



Original Research Article

PROCESS EVALUATION OF CASE MANAGEMENT SERVICES UNDER THE KALA-AZAR ELIMINATION PROGRAMME IN MALDA DISTRICT, WEST BENGAL: A MIXED-METHODS STUDY

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ABSTRACT

Background: In 2022, almost all of India's endemic blocks had achieved the kala-azar elimination threshold. Sustaining this progress requires effective surveillance and case management. This study evaluated kala-azar case management activities in Gazole Block, Malda district, West Bengal, in 2022.

Materials and Methods: A mixed-methods process evaluation was conducted using an Input–Process–Output framework. Data were collected through review of programme records, facility assessments, key informant interviews, and beneficiary interviews. Input indicators included human resources, training status, availability of diagnostics, drugs, logistics, guidelines, and information, education and communication (IEC) materials. Process indicators assessed case detection, diagnosis, treatment initiation, follow-up, supervision, and reporting. Output indicators included treatment-related outcomes, beneficiary support, and programme performance. Quantitative and qualitative findings were triangulated to assess implementation fidelity and identify operational challenges.

Results: Training coverage among programme personnel was generally high, with Gazole Block performing better than district averages across most staff categories. Programme records demonstrated adherence to national case management guidelines, including universal HIV testing of visceral leishmaniasis cases and maintenance of treatment-related registers. Active case search coverage was 92.6%, exceeding the district average of 82.5%. Beneficiary interviews indicated satisfaction with free treatment, follow-up services, and support provided by frontline health workers. However, important implementation gaps were identified, including expiration of all available rK39 rapid diagnostic kits, stock-out of Miltefosine, limited involvement of private practitioners, and concerns regarding the adequacy of financial assistance provided to patients.

Conclusion: Kala-azar case management services in Gazole Block were largely implemented according to programme guidelines and contributed to sustaining elimination activities. Strengthening diagnostic and drug supply chains, enhancing private-sector engagement, and improving beneficiary support mechanisms may further strengthen programme resilience and help prevent disease resurgence in the post-elimination era.

Keywords: Kala-azar; Visceral leishmaniasis; Programme evaluation; Case management; Process evaluation; Elimination; Mixed-methods; India.

INTRODUCTION

Visceral leishmaniasis (VL), commonly known as kala-azar, is a neglected tropical disease caused by *Leishmania donovani* and transmitted through the bite of infected female *Phlebotomus argentipes* sandflies. The disease is characterized by prolonged fever, splenomegaly, weight loss, anemia, and, if left untreated, may be fatal in more than 95% of cases. Despite substantial progress in disease control, visceral leishmaniasis remains an important public health problem in several countries of South Asia, East Africa, and South America. The World Health Organization (WHO) estimates that tens of thousands of new VL cases continue to occur annually worldwide, with the Indian subcontinent historically accounting for a substantial proportion of the global burden.^[1]

India has made substantial progress towards kala-azar elimination through sustained implementation of the National Kala-Azar Elimination Programme (NKEP), which targets an annual incidence of <1 case per 10,000 population at the block level. Strengthened surveillance, early diagnosis, effective treatment, integrated vector management, and community participation enabled India to achieve this elimination threshold nationally in 99.8% endemic blocks in 2023.^[2,3] However, achieving the threshold does not imply interruption of transmission. Sustaining elimination requires continuous vigilance, high-quality case management, robust surveillance, and prompt detection and treatment of cases to prevent resurgence.^[4]

Case management constitutes one of the most critical pillars of the kala-azar elimination strategy. Early diagnosis using rapid diagnostic tests such as rK39, timely initiation of effective treatment, monitoring of treatment adherence, management of adverse events, screening for HIV co-infection, and follow-up of treated cases are essential components of programme success.^[5] Delays in diagnosis or treatment not only increase the risk of severe disease and mortality but also contribute to ongoing transmission within endemic communities. Furthermore, post-kala-azar dermal leishmaniasis (PKDL) patients may serve as important reservoirs of infection and therefore require active detection and appropriate management within elimination settings.^[6]

As countries move from the attack phase to the consolidation and maintenance phases of elimination, programme performance increasingly depends on the quality of implementation rather than merely the availability of interventions. WHO and national guidelines emphasize the importance of periodic programme evaluations to assess operational readiness, identify implementation bottlenecks, ensure uninterrupted availability of diagnostics and medicines, and monitor adherence to recommended case management practices.^[4,7]

