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# Barriers and facilitators of visceral leishmaniasis case management in the Amhara Region, Northwest Ethiopia: an exploratory qualitative study

Yared Mulu Gelaw<sup>1,2\*</sup>, Jean-Pierre Gangneux<sup>2</sup>, Getu Degu Alene<sup>3</sup>, Florence Robert-Gangneux<sup>2</sup>, Adisu Abebe Dawed<sup>4</sup>, Mohammed Hussien<sup>1</sup> and Wendemagegn Enbiale<sup>5</sup>

## Abstract

**Background** Visceral leishmaniasis (VL) is among the world's most serious public health threats, causing immense human suffering and death. In Ethiopia, little is known about the barriers and facilitators of visceral leishmaniasis case management. This study aimed to explore such barriers and facilitators in the Amhara Regional State, Northwest Ethiopia.

**Methods** An exploratory qualitative study was conducted on 16 purposively selected patients and key informants from May 8 to June 2, 2023. The study participants were recruited using the maximum variation technique. The interviews were audio recorded, transcribed verbatim, and translated into English. Thematic analysis was employed using Atlas.ti 9 software with a blended approach of both deductive and inductive coding.

**Results** The study identified a variety of issues that hinder the success of visceral leishmaniasis case management. Treatment centers face frequent interruptions of medicinal supplies, a lack of funding, and a lack of trained healthcare providers. A lack of support from health authorities, including weak supervision and feedback systems, is also a source of concern. Most patients receive treatments after significant delays, which is primarily due to low awareness, poor surveillance, and misdiagnosis by healthcare workers. The case management is further constrained by malnutrition, VL-HIV co-infection, and other comorbidities. Despite these issues, we found that effective collaboration between hospital units and VL treatment centers, acceptance by hospitals, and the caring attitude of healthcare workers play a positive role in facilitating the program's effectiveness.

**Conclusions** Despite the existence of certain efforts that facilitate the program's effectiveness, VL remains largely neglected, with little government attention or intervention. Such inattention is the root cause of most of the issues. Despite limited resources, most issues could be resolved with cost-effective strategies if health authorities at all levels have the will and commitment to do so.

**Keywords** Visceral leishmaniasis, Case management, Barriers and facilitators, Ethiopia

\*Correspondence:  
Yared Mulu Gelaw  
yareadmulu@gmail.com

Full list of author information is available at the end of the article



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## Background

Leishmaniasis is one of the top-rated 10 neglected tropical diseases, affecting some of the world's poorest people [1]. Visceral leishmaniasis (VL), often known as kala-azar, is a severe form of leishmaniasis that is deadly for more than 95% of patients if left untreated [2]. VL is one of the world's most significant public health threats. Annually, an estimated 50,000 to 90,000 new cases of VL are recorded worldwide, with the majority of infections occurring in Brazil, East Africa, and India [2]. East Africa is the world's largest VL endemic region, contributing 50% of new cases to the global burden, with Sudan, Ethiopia, and South Sudan accounting for the majority of new VL cases [3]. The estimated annual incidence of VL in Ethiopia ranges from 3,700 to 7,400 cases, making it one of the seven countries that account for over 90% of the global VL burden [3].

VL is widespread in Ethiopia's arid and semi-arid regions. The *Metema* and *Humera* plains in northern Ethiopia are among the most important endemic foci in the country [4], with the Amhara region accounting for more than three-fourths of the country's VL burden [5]. VL epidemics are linked to migration and the relocation of nonimmune laborers from nonendemic highlands to extensively endemic farmlands [6].

VL poses a significant impediment to poverty reduction, socioeconomic development, and public health [6, 7]. It inflicts immense human suffering and death, with a high morbidity and mortality rate, affecting the quality of life and causing mental illness, social stigma, and psychosocial morbidity [8, 9].

Early diagnosis and effective treatment aids in the reduction of VL transmission, disability, and death [2]. The introduction of antileishmanial drugs in recent years has resulted in a remarkable reduction in mortality [10]. Following an increase in outbreaks of the disease, the government of Ethiopia developed its control strategies in 2006 [11]. A VL diagnosis and treatment guideline was developed taking into account current international recommendations [12].

Although various national and international efforts are in place to control and eliminate VL, there are numerous difficulties to overcome, including inaccessibility to the few chemotherapeutic agents, unreliable stocks of medications, high cost of treatment, unfavorable outcomes, and treatment failures [13, 14]. In particular, VL case management in East Africa is threatened by challenges related to drugs and diagnostics, limited stocks of suppliers, and fragile supply chains [15]. Attempts to eliminate VL in this sub-region are further hampered by obstacles within the healthcare system, including a lack of qualified healthcare workers combined with high turnover [16]. Due to a weak surveillance system [17] and low awareness among the target population [17, 18], patients

initiate treatment late, which imposes a heavy burden on the healthcare system and patients. It is well documented that VL is linked to malnutrition, HIV co-infections, comorbidities, and poor sanitary and housing conditions [3, 19–23]. VL-HIV coinfection, in particular, intensifies the burden of leishmaniasis due to greater difficulty in clinical management and treatment [6, 24, 25].

