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Assessment of Knowledge, Attitudes, and Practices about Visceral Leishmaniasis in Endemic Areas of Malda District, West Bengal, India

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Abstract. Community participation is an important aspect for the success of kala-azar (KA) elimination program implemented in five Southeast Asian countries by the WHO. The participation of community depends on the level of knowledge of, attitude toward, and practice around risk factors associated with KA transmission among the population. We assessed the knowledge, attitude, and practice toward KA elimination in endemic areas of Malda district, West Bengal, India. A total of 709 individuals from different villages of 12 sub-centers were interviewed during April–July 2019. Data were recorded in a structured questionnaire under four categories: sociodemographic parameters, knowledge, attitude, and practice. The association of dependent variables such as knowledge, attitude, and practice with independent variables such as the economy and sociodemographic parameters was analyzed by binary logistic regression model and chi-square test using SPSS software. Despite the endemicity of the disease for a long time, the adequacy of knowledge about the disease was found to be poor that can be attributed to low education level and socioeconomic status, but the attitude and practices were good. So, there is a scope of improvement in knowledge of the disease through proper health education. This will further improve the level of attitude and practices that will be helpful for the smooth implementation of different activities of the program by more active participation of the community.

INTRODUCTION

Visceral leishmaniasis (VL), also known as kala-azar (KA), is one of the world's most important neglected tropical diseases, affecting mainly the poor people of developing countries. Globally, an estimated 50,000–90,000 VL cases were reported each year, prevailing in 98 countries.[1] The most affected countries are India, Brazil, Ethiopia, Kenya, Somalia, South Sudan, and Sudan. In WHO-Southeast Asian region, VL is endemic in India, Nepal, and Bangladesh, and they accounted for 50% of the global burden.[2] India contributes the major share, particularly from four adjoining states—Bihar, Jharkhand, West Bengal, and the northern part of Uttar Pradesh.[3] The disease is characterized by prolonged fever, weight loss, anemia, hyperglobulinemia, enlargement of the spleen and liver, and darkening of the skin, and is usually fatal if left untreated.

In the Indian subcontinent, VL is anthroponotic in nature, caused by the protozoan parasite, *Leishmania donovani*, and transmitted by the infected female sand fly, *Phlebotomus argentipes.*[4] Three adjoining countries India, Bangladesh, and Nepal initiated a regional alliance to eliminate KA supported by the WHO with a target to eliminate it from this part of the world by 2015.[5,6] The target was to decrease the incidence of KA so that it no longer remains a public health problem. Later, the initiative was revised; two more countries, Bhutan and Thailand, were included, and the deadline was extended to 2020.[7] The National Vector Borne Disease Control Program (NVBDCP) of India framed a regional strategy for VL elimination having five components. The most important components were early diagnosis and complete treatment of VL and post k-azar dermal leishmaniasis cases through passive and active case detection for reduction of the source of transmission and integrated vector management for reducing human–vector contact.[8]

Despite the implementation of various control measures, a reduction in the occurrence of KA has been found to be difficult. This is partly due to inadequate information about the various risk factors associated with the disease. It has been found that poverty may not be a direct risk factor for KA transmission, but it led to poor health, bad housing conditions, lack of preventive measures such as nonuse of mosquito nets and illiteracy. Thus, poverty could be a major determinant of the continued transmission of KA. Regarding housing conditions, mud wall or mud plastering of walls was found to be significantly associated with KA transmission.[9,10] The vector, sand fly, is endophagous in nature and breed inside cowsheds and human dwellings.[11] Mud walls and peri-domestic vegetation make favorable humid conditions for sand fly breeding.[12] The dampness of mud-house acts as a risk factor, that has been reported from West Bengal and Nepal.[13] Improvement of housing conditions in KA-endemic areas could reduce the disease transmission by decreasing the conditions suitable for the breeding of sand flies inside the houses.[10,14] Cattle rearing is another risk factor of VL transmission, particularly where the cattle sheds are located inside or in close proximity to the houses. This close coexistence of human and cattle allows easy vector–human contact, accelerating disease transmission.[15] Besides this, occupation also has an important role in disease transmission. Seasonal migration of laborers between VL endemic and non-endemic regions, combined with biological, environmental, and socioeconomic risk factors may be responsible for the spread of the disease.[16]

From the interdisciplinary perspective of public health, the KA disease ideally should be dealt with a multidimensional and intersectional approach. The integrative paradigm that needs to be encompassed is that the curative approach should be directly supplemented by the preventive and health promotive practices, that is, preventive best practices, promotion of awareness, and enhancement of health-seeking behavior.

