Block, Muzaffarpur district ($n = 3,968$)

Item*	Responses	Number	Percentage
1. Awareness about KA	i. Aware	3,866	97.4
	ii. Not aware	102	2.6
2. Signs and symptoms	i. Fever	2,901	71.3
	ii. Loss of weight	1,210	30.5
	iii. Spleen enlargement	237	5.8
	iv. Liver enlargement	406	9.9
	v. Black pigmented skin	221	5.7
	vi. Abdominal discomfort/pain	97	2.4
	vii. Others	42	1.0
	viii. Don't know	656	16.1
3. KA is an infectious disease, transmitted from one person to another	i. Yes	1,628	39.9
	ii. No	1,280	31.3
	iii. Don't know	958	28.8
4. Complete cure of the disease is possible	i. Yes	3,601	93.2
	ii. No	47	1.2
	iii. Don't know	218	5.6
5. Kala-azar spreads through	i. Polluted water	233	6.0
	ii. Polluted air	57	1.5
	iii. Mosquito bites†	2,813	72.8
	iv. Sandfly bites†	107	2.8
	v. Insect bites†	370	9.6
	vi. Others	22	0.6
	vii. Don't know	264	6.8

* Denominator for items no. 2 to 5 is 3,866 (those aware of KA).

† Considered as correct answer.

sites/habitat, biting time, and preventive measures to reduce the chances of vector-human contact. Cattle sheds as a breeding site was known to 39.0% of the respondents. However, habitats of the vector were poorly known to the community. The fact that the sandfly bites mostly at midnight needs to be made known to the community. Although most of the people were aware of the protective role of mosquito nets, the role of insecticide spray was known to only one half of the population. This is a matter of concern because this makes the population indifferent to the public sector efforts of insecticide spray, even disallowing the sprayers entry into the house for flimsy reasons of inconvenience or bad odor, thus leading to inefficient spraying. An incomplete spray can be disastrous, leading to quick build up of the vector. A successful insecticide spray holds the key to the success of the control/elimination program, and the affected population has to be

made aware of its importance. In the neighboring country of Nepal, in a similar study, it was found that virtually no one knew how the disease could be prevented.¹⁴ It has been found that the communities affected with VL perceive it as a very threatening disease, and the demand for treatment is high.¹⁵ In this study, the majority (71.0%) of respondents perceived it as a more serious disease than malaria.

Only a small minority preferred public health facilities for treatment because of their views of inadequacy of the health system to manage KA cases. Primarily, in the public health system, PHCs are supposed to treat the cases of KA, and difficult cases are referred to the district hospital or medical college. Major reasons for people turning away from the public health system are abysmal facilities and receiving toxic and ineffective drugs (sodium stibogluconate) at PHCs. Two years later (in 2003), we reassessed the preferred health fa-

TABLE 3
Knowledge about vector

Item ($n = 3,290$)	Responses	Number	Percentage
1. The mosquitoes/sandfly insects breed in	i. Polluted water	2,090	63.5
	ii. Cracks and crevices in the house	308	9.4
	iii. Cattle sheds	1,282	39.0
	iv. Garbage collection sites	2,094	63.6
	v. Dark places in the house	401	12.1
	vi. Humid places	236	7.1
	vii. Do not know	108	3.3
2. Biting time of Kala-azar mosquito/sandfly	i. During dusk	1,540	46.8
	ii. During midnight	1,306	39.7
	iii. During day time	5	0.1
	iv. Any time	411	12.5
	v. Do not know	128	3.9
3. Family can be protected from this mosquito bite by	i. Use of mosquito nets	3,052	92.8
	ii. Use of insecticides	550	16.7
	iii. Use of mosquito repellents	569	17.3
	iv. Other methods	98	3.0
	v. Do not know	101	3.1

TABLE 4
Kala-azar related attitude and practices

Item	Responses	Number	Percentage
1. Seriousness of the disease as compared to malaria ($n = 3,866$)	i. More serious disease	2,744	71.0
	ii. Equally serious disease	766	19.8
	iii. Less serious disease	45	1.2
	iv. Can't say	311	8.0
2. Kala-azar can be controlled by DDT spray ($n = 3,866$)	i. Yes	2,075	53.7
	ii. No	140	3.6
	iii. Partially	1,241	32.1
	iv. Don't know	410	10.6
3. First choice of health system for treatment of suspected Kala-azar ($n = 3,866$)	i. Primary health centre	406	10.5
	ii. District hospital/medical college	506	13.1
	iii. Private doctor	1,839	47.6
	iv. NGOs/charitable hospital	926	24.0
	v. Can't say	189	4.8
4. Facilities at PHCs are adequate to manage KA cases ($n = 3,866$)	i. Yes	498	12.9
	ii. No	2,159	55.9
	iii. Partially	699	18.1
	iv. Don't know	510	13.2
5. Availability of at least one usable mosquito bed net ($n = 3,968$)	Yes	3,021	76.1
	No	947	23.9

cilities, and only 13.5% rated public health facilities as their first choice (data not shown). Although it is difficult to extrapolate these findings to the entire state of Bihar, the level of KAP about VL is not likely to be substantially different in other parts, because the study area is the oldest focus of VL in Bihar and expected to have maximum awareness about the disease.

Although the majority of households had at least one bed net in good condition, its acceptability and efficacy against KA need to be ascertained. A case control study in Nepal identified use of bed net as protective against KA.¹⁶

Overall, these findings suggest ineffective information, education, and communication efforts of the public health system and other agencies responsible for it. Even after such a prolonged and incessant disease transmission in the area, this lack of knowledge, indifferent attitude, and incorrect practices are indicators showing poor commitment of the health policy planners for the disease.

It is important to know the level of KAP of a community and to improve it to a satisfactory level before launching any disease control program to get the maximum support from the community. In this study, poor knowledge of the study subjects about symptoms, infectious nature, mode of transmission, and preventive measures of the disease, and breeding sites of sand flies emphasizes the need for health educational campaigns. To increase the use of public health facilities, it should be fully equipped to deal with cases of kala-azar.

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Authors' addresses: Shri Prakash Singh, Reader in Community Medicine, Institute of Medical Sciences, BHU Varanasi 221005, India. Dandu Chandra Shekhar Reddy, National Professional Officer (HIV/AIDS), WHO, India, New Delhi 110011, India. Rabindra Nath Mishra, Division of Biostatistics, Department of Community Medicine, Institute of Medical Sciences, BHU Varanasi 221005, India. Shyam Sundar, Professor of Medicine, Institute of Medical Sciences, BHU Varanasi 221005, India.

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