Despite the country's high disease burden, little is known about the barriers and facilitators of VL case management in Ethiopia. Coulbourn et al. [18] investigated the barriers to VL diagnosis and treatment among mobile seasonal workers, as well as the financial and workload burden it imposes on the public healthcare system in northwest Ethiopia. It focused primarily on community-level issues that contribute to late case detection and healthcare seeking and did not assess healthcare-system and patient-level issues that influence the success of VL treatment. We thus aimed to explore the barriers and facilitators of VL case management in selected treatment centers of the Amhara regional state. The findings of this study will be valuable in establishing appropriate VL control and elimination strategies for policymakers, program implementers, partners, and the community.

## Methods

### Study setting

The study took place in VL treatment centers of the Amhara regional state, Northwest Ethiopia. VL treatment in the Amhara regional state is provided at five selected hospitals: the Addis Alem (Bahir Dar), Addis Zemen, Gondar, Metema, and Sekota hospitals. All treatment centers were included in the study except for the Sekota hospital (unable to collect data because of the ongoing war in northern Ethiopia between the federal government and Tigray region forces).

A large number of mobile seasonal workers from various regions of the Amhara region travel to the highly VL endemic lowland area of Northwest Ethiopia along the Ethio-Sudan border to work as day laborers on farmland, as large-scale agriculture based on sesame, cotton, and sorghum production is important to the local economy [18]. After contracting the disease, VL patients receive treatment at kala-azar centers at selected hospitals in the region.

### Study design

The study employed a qualitative case study design. A qualitative case study is a research method that entails a thorough examination of a specific subject, such as a person, group, location, event, organization, program, or phenomenon. It is a suitable research design that aids in the acquisition of concrete, contextual, and in-depth knowledge about a specific real-world subject. Case studies enable researchers to delve into the case's

key characteristics, meanings, and implications. These studies are useful for describing, comparing, evaluating, and understanding various aspects of a research problem [26]. The current study followed the Consolidated Criteria for Reporting Qualitative Research (COREQ) standards for ensuring comprehensive and transparent reporting of the study design, recruitment approaches, data collection, and analysis methods [27].

### Participant selection

The interviewees were purposefully chosen using the maximum variation technique to gain insights from a diverse range of perspectives and to recount notable shared experiences among the various stakeholders [28]. A total of 16 participants took part in this study. Of these, eight key informants (two from each treatment center) were recruited by considering their role in the hospital. These include hospital CEOs, heads of treatment centers, and healthcare providers. Key informants were selected for their ability to provide a wealth of information as well as their active participation in VL case management.

Eight VL patients were carefully selected for the in-depth interviews by healthcare providers based on their ability to provide valuable information and their experience in treatment centers. Patients who completed their treatment or were readmitted after relapse were selected because they were required to share their experiences based on their observations in the treatment centers. The final sample size for both hospital CEOs and service providers, as well as patient groups, was determined based on data saturation, with no new information emerging from additional participants [29]. The principal investigator, who facilitated and conducted the data collection process, is based in an academic institution and had no prior relationship with the study participants or study sites.

### Data collection

The data were collected between May 8 and June 2, 2023, using in-depth interviews (IDIs) and key informant interviews (KIIs), using a semi-structured interview guide that was developed for this study and reviewed by five experts (Supplementary file.docx). It was designed to elicit the participants' perspectives through open-ended questions that were further probed to trigger more discussions. IDIs were conducted with current VL patients who completed their treatment course to explore their views and experiences concerning the disease and attempted treatment options, their health-seeking behavior, and the quality of the healthcare at the treatment centers. The interviews were conducted at a convenient location in the hospital just before they were discharged.

The KIIs were intended to explore the views of hospital CEOs and service providers concerning the support

received from various stakeholders, program governance and integration issues, the quality of healthcare, and other factors that are both barriers and facilitators of the effectiveness of VL treatment from the perspective of both the healthcare systems and the patients. Key informants were interviewed at their place of work during a predetermined meeting.

The interviews for this study were carried out by the lead investigator (YMG), a researcher with a master's degree in health systems management, a PhD fellow, and extensive experience in conducting qualitative interviews. All of the interviews were conducted face-to-face in convenient locations privately within the hospital setups to encourage openness and honesty. The interview sessions lasted between 25 and 60 min and were conducted in Amharic, the local language. With the participants' permission, all conversations were audio recorded using a digital voice recorder, and field notes were taken during the interviews by one of the authors (MH). Everyone we contacted agreed to participate in the study.

### Trustworthiness

We used various approaches to improve the trustworthiness of the data, such as reflexivity, data triangulation, and thick description. These data collection methods and data sources (method and source triangulation) helped to increase the credibility of the findings [30]. Throughout the research process, the principal investigator kept a reflexive journal to record expectations, observations, interview experiences, options available, and decisions made, which helped to foster reflexivity [31]. To enhance understanding and transferability, the research setting, process, and findings were thoroughly described. We present a detailed account of the findings, supported by sufficient evidence in the form of quotes from the participant interviews [29].