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Considering the vector is a significant component, one also needs to understand that the environment and the host of the epidemiological triad are important stakeholders. Community participation is the most important prerequisite for the success of any disease control program. The cooperation of the affected population is very essential for the successful implementation of different program activities. Program implementers need to assess the disease-related knowledge, attitude, and practices of the community because these are important determinants of community participation. Few reports are available from India regarding KA-related knowledge, attitude, and practices of the community living in KA-endemic areas,[15,17–19] but such study from West Bengal is very rare.[18] After the implementation of different preventive measures against the disease KA, it is necessary to find out the overall impact of this at the community level, through assessing their knowledge, attitude, and practice toward disease prevention. Therefore, the present study was undertaken and designed to access the knowledge, attitude, and practice in KA-endemic areas of Malda district, West Bengal, India.

MATERIALS AND METHODS

Study areas. The study was undertaken in 12 sub-centers of Habibpur block of Malda district, West Bengal, during the month of April–July 2019. Malda is one of the 11 districts of West Bengal endemic for VL.[8] Malda district is located between 24°40′20″ to 25°32′08″ north latitude, and 87°45′50″ to 88°28′10″ east longitude. The geographical location of Malda is very important as it is bounded with an international border with Bangladesh (VL-endemic country) in the east, and an interstate border in the west with Jharkhand and Bihar, the most VL affected states of India. According to the 2011 census, the total population of Malda district was 3,988,845 (2,051,541 males and 1,937,304 females), of which 86.4% were rural settlers. The study areas were mostly inhabited by tribal population.

Sample size calculation. The present study involved a cross-sectional survey conducted to estimate the knowledge, attitude, and practice related to KA using a structured questionnaire. The detailed census about the household number, population, and prevalence of leishmaniasis of each of the sub-centers were obtained from the ongoing research project conducted by the Calcutta School of Tropical Medicine, Kolkata. The sample size for each of the study sub-center was calculated separately by using the statistical formula:

$$n_i = k/\{1 + (k/n_i)\}, i = 1, 2, 3, \ldots, 12,$$

where n_i = sample size of ith sub-center, $k = Z^{2*}P^*(1 - P)/e^2$, Z = Z-score (value of Z-score is 1.96 using 95% CI), P = prevalence value (0.2), e = margin of error (0.05), and N_i = population size of ith sub-center.

The total calculated sample size of all the study sub-centers was 709.

Study variables. For operational clarity, the broad sets of variables were structured under four categories: demography, knowledge, attitude, and practice about the disease KA which pose a major risk to human population.[20]

Data collection, management, and analysis. Before the initiation of data collection, a meeting was organized to sensitize the village population in the presence of the district and block health and administrative officer. A three-member team comprising one project staff, one local volunteer, and an accredited social health activist of that village went door to door with a preprinted questionnaire and interviewed adult members (few non-adult members in the absence of adults) of the selected houses (every 18th house) to record the information. Indexes of knowledge, preventive attitude, and practices toward KA and its prevention were calculated. Every question under the variables knowledge about the disease and vector, attitude, and practice were scored by adding a value of 0 or 1. Each correct answer was scoring a value of 1, whereas the wrong/"do not know" answer by zero. Each index was grouped into two categories—"poor" and "good". The values below the median range of overall score were categorized as "poor," whereas the score above the median value as "good." There were 12 questions under the variable knowledge about the disease and scored 0–12. The scoring of 0–6 was considered as "poor" and 7–12 as "good." The knowledge index for vector sand fly was scored 0–4, where 0 stood for "nil" knowledge, 1, 2 for "poor," and 3, 4 for "good." The attitude index was scored 0–8, where 0 was denoted as "nil," 1–4 as "poor," and 5–8 was considered as "good." In case of practice index, scoring was performed from 0 to 8, where 0 was depicted as "nil," 1–4 as "poor," and 5–8 as "good" practice. The relationship between different dependent variables such as overall knowledge about disease and vector, attitude, and practice with independent variables (such as gender, literacy level, occupation, poverty level, family income, house type, and history of KA) was determined by binary logistic regression model using SPSS software version 21 (IBM Corp., Armonk, NY).