Process evaluations are particularly valuable because they provide insight into whether programme activities are being implemented as intended and help identify contextual factors influencing programme effectiveness.^[8]

Although several studies have documented epidemiological trends and progress towards kala-azar elimination in India, relatively few have examined the implementation quality of case management services at the district level, particularly in eastern India. Most available evidence focuses on disease burden, treatment outcomes, or vector control activities, with limited attention to operational aspects such as workforce preparedness, diagnostic readiness, supply-chain management, supervision, beneficiary support, and follow-up mechanisms. Understanding these implementation factors is increasingly important in the post-elimination era, when weakening programme performance could jeopardize hard-earned gains.

Malda district of West Bengal has historically been one of the kala-azar-endemic districts of eastern India and remains an important area for monitoring elimination activities. Evaluating the implementation of case management services in such settings can provide valuable insights into programme strengths, operational challenges, and opportunities for quality improvement. Therefore, the present study was undertaken to evaluate the implementation of kala-azar case management activities in Malda district, West Bengal, using an Input–Process–Output framework, with the objective of assessing programme preparedness, implementation fidelity, service delivery, and beneficiary-level outcomes.

MATERIALS AND METHODS

Study design: A convergent mixed-methods process evaluation was conducted using an Input–Process–Output (IPO) framework to assess the implementation of case management activities under the National Kala-Azar Elimination Programme (NKEP) in Malda district, West Bengal, India. The evaluation examined programme preparedness, implementation fidelity, service delivery, and beneficiary-level outcomes through triangulation of quantitative and qualitative data sources.

Study setting: The study was conducted in Malda district, West Bengal, one of the historically endemic districts for visceral leishmaniasis (kala-azar) in eastern India. The district has implemented kala-azar elimination activities through district, block, and sub-centre level health systems under the National Kala-Azar Elimination Programme.

The evaluation was carried out during November 2022 and assessed programme activities implemented during the preceding year.

Evaluation framework: The evaluation was guided by an Input–Process–Output framework adapted

from standard public health programme evaluation approaches. Input indicators assessed the availability of human resources, training, logistics, diagnostics, drugs, guidelines, and financial support. Process indicators evaluated programme implementation,

supervision, diagnosis, treatment, follow-up, and referral mechanisms. Output indicators assessed service coverage, treatment completion, follow-up, and beneficiary satisfaction.

Table 1: Input–Process–Output framework, indicators, and data sources used for evaluation of kala-azar case management services in Gazole Block, Malda District, 2022

Evaluation Domain	Component	Indicators Assessed	Data Source	Data Collection Method
Input	Human resources	Availability of Medical Officers, Nursing Staff, Laboratory Technicians, ANMs, ASHAs, and Kala-Azar Technical Supervisors (KTS)	Programme records	Document review
	Capacity building	Proportion of programme personnel trained in kala-azar diagnosis, treatment, surveillance, and follow-up	Training records, programme staff	Document review, interviews
	Diagnostics	Availability and validity of rK39 rapid diagnostic test kits; availability of VL and PKDL diagnostic services	Stock registers, health facilities	Observation, document review
	Drugs and logistics	Availability of anti-leishmanial drugs (Liposomal Amphotericin B and Miltefosine), consumables, and logistics support	Stock registers, health facilities	Observation, interviews
	Programme management	Availability of operational guidelines, case definitions, reporting formats, and programme records	Programme documents	Document review, observation
	Information and communication	Availability of IEC materials and IEC personnel	Programme records, facilities	Document review, observation
	Financial support	Availability of beneficiary support schemes and wage reimbursement mechanisms	Programme records	Document review, interviews
Process	Case detection	Active and passive detection of suspected VL and PKDL cases	Programme records	Document review, interviews
	Diagnostic practices	Number of rK39 tests performed and adherence to diagnostic guidelines	Laboratory and case records	Document review
	Treatment practices	Administration of recommended treatment regimens for VL, PKDL, and VL-HIV co-infection	Treatment records	Document review, interviews
	Follow-up and monitoring	Patient follow-up, monitoring of treatment completion, adverse drug reactions, relapse, and loss to follow-up	Case records	Document review, interviews
	HIV screening	HIV testing among confirmed VL cases	Facility records	Document review
	IEC implementation	Conduct of community awareness activities, meetings, miking, banners, and interpersonal communication	Programme records, stakeholders	Interviews, observation
	Beneficiary support	Timely payment of wage compensation and other programme benefits	Beneficiary interviews, programme records	Interviews, document review
Output	Service delivery	Number of cases diagnosed, treated, and referred	Programme records	Document review
	Treatment outcomes	Treatment completion, cure, relapse, adverse drug reactions, loss to follow-up, and mortality	Case records	Document review
	Programme coverage	Population coverage achieved during Active Case Search (ACS) activities	Programme reports	Document review
	Beneficiary experience	Satisfaction with services, accessibility of care, and perceived programme benefits	Beneficiary interviews	Structured interviews
	Overall programme performance	Achievement of key kala-azar elimination programme indicators	Multiple data sources	Data triangulation