### Data analysis

The audio recordings of the interviews were transcribed verbatim and then translated into English. The transcriptions also included a summary of the field notes. Thematic analysis was conducted based on the finalized translated data. The coding process was facilitated using the Atlas.ti 9 software package. First, all interview transcripts were read and reread to gain a comprehensive understanding of the data set. A blended approach involving both deductive and inductive methods was used in the coding process. The deductive approach was used to first identify preliminary themes and sub-themes based on a review of the existing literature and research questions. The themes that emerged during the coding process were incorporated inductively rather than by trying to fit them into a predefined coding framework. The principal investigator independently generated the initial

coding schemes, and he classified them into subthemes and themes. The preliminary results were reviewed and revised with the coauthors to ensure that the findings accurately capture the complexities of the participants' responses.

## Results

Five main themes emerged from the thematic analysis of the interviews: (1) governance and integration into the system; (2) structural inertia and a lack of focus; (3) quality of healthcare; (4) patient behaviors, practices, and social support; and (5) the nature of the disease and its treatment modality. Sub-themes were identified for each main theme and are described.

### Program governance and integration into the system

#### Supply management

Poor supply management, such as interruption of the availability of drugs, in particular liposomal amphotericin B (AmBisome), which is the costliest, and rk39 diagnostic test kits, was an important issue faced by the VL treatment centers. In particular, the timely and need-based supply of drugs was the most highly discussed concern in most of the interviews. Supply management did not consider the true needs of the treatment centers. Despite the assumption that drugs would be supplied based on the number of patients treated, centers faced intermittent shortages. Some participants suggested that the distribution of drugs should consider other factors, such as the repeated admission of patients. As a result, centers are forced to refer patients to other areas or make patients wait until the drugs are available.

*“Another challenge has been the lack of drugs, now around three months. We do not have the drug called AmBisome. Although it is supplied by the program, its availability is usually interrupted. Recently, its deliveries were interrupted. Patients have also arrived recently for treatment, and hence, the drug is lacking. Now, there are many patients in our hospital. The amount of the drug given to us is also insufficient (in terms of the number of patients). The amount supplied is not according to our request.”* [KII-4, service provider].

#### Government support

Participants also highlighted that the overall support obtained from the health authorities is not sufficient and does not take into account the spread and burden of the disease. Indeed, supportive supervision is conducted by experts from the regional health bureau; however, it is infrequent, irregular, fault-finding, and non-responsive to the gaps identified. Some of the interviewees argued

that the support from the Ministry of Health does not go beyond the distribution of drugs, and they could not remember a recent supervision event. In most cases, their communication is only via the reporting system.

*“... the support we get from government institutions is usually limited to drugs from the Ministry of Health. In fact, there are many problems with that too. ... we are not adequately supplied with AmBisome”* [KII-7, Head, treatment center].

*Well, this is difficult... the support provided is not organized or system-based. It takes into consideration the goodwill of individuals and their understanding of things; it is not system-based. It is not coordinated in a way that is planned, budgeted, or in connection with human resources.”* [KII-2, Hospital CEO].

#### Capacity building for healthcare providers and leaders

Capacity-building activities have been conducted by the regional health bureau and aid organizations. Budgets have been allocated by the regional health bureau, and hospitals have mobilized additional resources to train the healthcare providers involved in VL case management. However, the training budget is inadequate, as it is not exclusively dedicated to VL. Moreover, these activities are not continuous, and not all healthcare providers receive relevant training. Interview participants suggested that the assessment of training needs to be performed over time and that all service providers receive formal training in VL management because those already trained are leaving the center or working in shifts in other units of the hospital. Despite not all care providers receiving formal training, there is knowledge transfer between those who are trained and those who are not. An exception to the current situation is the VL case management in one of the treatment centers, where all care providers have received the required training.

*“It is good if everyone receives training as much as possible because it is very good if a trained person manages VL patients. If there is one trained person, he will be required to show the others. But it would be good if every professional received formal training. Sometimes there is this deficiency.”* [KII-4, service provider].

#### Administration issues

The responses concerning hospital administration were mixed. Some of those interviewed argued that the hospital administration is trying its best to address problems

and fill gaps. They argued that the effectiveness of a VL treatment center is attributable to the strength of the hospital management and felt that the support from higher officials was weak. Some of the efforts that hospitals undertook, according to the respondents, included better control and efficient use of supplies to prevent shortages, the continuous supply of food despite budget constraints, resource mobilization for capacity-building activities, and knowledge transfer between staff.

*“The support of the hospital management is good. For example, when there are patients who lack food, the hospital provides the necessary food and treatment. They decide what needs to be done and do it on time. The regional state can replace the budget later.” [KII-1, service provider].*

Contrary to the above statements, respondents disclosed a number of administrative concerns in hospitals where the VL treatment centers are located, including immediate responses to problems, the cleanliness of treatment rooms, and the supply of food. In particular, patients and service providers in all treatment centers expressed great concern concerning the quality of food available for VL patients, as this is highly linked to the effectiveness of the treatment.