Ethical consideration. The present study protocol was approved by the Ethical Review Committees of the Calcutta School of Tropical Medicine. Informed consent in the household survey was signed by the head of the household before their voluntary participation in the study.

RESULTS

Sociodemographic characteristics of participants. A total of 709 individuals were interviewed; among them, 677 were adults (older than 18 years) and 32 were minor (younger than 18 years), and were excluded from the analysis. The sociodemographic characteristics of the study respondents (n = 677) are given in Table 1.

Of 677 adult participants, 51.4% were male and the remaining 48.6% were female. A significant portion of the respondents were illiterate (37.8%), whereas 30.4% possessed primary education and 31.8% had higher education. Agriculture was the main occupation (89.8%). Maximum respondents belonged to below poverty line (BPL) (78.4%). The houses were mainly "kaccha" type with mud wall (94.2%) and "mud" floor (94.4%). Family with experience of a past history of KA for at least one person was recorded in 23.5% cases.

Knowledge about KA and vector sand fly. It was recorded that 93.4% of the respondents had heard about KA, whereas 79.2% of participants were unaware about the outcome of the disease if left untreated. Fever as a common symptom of KA was known to 72.7% of respondents, but knowledge about other symptoms was poor. None of the villagers knew about the causal agent of KA. The fact that KA is transmitted by sand fly was known to 41.5% of the respondents. Of different methods to diagnose KA, 80.2% were of the view that some

TABLE 1
Socio-demographic characteristics of the respondents

Variable name	Categories	Number of individuals	Percentage
Gender	Male	348	51.4
	Female	329	48.6
Education	Illiterate	256	37.8
	Primary	206	30.4
	Higher education	215	31.8
Occupation	Agriculture	608	89.8
	Business	61	9.0
	Service	8	1.2
Poverty level	BPL	531	78.4
	Above the poverty line	146	21.6
Family size	0–4	315	46.5
	5–7	295	43.6
	8–10	52	7.7
	> 10	15	2.2
Type of house	"Kaccha" with mud wall	638	94.2
	"Pucca" with brick wall	39	5.8
No of bedrooms	0–3	642	94.8
	3–6	35	5.2
Floor type	Concrete	38	5.6
	Mud	639	94.4
Family history of kala-azar	Yes	159	23.5
	No	518	76.5

sort of blood test is required for the diagnosis, whereas 19.4% did not know the method of diagnosis. It was observed that 63.1% of the study participants did not have any knowledge about the treatment of KA. Government hospitals were the preferred choice for place of treatment by only 25.9% respondents. Overall knowledge about the disease was poor among 75.2%, good among 21.9%, whereas 2.9% had no knowledge. Similarly, overall knowledge about the vector was very poor among 93.2% participants (Table 2).

Only six (0.8%) responders were able to correctly identify the vector sand fly.

Attitude towards prevention of KA. When asked a question what will they do if someone of the family suffers from prolonged fever, to elicit their health-seeking attitude, 81.4% were in favor of attending the government hospitals. The overwhelming majority (98.4%) of them were of the view that the completion of KA treatment is important. About 94.9% of them would allow blood or bone marrow tests for diagnosis of KA, whereas 1.0% would refuse, and 3.9% were not sure about what to do. Almost half of the respondents (46.7%) would use mosquito net to prevent KA; 7.4% would prefer insecticide spray, and 28.7% were in favor of both mosquito net and insecticide spray. About 94.1% of them agreed that they would allow insecticide spray workers in their houses. The overall attitude toward preventive measures against KA was good among 96.5% of the respondents (Table 3).

Practice toward prevention of KA It was found that 97.9% use mosquito net. Sleeping at outside the room was a common practice. Animal rearing was observed among 91.7% of the participants. Cattle were kept adjacent to the living room (65.3%) and within the same room in 19.8%, allowing the increased risk of easy human–vector contact. The overall scoring showed that the practice index was good among 68.4% of the respondents, although almost one-third (31.6%) had poor health practice (Table 4).

Association of knowledge, attitude, and practice index with sociodemographic variables. It was found that knowledge about KA was education dependent, the higher the education the better the knowledge. Literate persons with primary education and higher education had 0.97 times (OR = 0.97, 95% CI = 0.52–1.52) and 1.03 times (OR = 1.03, 95% CI = 0.66–1.59) better knowledge about disease, respectively, than the illiterate. Literate persons with both primary and higher education had better knowledge about vector than illiterates (OR = 2.09, 95% CI = 0.49–8.84). People living above the poverty line (APL) had better knowledge about disease (OR = 1.17, 95% CI: 0.76–1.79) and vector (OR = 1.84, 95% CI = 0.55–6.20) than those below poverty line (BPL).