Footnote: Indicators were assessed through review of programme records, facility assessments, key informant interviews, beneficiary interviews, direct observations, and triangulation of quantitative and qualitative findings.

Sampling and study participants: A multistage sampling approach was adopted. Administrative units were selected from areas reporting kala-azar cases during the evaluation period. Programme personnel involved in implementation of kala-azar case management activities were purposively selected for qualitative assessment. These included district programme managers, Block Medical Officers of Health, Kala-Azar Technical Supervisors

(KTS), laboratory personnel, and frontline health workers.

Beneficiaries diagnosed and treated under the programme were included for assessment of service delivery experiences, treatment adherence, follow-up practices, and receipt of programme benefits.

Data collection: Both secondary and primary data sources were utilized.

Secondary data: Programme records maintained at district and block levels were reviewed. These

included case registers, treatment records, training records, stock registers, supervisory reports, financial assistance records, laboratory reports, and programme monitoring documents.

Primary data: Primary data were collected using multiple methods to facilitate triangulation.

Key Informant Interviews (KIIs): Semi-structured interviews were conducted with programme managers and implementing personnel to assess programme implementation, logistics management, supervision, diagnostic services, treatment delivery, and operational challenges.

Focus Group Discussions (FGDs): FGDs were conducted with frontline workers involved in kala-azar control activities to explore training experiences, case detection practices, follow-up mechanisms, community engagement, and implementation challenges.

Beneficiary Interviews: Structured interviews were conducted among kala-azar patients or their family members to assess access to diagnosis, treatment experiences, adherence, follow-up services, and receipt of programme incentives.

Direct Observation: Observation checklists were used to assess the availability of diagnostic kits, drugs, reporting formats, programme guidelines, laboratory facilities, and other essential resources.

Data triangulation: Findings obtained from programme records, interviews, focus group discussions, beneficiary surveys, and observations were compared and integrated to assess consistency across data sources and identify implementation gaps that might not be evident from routine programme reports alone.

Data analysis: Quantitative data were entered and analysed using Microsoft Excel 2019. Descriptive statistics were used to summarize programme indicators and coverage measures. Qualitative data from interviews and focus group discussions were reviewed manually and analysed thematically. Findings from quantitative and qualitative

components were subsequently integrated using a triangulation approach and presented according to the Input–Process–Output framework.

Ethical considerations: The evaluation was conducted as part of programme monitoring and assessment activities after obtaining permission from the concerned district health authorities. Informed verbal consent was obtained from all interview and focus group discussion participants before data collection. Confidentiality of respondents and programme records was maintained throughout the study.

RESULTS

A mixed-methods process evaluation was conducted to assess the implementation of case management activities under the Kala-Azar Elimination Programme in Gazole Block of Malda district, West Bengal. Findings are presented according to the Input–Process–Output framework, integrating evidence from programme records, facility assessments, stakeholder interviews, beneficiary interviews, and direct observations.

Input Indicators

Human resource preparedness: Review of programme records demonstrated satisfactory training coverage among healthcare personnel involved in kala-azar elimination activities. At the district level, training coverage ranged from 62.5% among Accredited Social Health Activists (ASHAs) to 100% among Kala-Azar Technical Supervisors (KTS). Gazole Block reported higher training coverage than the district average across all cadres. All laboratory technicians and KTSs in Gazole Block had received programme-specific training, while more than 80% of medical officers, nursing staff, ANMs, and ASHAs had been trained in kala-azar case management activities.