*“... the response to problems is not sufficiently swift; for me, the response is too late. I'm the one who is close to the case and facing it. The management will probably only find it in the report.” [KII-4, service provider].*

*“There are problems concerning cleanliness and the food. There should be a variety of food. We are the ones who clean the room we are in; they don't clean it for us.” [IDI-8, VL patient].*

### **Integration and referral system**

The extent to which the VL treatment center works cooperatively with other units of the hospital and has received support from the hospital management was another area of discussion. In this regard, the VL treatment centers are well integrated, and it is such integration that has largely contributed to the effectiveness of VL case management, as stated by most of the interviewees.

*“Healthcare is a collaborative effort. Without the pharmacy, laboratory, and other departments, this department cannot be effective. The kala-azar service provision is shared; everyone knows what to do. The coordinated approach is one of the reasons for our effectiveness.” [KII-1, service provider].*

The situation in one of the VL treatment centers is different. Due to the fact that the treatment center has its own independent team, budget, and support from an aid organization, it is viewed by the hospital community as a separate entity that is not part of the hospital in many ways. For this reason, center staff are not invited to participate in the hospital affairs and training activities, such as updates on HIV management.

*“We are not allowed to participate in various training organized by the Ministry of Health and the hospital as part of the hospital staff. Various updates are made on HIV and TB management, but they don't invite us to participate in these updates, despite the fact that we are actively working in their management.” [KII-7, Head, treatment center].*

*“They [the hospital community] think that VL patients are somehow only ours; they think that the responsibility is only ours, even though it is everyone's responsibility. They think it is something different. There is no supervision or support like in other work departments.” [KII-8, service provider].*

The referral system is not a two-way process. Patients are referred to the treatment centers at other health facilities once they are identified or suspected as a VL patient. However, after completion of their course of treatment, they are not linked back to the referring health facility for follow-up.

*“We do not link them back to the referring health facility. If there is a specific problem, we advise them to go to the nearest health facility in their area, and if it is a problem related to kala-azar, to come here.” [KII-1, service provider].*

### **Monitoring and evaluation**

It is understood that the VL case management program is evaluated continuously, consistent with the evaluation system of other programs within the hospitals. VL issues are part of the hospital meeting agendas, and changes are made accordingly in each treatment center. Progress is reviewed based on the performance and case reports presented by VL treatment units. In one treatment center, the review process is more frequent and stronger, as it receives strong support from an aid organization.

*“Since it is a program of the hospital, like any other health program, it is reviewed every month by the multidisciplinary team. Focal people in each department manage the events they encounter every day, but the monitoring and control team evaluates them*

*every month, both quantitatively and qualitatively.” [KII-2, Hospital CEO].*

The monitoring and evaluation system becomes looser as one goes higher up in the health system hierarchy. Rare review meetings were organized by the Ministry of Health approximately three years ago but were then interrupted. Accordingly, the study participants recommend that a well-organized and system-based monitoring and evaluation strategy be established and that actions be based on the results of such monitoring and evaluation.

*“The medical center must be organized with an organized monitoring and evaluation system. Periodic indicators should be set, and the results need to be measured based on them. Second, there should be an actively programmed evaluation and revision of neglected issues by the regional health bureau. At the regional level, it was done only once this year, and there is no continuous monitoring or support. Evaluation implies attention to the program. [KII-3, Hospital CEO]*

### **Structural inertia and lack of focus**

#### **Structural inertia**

Another issue that impedes the effectiveness of VL case management is that the existing structure does not allow care providers to perform comprehensive activities. Despite the program being budget intensive and placing a great deal of pressure on healthcare providers, hospitals are running the program without additional human resources or budget allocation. As a result, their effort is limited only to curative services; despite that, they are expected to participate in preventive activities, such as screening. For better functioning and effectiveness of the program, there should be a separate treatment center with its own independent team and budget, as suggested by the respondents.

*“It is an additional responsibility for the existing structure. After the introduction of this program, there was no structural change. There are no additional human resources, no benefit package, and no other support staff, such as porters and cleaners. It is cost-intensive but not budgeted. When the work increases, you have to increase the budget and human resources. This is a fundamental problem for users and the effectiveness of this program. If you go conventional, it will not only compromise the service quality but also put pressure on the results.” [KII-2, Hospital CEO].*

It was also stated that responsible individuals are not assigned at the highest levels of the healthcare system hierarchy to coordinate this program. It was suggested that a coordinated approach is required from top to bottom to achieve the intended result; everyone’s effort is important.

*“... the support provided is not organized or system-based. It is not coordinated in a way that is planned, budgeted, or in connection with human resources; there is no person who can coordinate it at every level, and it is not being evaluated or managed accordingly.” [KII-2, Hospital CEO].*

#### **Weaknesses at the ground level: surveillance and health education**

Another critical issue that hinders the effectiveness of VL case management is that efforts targeting VL are missing an important area of intervention: surveillance and the creation of awareness among the population and healthcare providers. As a result, patients come late to treatment centers after major vital organ dysfunction.