Male respondents had two times better attitude than females (OR = 2.16, 95% CI = 0.91–5.12). The level of education also showed a positive association with overall attitude. Higher educated respondents had nearly two times better attitude toward KA than illiterate (OR = 1.89, 95% CI = 0.65–5.51). No association was noted between practices toward KA with any of the sociodemographical variables of the respondents (Table 5).

The number of families with a past history of KA showed significant association with illiterate respondents (chi-square = 6.68, *P*-value = 0.006), practice of agriculture (chi-square = 6.05, *P*-value = 0.006), large family size (chi-square = 11.13, *P*-value = 0.004), and gender (chi-square = 6.92, *P*-value = 0.005), whereas no significant association was found between number of families with a past history of KA with mud houses (chi-square = 2.67, *P*-value = 0.071), number of bedrooms (chi-square = 0.25, *P*-value = 0.396), and floor type (chi-square = 2.39, *P*-value = 0.083). While analyzing the association among dependent variables, no association was recorded between overall knowledge about diseases with overall attitude (chi-square = 0.015, *P*-value = 0.568) and overall practice (chi-square = 0.572, *P*-value = 0.257). Similarly, no significant association was recorded between overall attitude and overall practice (chi-square = 0.399, *P*-value = 0.334).

DISCUSSION

In this study, we have assessed knowledge, attitude, and practice toward the prevention of KA in an endemic area of Malda district of West Bengal, India. The study revealed that

TABLE 2
Knowledge about KA and sand fly

Variable	Categories	No. of individuals	Percentage
Heard about KA	Yes	632	93.4
	No	45	6.6
Causal agent of KA	Do not know	677	100
Symptoms and signs of KA	Prolonged fever	492	72.7
	Loss of appetite	293	43.3
	Loss of body weight	268	39.6
	Enlargement of spleen	213	31.5
	Enlargement of liver	151	22.3
	Anemia	142	20.9
	Darkening of skin	319	47.1
	Do not know	98	14.5
Knowledge about transmission of KA	By mosquito	184	27.2
	By sand fly	281	41.5
	By contaminated food and water	24	3.5
	Pig	36	5.3
	Do not know	152	22.5
Knowledge about fate of untreated KA	Death	141	20.8
	Do not know	536	79.2
Knowledge regarding method of diagnosis of KA	Symptoms	1	0.1
	Blood test	543	80.2
	BM test	2	0.3
	Do not know	131	19.4
Knowledge about treatment of KA	Local doctor	74	10.9
	Government hospital	176	25.9
	Do not know	427	63.1
Ability to identify sand fly	Yes	6	0.8
	No	671	99.1
Knowledge about breeding place of sand fly	In water	45	6.6
	In cattle shed	133	19.6
	In shady places	19	2.8
	Do not know	493	72.8
Knowledge about biting time of sand fly	Night	545	80.5
	Day	48	7.1
	Both day and night	29	4.3
	Do not know	55	8.1
Overall knowledge about the disease	Poor	509	75.2
	Good	148	21.9
	Nil	20	2.9
Overall knowledge about the vector	Poor	631	93.2
	Good	12	1.8
	Nil	34	5.0

KA = kala-azar; BM = bone marrow.

overall the participants had poor knowledge about the disease KA and vector sand fly, whereas they possess overall good attitude and practice toward prevention of the disease. The knowledge of the population may be improved through health education.

A positive association was noticed between knowledge about the disease with literacy and socioeconomic status. Regarding knowledge, we noted that most of the respondents had heard about the disease KA, which was similar to other studies from India[17] and abroad.[21] This was higher than the results reported from other parts of the country.[19,22] Most of them were unaware of the outcome of the disease if left untreated, contrary to observations of other Indian studies.[17,19,23] Most of the respondents were aware of the sign and symptoms of KA, which was similar to previous reports.[17,19,21,24] Fever as the most common symptom and sign of KA was reported by most of the respondents, whereas other symptoms such as splenomegaly and hepatomegaly were reported by a significant portion of respondents, which is higher than the reports from Bihar, India.[17,19,24] Although most of the respondents knew about the requirement of blood examination for the diagnosis of KA, the majority were unaware about its treatment.