Table 2: Training status of personnel involved in kala-azar elimination activities (%)

Cadre	District	Gazole Block
Medical Officers	80.3	86.5
Nursing Staff	64.3	82.2
Laboratory Technicians	90.0	100.0
1st ANM	82.1	92.5
2nd ANM	78.3	89.9
ASHA	62.5	80.0
Kala-Azar Technical Supervisor	100.0	100.0

Availability of diagnostics, logistics, and programme resources: Facility assessments revealed that operational guidelines, case definitions, and programme records were available at all assessed facilities. However, a major operational gap was identified in diagnostic readiness. All available rK39 rapid diagnostic test kits had expired by November 2022, and no

replacement stock had been supplied until the end of December 2022. The average number of rK39 tests performed per month was 22.

In addition, stock-out of Miltefosine was reported during the evaluation period. Despite these shortages, HIV testing services for all confirmed visceral leishmaniasis cases remained available through programme facilities.

Table 3: Availability of key resources and programme preparedness for kala-azar case management

Indicator	Gazole Rural Hospital	Gazole Subcentre
Register for suspected cases available	Yes	Yes
Register for confirmed cases available	Yes	Yes
HIV testing for VL cases	Yes	Yes
IEC activities conducted (%)	85	90
Case definition available	Yes	Yes
rK39 kit available and valid	No (expired)	No (expired)
Miltefosine available	No (stock-out)	No (stock-out)

Process Indicators: Programme records and stakeholder interviews indicated satisfactory implementation of case management activities. Suspected kala-azar cases were screened using rK39 rapid diagnostic tests whenever kits were available, and confirmed cases were managed according to national guidelines. HIV screening of visceral leishmaniasis cases was routinely conducted. Programme personnel reported that adverse drug reactions, relapse, treatment completion, cure, loss to follow-up, and mortality were systematically documented in programme registers.

Information, education, and communication (IEC) activities were implemented through community meetings, interpersonal communication, banners, and public announcements. However, stakeholders reported variability in the intensity of IEC activities across villages.

Active Case Search (ACS) activities achieved high population coverage. During the most recent ACS round, coverage in Gazole Block reached 92.6%, exceeding the district average of 82.5%.

Output Indicators: Programme records demonstrated satisfactory maintenance of case management indicators, including treatment completion, follow-up, HIV screening, and beneficiary support. Interviews with programme staff confirmed that wage compensation and other programme entitlements were provided to eligible beneficiaries.

Beneficiary experience

Programme support and treatment: A beneficiary diagnosed with visceral leishmaniasis in November 2021 described an overall positive experience with the kala-azar programme. The respondent reported

receiving free diagnosis and treatment, financial assistance, and nutritional support, which substantially reduced the financial burden of the illness. The beneficiary also expressed satisfaction with the support provided by the ASHA and Kala-Azar Technical Supervisor throughout the treatment process. As the respondent stated, "The ASHA and Kala-Azar Technical Supervisor visited me regularly, ensured that I received my medicines on time, and guided me throughout my treatment."

Community awareness: The beneficiary reported that awareness activities on kala-azar were conducted regularly in the village, improving community knowledge about the disease and the importance of early diagnosis and treatment. The respondent remarked, "People in our village now know that kala-azar can be treated, and they seek care earlier because of the awareness programmes."

Challenges encountered: Despite the positive experiences, the beneficiary identified important gaps in programme support. Lack of transportation assistance for travel to health facilities was reported as a major challenge, and the financial assistance provided was perceived to be insufficient to meet all treatment-related expenses. Reflecting on these difficulties, the beneficiary stated, "The medicines were free, but travelling to the hospital was expensive, and the financial assistance was not enough to cover all the costs during my illness."

Data Triangulation: Triangulation of findings from programme records, facility assessments, stakeholder interviews, and beneficiary interviews demonstrated substantial agreement regarding programme strengths and operational gaps.