Respondents stated that health education was provided by healthcare professionals occasionally in urban locations of the endemic areas; however, these activities have received less attention in the last few years. Some VL patients stated that they had never received any health education concerning VL before they became sick in that area.

*“It’s not a given; we are just doing the work; there is no one to teach us. There are many people who go to the VL endemic lowland areas for seasonal work because there is money, but no one turns around, and they don’t teach us.” [IDI-8, VL patient].*

Some migrant workers cross the Ethio-Sudan border to find seasonal work in Sudan. It is understood that there is no health education activity in this area.

*“We work in Sudan. We pick weeds and harvest cotton and sesame. There is no such thing as health education. It is not for health education that we go, let alone that we don’t know their language. When we get sick, they just give us anti-malaria drugs empirically.” IDI-7 VL patient]*

Respondents suggested that an emphasis should be given to efforts to create awareness among the population to enhance health literacy. In particular, it should target the migrant workers at workplace camps, the population in non-endemic areas, and the healthcare workers at lower-level health facilities, both public and private.

*“Yes, they did not know about it; now, in our district, people do not know about kala-azar. People in our district should get health education about the disease.” [IDI-2, VL patient].*

Although it is not feasible to design and implement regular health education activities at the community level, it was possible to incorporate VL as part of the morning health education sessions in all public health facilities. However, this was also not practical, as witnessed by VL patients.

*“If there was such awareness in non-endemic areas, we could save the people who died in these areas. There are many patients attending treatment in these non-endemic areas, like in the Bahir Dar VL treatment center. If they teach once a month, it’s possible to save the lives of four or five people, but no one works on it.” [IDI-2, VL patient].*

Despite being an essential area of action for effective VL case management, surveillance does not function well, as stated by most of the respondents at the VL treatment centers.

*Migrant workers return to their families after being too weak and losing their energy. If the screening work in that area is strengthened, this problem will be greatly reduced. If the practice of screening is established and strengthened in the area where the disease is endemic, we can save many things. If this were the case, people would not waste their time and money. [KII-4, service provider]*

It was stated that the health system was unable to use the existing opportunity to strengthen surveillance. Health extension workers, who are located at the grass-roots level in the community, are mainly responsible for screening and linking patients to a higher-level health facility. With appropriate capacity building, they could screen patients with signs and symptoms of VL and link them to treatment centers. However, this is not the case, as they are not empowered by the relevant body to carry out these tasks.

*Surveillance itself is very important; it is very basic and should be linked to the health extension workers. The first thing to do is that they should screen the people before they fall ill, just like when a TB suspect is screened and sent to a treatment center. For example, if a person with a fever of more than two weeks tests negative for malaria, it should be suspected that it may be kala-azar, and it is neces-*

*sary to rapidly link the person to a kala-azar test center. [KII-6, Hospital CEO]*

#### **Lack of focus and sense of engagement: yet it is neglected**

Another concern stated by the study participants was that the disease has not received government attention or a sense of engagement. Some believe that the supply of drugs free of charge implies attention by the government, whereas others argue that the responsibility is left to donor organizations and treatment centers and that the efforts by the Ministry of Health are minimal. Overall, it is understood that there is an overreliance on aid organizations and that efforts do not extend much beyond a curative service.

*“The name “neglected” exists by itself; however, I don’t think that VL itself has been given a place among the neglected tropical diseases. It is the neglected of the neglected.” [KII-6, Hospital CEO].*

*“The work goes in line with the activities of partner organizations; it moves forward when they come and stops when they go. If the partner organization stops working, everything stops. It seems to be the responsibility of some institutions only. It is difficult to ensure continuity of the service under the sole responsibility of this hospital.” [KII-3, Hospital CEO].*

The absence of a sense of ownership and a focus on the program by the higher-level hierarchy is infectious. Thus, healthcare providers behave in the same way.

*“As experts are also part of the community, if the community doesn’t share how much is the consequence of the problem and the attention given to the program, just like any community member and the people who lead this program, there is a behavior that is on and off, and we don’t take it as good. There is a tendency to focus only on injecting the drug by professionals; healthcare is not as comprehensive.” [KII-2, Hospital CEO].*

Despite the above issues, respondents did not deny the existence of many opportunities that are linked to donor organizations. The availability of drugs and laboratory facilities free of charge, full support for a treatment center by covering all its costs in one of the VL treatment centers, regular follow-up, and capacity building activities are some of the main roles of aid organizations identified from the interviews.

## Patient behaviors, practices, and social support

### *Delays in seeking care and its reasons*

There are a number of important issues that emerged from the patients' perspective that threaten the effectiveness of VL case management. In particular, a delay in seeking care is a critical problem that all respondents were concerned with. Most patients reach the VL treatment centers after they reach end-stage disease, with damage to the vital organs, and, on some occasions, they die just after arrival.