Regarding the transmission of the disease, about half of the respondents answered correctly as sand fly to be the vector, whereas a certain proportion had the wrong notion that mosquitoes transmit the disease. This finding is in agreement with results of studies from other parts of India[17–19] as well as different parts of the world.[25,26] Other misconceptions about transmission of KA prevailing in the community include pig rearing and consumption of contaminated food, whereas about a quarter did not have any knowledge. This low level of knowledge about disease transmission increases the chance of human–vector contact and reflects the problem associated with KA elimination in this part of India.

Similar to the earlier observation made by Govil et al.[19] and Alemu et al.,[23] almost all of the respondents were unable to identify the vector sand fly. Vector control plays a pivotal role for controlling any vector-borne diseases such as KA, where knowledge about biting time and breeding place of the vector is important for adequate measures taken against it.[24] Although most of the responders knew about the biting time of sand fly, a significant proportion did not know its breeding place. This is similar to the observations made by Govil et al.[19] and Alemu et al.[23]

TABLE 3
Attitude among the respondents toward prevention of KA

Questions posed	Categories	Frequency	Percentage
What will you do if any one of your family member suffers from prolonged fever?	Send to local unqualified doctors	108	15.9
	Send to Kabiraj	18	2.7
	Government hospital	551	81.4
Would you allow testing for blood/bone marrow?	Yes	643	94.9
	No	7	1.0
	Do not know	27	3.9
What will you do for preventing KA?	Use mosquito net	316	46.7
	Both net and spray	194	28.7
	Spray insecticide	50	7.4
	Do not know	117	17.3
Do you participate in community meeting about KA?	Yes	643	94.9
	No	34	5.0
Will you take complete treatment, if suffer from KA?	Yes	667	98.5
	No	10	1.5
Will you allow spraying in your house?	Yes	637	94.1
	No	40	5.9
How long will you keep the spray on your wall?	1 month	235	34.7
	Upto 6 months	122	18.0
	As mentioned by the spray worker	38	5.6
	Do not know	282	41.7
Which areas of your house will you allow to be sprayed with insecticide?	All inside	425	62.8
	Only outside	37	5.5
	Only cattle shed	148	21.9
	Do not know	67	9.9
Overall attitude	Poor	23	3.4
	Good	653	96.5
	Nil	1	0.1

KA = kala-azar.

The overall knowledge about the disease and vector sand fly was poor among the respondents despite a long history of KA endemicity in the area. This poor knowledge could be due to poor level of education. Similarly, the association between poor educations with low knowledge about KA was also reported from KA-endemic areas of Bihar.[17–19]

We observed the knowledge about KA was higher among males which might be due to higher level of education than females. Similar observation was also reported by Govil et al.[19] and Berhe et al.[21] Individuals belonging to BPL showed a low level of knowledge.

To evaluate the overall attitude of the responders toward KA, they were asked about diagnostic methods for this disease, preferred place for treatment, and use of preventive measures. Almost all of them agreed to complete treatment for the successful cure of KA. This observation is in conformity with other similar studies.[19,21,23] This could be due to the good accessibility of the healthcare workers and appropriate sensitization of them about KA. It was noted that most of them preferred government hospitals as a place of treatment that reflects their reliance toward the existing government treatment facility and the health system. Maximum respondents agreed to participate in community meetings about KA elimination, its treatment, and preventive methods that would improve their level of knowledge. Most of them also agreed that

TABLE 4
Overall preventive practice against kala-azar

Questions posed	Categories	Frequency	Percentage
Do you use mosquito net?	Yes	663	97.9
	No	14	2.1
Where you sleep in the night?	Always inside room	187	27.6
	Always outside room	33	4.9
	Sometime outside room	457	67.5
Where is your cattle shed?	Adjacent to living room	442	65.3
	In the same room	134	19.8
	Away from living room	57	8.4
	Outside house	44	6.5
Animal rearing	Yes	621	91.7
	No	56	8.3
Use of preventive measures against sand fly	Coil	423	62.5
	Smoke	399	58.9
	Mosquito net	451	66.6
	IRS	38	5.6
Overall practice	Poor	214	31.6
	Good	463	68.4
	Nil	0	0

IRS = indoor residual spray.