Table 4: Triangulation of findings from multiple data sources

Evaluation domain	Primary data	Secondary data	Interpretation
Training of Medical Officers and nursing staff	Confirmed	Confirmed	Adequate workforce preparedness
Training of ANMs, ASHAs and KTS	Confirmed	Confirmed	Strong community-level capacity
HIV testing for VL cases	Confirmed	Confirmed	Good adherence to guidelines
IEC activities	Confirmed	Confirmed	Implemented but scope for strengthening
Case definition availability	Confirmed	Confirmed	Operational readiness maintained
Wage reimbursement	Confirmed	Confirmed	Beneficiary support mechanism functional
rK39 kit availability	Expired kits observed	Expired kits recorded	Critical diagnostic gap identified
Drug availability (Miltefosine)	Stock-out reported	Stock-out documented	Treatment logistics gap identified
Registers for ADR, relapse, cure and follow-up	Available	Available	Robust monitoring system maintained
Private practitioner involvement	Absent	Absent	Missed opportunity for surveillance strengthening

Overall, the evaluation demonstrated strong implementation of several components of kala-azar case management, including workforce training, HIV screening, beneficiary support, record maintenance, and active case search activities. Nevertheless, stock-outs of essential diagnostics and anti-leishmanial drugs, along with the absence of private-sector engagement, emerged as important operational challenges requiring attention.

DISCUSSION

This mixed-methods process evaluation assessed the implementation of kala-azar case management activities in Gazole Block of Malda district using an Input–Process–Output framework. Overall, the findings indicate satisfactory programme implementation, characterized by a well-trained workforce, adherence to national case management guidelines, routine HIV screening, effective active case detection activities, and positive beneficiary experiences. However, several operational gaps were identified, including expired rK39 diagnostic kits, stock-out of Miltefosine, limited engagement of private healthcare providers, and concerns regarding the adequacy of beneficiary support mechanisms.

The evaluation was conducted during a critical phase of India's kala-azar elimination programme. Following decades of concerted efforts in surveillance, diagnosis, treatment, vector control, and community mobilization, India achieved the kala-azar elimination threshold in all endemic blocks by 2023.^[2,3] Sustaining this achievement requires continued strengthening of health systems and uninterrupted access to diagnosis and treatment services, as emphasized in both the WHO Neglected Tropical Disease Roadmap and the National Kala-Azar Elimination Programme guidelines.^[2,4,7] The present evaluation therefore provides important insights into the preparedness of local health systems to maintain elimination gains in the post-elimination phase.

Human resource preparedness emerged as a notable strength of the programme. Training coverage among medical officers, nursing staff, laboratory technicians, ANMs, ASHAs, and Kala-Azar Technical Supervisors was generally high, with Gazole Block performing better than district averages across most cadres. Continuous training remains essential because prompt recognition of symptoms, accurate diagnosis, treatment initiation, and patient follow-up are heavily dependent on the competence of frontline health workers.^[2,9,10] Previous studies from endemic regions of the Indian subcontinent have similarly highlighted the importance of maintaining skilled personnel even after disease incidence declines, as reduced clinical exposure may gradually erode programme capacity.^[10,11]

A major concern identified during the evaluation was the complete expiration of rK39 rapid

diagnostic kits without timely replacement. Diagnostic readiness is a cornerstone of kala-azar elimination because early case detection prevents disease progression and reduces the risk of ongoing transmission.^[2,10] The absence of valid diagnostic kits at peripheral facilities can delay diagnosis, increase dependence on referral services, and compromise surveillance sensitivity. In low-incidence settings approaching elimination, each missed or delayed case assumes greater epidemiological significance.^[11,12] Similar concerns regarding maintenance of diagnostic capacity have been raised in studies examining post-elimination surveillance systems in endemic countries.^[13]

The evaluation also documented stock-out of Miltefosine during the assessment period. Although Liposomal Amphotericin B currently represents the preferred treatment option for visceral leishmaniasis in India, Miltefosine remains important for the management of post-kala-azar dermal leishmaniasis and selected clinical situations.^[2,5] Uninterrupted availability of anti-leishmanial drugs is critical for preventing treatment delays and ensuring programme credibility. Previous studies have shown that limitations in drug supply chains may adversely affect treatment outcomes and threaten long-term elimination efforts.^[14]

Assessment of process indicators demonstrated good adherence to national case management protocols. HIV screening was performed for all confirmed visceral leishmaniasis cases, and programme records documented treatment completion, adverse drug reactions, relapse, cure, mortality, and loss to follow-up. These findings reflect strong implementation fidelity and compliance with national and international recommendations.^[2,10] Integration of HIV testing into routine kala-azar management is particularly important because VL-HIV co-infection is associated with increased treatment failure, relapse, and mortality.^[15]

Active Case Search (ACS) activities achieved population coverage of 92.6%, exceeding the district average of 82.5%. Active surveillance remains a critical component of kala-azar elimination programmes because asymptomatic infections, delayed diagnosis, and residual transmission may persist even after elimination targets are achieved.^[11,12] Studies have demonstrated that sustained active case detection can substantially improve surveillance sensitivity and facilitate early identification of residual transmission foci.^[16] The high ACS coverage observed in the present evaluation therefore represents an important programme strength.