*"With some unique conditions, VL patients may have a poor treatment outcome or a sluggish response. It matters if they stay sick for too long without starting treatment. If they come here after a long period of sickness with complications, the treatment response will be poor." [KII-7, Head, treatment center].*

The delay in seeking care was attributed to several reasons, as explored in the interviews. A low level of awareness among patients, the population, particularly in non-endemic areas, and healthcare workers at lower-level health facilities play an important role. Some respondents stated that there is better awareness of the disease in endemic areas. However, the people most affected are migrant workers who travel from non-endemic areas to endemic areas searching for seasonal work. When they fall sick, they return to their family, where both the population and healthcare providers are unaware of the disease. As a result, patients are misdiagnosed, and various treatment options are tried at health facilities and by traditional healers before patients reach the treatment center.

*"I myself waited for a month; there are some who wait for a year without being treated. Many people do not know about kala-azar in our district because it is rural. I did not think it could be kala-azar, never. I heard that there is a disease called kala-azar, but I never thought that it would be my disease; I did not know the symptoms." [KII-8, service provider].*

*"Healthcare workers in non-endemic areas have limited knowledge about VL; they don't take the disease into account because it's not common in their area; they don't have the training; most don't have the knowledge except for some who are looking proactively. I think the experts' lack of knowledge is the main reason for the delay in seeking care." [KII-7, Head, treatment center].*

Some argued that migrant workers could hear about kala-azar in one way or another in an endemic area, but once they started work, their main focus was on generating income rather than protecting their health. As such seasonal work is for a brief period, they continue working despite feeling ill, planning to possibly seek care later.

*"To begin with, we are uneducated, and then our focus is on working and generating more income in the short term. Although we feel sick, we take painkillers and pursue our work." [IDI-7, VL patient].*

The high prevalence of malaria in VL endemic areas and the similarity of symptoms between the two diseases were the most frequently mentioned causes of VL patients' waiting to seek care. This condition confuses patients, inexperienced healthcare workers, and those with a better awareness of VL. The first option for febrile patients is the empirical prescription of antimalaria drugs by healthcare providers or over-the-counter medications by the patients themselves. This relieves the symptoms for a short time and causes them to relapse later, which increases their belief that the disease is malaria.

*"Patients take anti-malaria drugs by themselves. When you take the drug, it seems that the disease goes away for some time, the fever stops, and it comes back after three days. When it gets worse, they go to a private clinic and are told that it is malaria itself. I have experienced it myself. I was treated this way before." [IDI-4, VL patient].*

*"VL is characterized by signs of intermittent fever. If a patient has a fever today, he may be fine tomorrow; he may not feel much pain; he will continue to work; and the day after tomorrow, he will be sick; he will take painkillers and feel better. They will stay like this for two weeks or more without seeking treatment." [KII-7, Head, treatment center].*

Another reason for the late presentation of patients is the absence of a strong surveillance system, which complements the above problems of low community awareness. Moreover, because the treatment centers in the region are limited in number, they are not easily accessible for most patients, which is another reason for waiting to seek care and incurring both direct and indirect costs.

*"Community surveillance is non-functional. They come after major vital organ dysfunction, which is due to a lack of surveillance. Such things lead to relapses, other health problems, etc." [KII-2, Hospital CEO].*



### **Belief in and the use of traditional drugs**

Although the first choice of VL patients is to visit the nearest primary healthcare facility, the next option is to visit traditional healers because of their lack of confidence in traditional healthcare facilities. These range from stabbing and/or heating parts of their body, drinking herbal products, and visiting witch hunts to the use of holy water in religious places.

*“They come late having tried many traditional treatments; they go to witch hunts, try holy water, try different drinking potions, and stab their tongues when they develop jaundice or ‘bird disease,’ which exposes them to anemia.” [KII-1, service provider].*

*“This disease does not allow anyone to go early, including me. I did not come early because I used holy water one time and went to a witch hunt another time. There was no place I would not go to. Later, I decided to come here after I tried other things and understood that I had no other option.” IDI-3, VL patient]*

Signs and symptoms of VL are given different names and reasons in society. When patients show signs of jaundice at the late stage of the disease, it is traditionally referred to as “wofie” or “bird disease,” whereas enlargement of the spleen and liver is known as “Lava”. In the community, it is believed that such ailments are cured only by traditional drugs.

*“Another symptom is that their eyes turn yellow because VL affects the liver. Traditionally, this is called ‘bird disease.’ People try various alternatives to traditional drugs for such diseases.” [KII-7, Head, treatment center].*

### **Adherence to treatment and doctors’ advice**

Most of the time, VL patients adhere well to the treatment plan and doctors’ recommendations because they reach the treatment center with various complications and understand the severity of the disease. However, there are instances of nonadherence due to the pain and suffering associated with anti-*Leishmania* drugs. In particular, this is common among those who have no social support and those who are young.

*“Because of the pain caused by the drug, occasionally some people stop. The injection is very painful. Recently, one of our patients defaulted and was lost due to fear of the pain after taking the drug for three days.” [KII-8, service provider].*

In addition to the medication, patients are also required to adhere to some professional recommendations. These include maintaining a balanced or high-protein diet, maintaining one’s health, and avoiding harmful practices, such as alcohol intake. VL patients disclosed that some do not follow these recommendations due to various reasons, including a lack of awareness or inattention.