TABLE 5
Association among knowledge, attitude, and practices toward kala-azar prevention with sociodemographical status

Sociodemographic variable		Knowledge							
		About disease (good/poor)		About vector (good/poor)		Attitude (good/poor)		Practice (good/poor)	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Gender	Male	1.11	0.52–1.62	1.34	0.42–4.26	2.16	0.91–5.12	1.20	0.87–1.66
	Female*	–	–	–	–	–	–	–	–
Education	Illiterate*	–	–	–	–	–	–	–	–
	Primary education	0.97	0.52–1.52	2.09	0.49–8.84	1.11	0.44–2.82	0.68	0.45–1.0
	Higher education	1.03	0.66–1.59	1.59	0.35–7.22	1.89	0.65–5.51	1.05	0.70–1.56
Occupation	Agriculture*	–	–	–	–	–	–	–	–
	Business	1.17	0.63–2.15	0.91	0.11–7.13	2.36	0.31–11.77	0.94	0.54–1.65
	Service	0	0	0	0	0	0	0.76	0.18–3.23
Economic status	BPL*	–	–	–	–	–	–	–	–
	Above the poverty line	1.17	0.76–1.79	1.84	0.55–6.20	0.54	0.23–1.28	1.35	0.89–2.03
Past history of KA in the family	Yes	1.59	1.06–2.39	0.65	0.14–2.98	0.74	0.50–1.81	1.18	0.79–1.74
	No*	–	–	–	–	–	–	–	–

* Reference category.

they would allow the diagnosis of disease by a blood test. This high level of appropriate attitude for diagnosis and treatment was in accordance with reports by others.[19,21,23] Besides, nearly half of them opted for mosquito net as a preventive measure, whereas the majority agreed to allow spray in their house. The overall attitude toward KA disease was good, which is in accordance with a study by Govil et al.[19]

Most responders practiced using mosquito nets while sleeping at night that would protect them from the bite of vector sand fly, although they preferred to sleep outside rooms, which were similar with observations of other studies.[17,19,21] Animal rearing was a common practice among the tribal-dominated study population. Two-third of the study subjects had animal sheds adjacent to their living rooms on the same house which were an important risk factor for acceleration of the disease progress by enhancing human–vector contact.[21] The humid environment of the mud house along with the presence of nearby cattle shed near to the living room is preferable for the survival of sand flies. The overall practice index was found to be good among most of the population, which was similar to other studies.[21,23] We did not observe any association between overall practice index toward KA elimination with sociodemographic parameters.

While discussing disease control programs, there is argument that the successful implementation of such programs depends on various factors such as the target population, awareness and information among the target population, distribution of information regarding the existing harms, and relative benefits of behavior and practice modification. The contribution of the Ottawa Declaration with respect to health promotion is imperative here to understand gradual capacity building to adapt to behavior change and practice in communities, advocating health as a major resource for social, economic, and personal development and an important dimension of quality of life. Enabling includes a secure foundation in a supportive environment, access to information, life skills, and opportunities for making healthy choices. Mediation in health promotion focuses on procedural aspects of supportive supervision and continuous monitoring and evaluation. Moreover, health promotion strategies and program should be adapted to the local needs and possibilities of individual countries and regions to take into account differing social, cultural, and economic systems.

Srinivasan et al.[18] showed that improvement of knowledge through behavior change communication (BCC) was helpful to educate the community about the disease and motivate them to take active participation and cooperation for the elimination of the disease.

Despite the implementation of activities toward the elimination of KA, a significant number of cases continue to occur in the study area. Poor knowledge about the disease might be an important factor for the maintenance of disease endemicity. So the improvement of knowledge about different risk factors of KA among the common people would be helpful to reach the goal set by the NVBDCP of India. Leishmaniasis needs to be dealt with at the individual, family, and community level because it has direct scope for potential intervention as mentioned earlier. The disease needs to be understood with the locality development approach, that with respect to the epidemiological triad, if the enhancement of environmental and host base of the triad is focused on, then the disease is manageable because an integrative paradigm of the curative approach sufficiently supported with the preventive best practices and promotive awareness, preventive behavior, and health-seeking behavior has come into the functioning framework. Small sample size is a limitation of this study. There is a need for further studies with a large number of respondents from other KA-endemic regions of India to assess the knowledge, attitude, and practice and community participation following BCC in KA-endemic areas of India.

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