Beneficiary interviews revealed generally positive experiences with programme services. Respondents reported receiving free treatment, financial assistance, nutritional support, and regular follow-up from frontline health workers. Satisfaction with the support provided by ASHAs and Kala-Azar Technical Supervisors highlights the importance of community-level health workers in improving

treatment adherence and strengthening trust in public health services. Similar findings have been reported from endemic regions where community engagement and social support were important determinants of successful programme implementation.^[17] Nevertheless, concerns regarding the adequacy of financial assistance and the absence of transportation support indicate opportunities for improving patient-centred care and reducing the economic burden associated with treatment seeking.

Another notable finding was the lack of involvement of private practitioners in kala-azar surveillance and case management activities. In many endemic settings, private providers represent an important first point of contact for patients seeking healthcare.^[18] Limited engagement of the private sector may therefore contribute to delayed diagnosis, under-reporting, and missed opportunities for surveillance. Strengthening public-private partnerships could enhance case detection and support the sustainability of elimination efforts.

The findings should be interpreted in light of certain limitations. First, the evaluation was conducted in a single block and therefore may not be representative of programme implementation throughout Malda district or other endemic areas. Second, some process indicators were assessed retrospectively using programme records and stakeholder reports, which may be subject to reporting bias. Third, the evaluation was conducted in 2022, and there was a time gap between data collection and publication. During this period, programme implementation, resource availability, and operational practices may have evolved, particularly following India's achievement of the WHO target for elimination of kala-azar as a public health problem in 2023. Consequently, some operational findings may not fully reflect the current status of programme implementation. Nevertheless, the evaluation remains relevant because it documents programme performance during a critical phase of the elimination programme and identifies health-system strengths and operational bottlenecks that are highly pertinent to sustaining elimination gains. Lessons related to diagnostic supply chains, workforce preparedness, beneficiary support, surveillance activities, and programme monitoring continue to have relevance in the post-elimination era, when maintaining programme quality is essential to prevent disease resurgence. A major strength of the study was the use of a convergent mixed-methods design, allowing triangulation of evidence from programme records, facility assessments, stakeholder interviews, and beneficiary experiences. Such triangulation enhances the validity and comprehensiveness of programme evaluation findings and is recommended within public health evaluation frameworks.^[8,19]

Overall, the evaluation demonstrates that kala-azar case management services in Gazole Block were largely implemented in accordance with programme

guidelines and contributed to sustaining elimination activities at the local level. Addressing identified gaps in diagnostic supplies, drug availability, private-sector engagement, and beneficiary support mechanisms will be important for maintaining surveillance quality and preventing resurgence in the post-elimination era.

CONCLUSION

This process evaluation demonstrated that kala-azar case management services in Gazole Block of Malda district were largely implemented in accordance with national programme guidelines, with satisfactory human resource capacity, strong record-keeping practices, routine HIV screening, high active case search coverage, and positive beneficiary experiences. The evaluation also identified important operational challenges, including expiration of rK39 diagnostic kits, stock-out of Miltefosine, limited engagement of private practitioners, and concerns regarding the adequacy of beneficiary support. While these gaps did not appear to substantially compromise programme performance during the evaluation period, addressing them remains essential for sustaining India's hard-earned elimination gains. Strengthening supply chain management to ensure uninterrupted availability of diagnostics and drugs, expanding capacity-building activities across all cadres of healthcare workers, enhancing public-private sector collaboration, and improving beneficiary support and follow-up mechanisms may further strengthen programme resilience. Continued monitoring through periodic programme evaluations and supportive supervision will be critical to maintaining surveillance sensitivity, ensuring high-quality case management, and preventing resurgence of kala-azar in the post-elimination era.

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