*“There are patients who drink alcohol knowing that it is harmful. Some patients died due to the intake of prohibited things. I remember a person who was on kala-azar treatment, drank alcohol and smoked cigarettes who is now dead, although I told him not to do so.” [IDI-2, VL patient].*

Despite both healthcare providers and VL patients placing a great emphasis on the importance of maintaining a balanced diet for the effectiveness of VL case management, it is not usually practical. The inability to maintain a balanced diet is related to the economic status of the patients and their families. Most VL patients are migrant workers who travel to VL-endemic areas to earn money and do not have assets. They may fall ill before they earn enough money, or they may spend their money on various treatment options before reaching the VL treatment center. Apart from their economic background, the disease and its treatment modality put a great burden on patients and their families in terms of both direct and indirect costs.

*“Now, I have spent a lot of money; I have spent no less than 5 thousand Birr, and that is only in a month. Now I am spending the money that I get from the seasonal agricultural work for the treatment of this disease.” IDI-8, VL patient]*

*“The payment is difficult for us; there are those who have nothing, but it is for a cure, which is a matter of life and death. Now, there is a patient here who has no money to pay, so he is very stressed. Now, it is sent from his family. We pay for not only VL but for additional diseases; it costs a lot.” IDI-1, VL patient]*

### **Social support**

The support patients receive from their social networks, including their families, was another point of discussion in the interviews. In this regard, differing views were reflected among the respondents, depending on the location of the treatment center. Patients who return to their place of permanent residence and receive treatment in the nearby centers receive relatively better support from their families. On the contrary, most VL patients in endemic areas did not receive social support because

they were migrant workers who were far from their families. In this situation, it is the additional responsibility of the healthcare provider to provide the required support.

*“It is difficult for a patient without a caregiver. Most of the patients are migrant workers and do not have family supporters. Patients support each other; some friends bring them, but their friends do not want to stay more than three days.”* [IDI-2].

*“Most of the migrant workers are far from their families; only a few have family members nearby; patients who are accompanied by family members can get good care of when food is not easy to obtain; but most of them have no family around.”* [KII-5, service provider].

#### **Nature of the disease and its treatment modality**

##### **VL-HIV co-infection and other co-morbidities**

VL-HIV co-infection is another challenge that impedes the effectiveness of VL case management, as stated by both service providers and VL patients. High rates of relapse and mortality are observed among these patients. Such patients usually receive repeated treatment and are admitted two or three times per year.

*“These patients experience treatment failure. The relapse rate is very high; it is about 50%. It compromises their quality of life, and they are admitted at least twice a year.”* [KII-8, service provider].

*“VL-HIV management is a big challenge for us. It is a very big challenge because, to your surprise, there is a person that we have treated 52 times. He comes three times a year, and we treat and discharge him; he can't be cured, and the parasite does not decrease.”* [KII-7, Head, treatment center].

Moreover, the presence of other co-morbidities and conditions, such as chronic diseases, tuberculosis, anemia, and severe malnutrition, is another challenge that affects the effectiveness of VL case management. Some of these conditions increase the parasitic load of the disease and complicate the medication process, as stated by the experts.

*“If they come with a co-morbidity, such as tuberculosis or severe malnutrition, and if they come sick for a longer period and develop complications, they have a poor treatment response.”* [KII-7, Head, treatment center].

##### **Burden of the disease on hospitals: workload and the high cost of care**

VL is a cost-intensive disease, incurring both direct and indirect costs, and puts a great economic burden on hospitals. On the one hand, VL treatment is very costly, and on the other, the hospitals face critical budget shortfalls due to a lack of additional budget for it. In this regard, hospitals are challenged to balance the two issues, which can compromise the quality of care.

*“Not having a budget is a fundamental problem. Feeding these people for a month will cost you millions a year. It is easier for the hospital to serve 5,000 or 6,000 other patients than manage 150 kala-azar patients annually. The inpatient stay for other health problems is not more than four days on average. But this one is a month, and it's a challenging issue, similar to a health problem with a large patient population.”* [KII-2, Hospital CEO].

The VL treatment center is an addition to the existing workload without additional human resources or any additional funding. This puts a great burden on healthcare providers and, hence, influences their level of motivation in all treatment centers, except for one, where the service providers are highly experienced, highly motivated, and work with great enthusiasm. This level of motivation and a positive work climate is attributed to the base salary paid to its staff. Because this treatment center is fully supported by an aid organization, it is an independent center with its own budget, human resources, and a better salary for its staff.

##### **Nature of the drugs: pain, toxicity, and other side effects**

Another issue that affects VL case management is that the treatment modality is not convenient for patients. The most frequent complaint from patients is the pain associated with administration of the drugs, in particular injectables (antimonial, liposomal amphotericin B, and paromomycin), which is the main modality of treatment. They cause severe pain, and it is challenging and psychologically stressful for both patients and healthcare providers. The fact that the course of treatment is long magnifies the problem. Due to intolerance to the pain, some patients decide to stop their medication and cease to visit the treatment centers. Moreover, the existing oral drug (miltefosine) causes severe gastric disturbances.

*“The treatment modality is to cure one disease by creating another. The injectable treatment causes severe pain; the pain creates stress on its own. Some patients suffer from other health problems as a result, especially children, because of their fear of*

*this, and it is not patient-centered.” [KII-2, Hospital CEO].*

Apart from the discomfort during administration, the drugs are also toxic, causing damage to vital organs and sometimes leading to death. Liver toxicity, kidney failure, and cardiac toxicity are among the side effects that are observed. In particular, if patients are put on medication without proper baseline assessment, stabilization, or careful drug selection, they are at a higher risk of complications from drug toxicity. Patients referred to the referral hospital from other centers usually come due to such scenarios.

*“Vital organs should be tested and stabilized before initiating the treatment because the drug is very toxic. There is one experience that saddens me, and I will never forget it in my life. The patient was assumed to be cured; he was one day away from discharge. We gave him an appointment card. When we tried to check his vital signs the next morning, he had died. The drug has cardiac toxicity, and he died due to that.” [KII-8, service provider].*

There is another issue associated with the long-term treatment modality. Because the course of treatment is long, VL patients are at a high risk of developing hospital-acquired diseases. Healthcare providers witnessed cases of death due to other diseases acquired in the hospital for patients admitted for VL treatment. A separate VL treatment center is recommended to avoid this problem.

*“Everyone is treated as an inpatient, which has its side effects. If the drug is taken in oral form, people can manage themselves at home. First, it will reduce the pressure related to inpatient management. Second, a shorter hospital stay means it will reduce hospital-acquired infections. There was a patient who came for VL treatment and died of a hospital-acquired infection.” KII-3, Hospital CEO]*

### **Quality of care**

#### **Accessibility, affordability, and timeliness**

The unavailability of drugs impedes treatment centers from providing timely and safe treatment for VL patients. In particular, drugs such as AmBisome and antimonial are frequently out of stock, and providers are challenged to manage patients with VL-HIV co-infection and other unique conditions. Sometimes they are required to treat more critical patients in times of drug shortages and leave others to wait or alternatively refer them to another center. Furthermore, due to a shortage of relatively safe

drugs, patients are forced to take more toxic and painful drugs.

*“A shortage of supplies, in particular drug shortages, is our biggest challenge. Now there is a shortage of a drug called AmBisome. It is very expensive, but it is the preferred drug to treat critical patients. Another one is the shortage of Dextrose 5% in water (D5W). There is a situation when we buy from private pharmacies and treat them. We do this because we have our own budget, but the other centers don't treat patients because of this, or the patient buys it himself, and if he can't, he waits until it is available.” [KII-8, service provider].*

*“I was told to start antimonial (SSG) because of the unavailability of AmBisome. After taking five injections, I was very weak; I couldn't withstand it and then it put me in bed. Then they stopped it and I waited until AmBisome was available.” [IDI-4, VL patient].*

The unavailability of laboratory tests and facilities, both diagnostic and follow-up, is another concern, as witnessed by patients and healthcare providers, except in one center where the situation is better. The main issue is inadequate facilities. In this regard, patients are required to visit private institutions, which is costly relative to their ability to pay.

*“They sent me outside when they had to do all laboratory tests, including cell blood counts. I went to a private hospital for laboratory tests. Then I spent more than 860 Birr. I was very sick and I was supported by someone at the time.” [IDI-5, VL patient].*

It was also pointed out that there is insufficient infrastructure and an insufficient number of healthcare providers. Some treatment centers reported a shortage of senior doctors, trained healthcare providers, and adequate rooms and beds. Despite the assumption that full healthcare is free, patients are required to pay for certain services when they are not available in the treatment centers, in particular laboratory services. Overall, affordability is not a major concern, as the main cost-intensive component of the course of treatment, drugs, is free of charge.

#### **Patient-centered care**

It was understood from most of the interviews that healthcare providers have a caring attitude and a positive relationship with VL patients. They strive to understand the concerns of patients, respond to their needs, and provide respectful care. As the treatment modality by itself puts a great burden on patients, healthcare providers

are mostly willing to support them. They try to relieve the pain associated with the drug injection using analgesics and encourage patients to boost their tolerance with friendly approaches.

*“Their care in kala-azar treatment is good; they accept us, they don’t complain, and they don’t get bored when we go there all the time. They are never tired of patients, according to my observation. They help us with what they have. So, I think it is good.” [IDI-6, VL patient].*

*“As far as I can see, they encourage you, they take care of you, they ask us questions, and they respond to us quickly. Not the government hospital, even a private one, will help in this way. They take great care of those who are sick.” [IDI-1, VL patient].*

As a result, patients have a thankful attitude when they leave the hospital and provide positive feedback.

#### **Effectiveness of care**

As part of the quality dimension, the points explored in the interviews included the extent to which patient care is based on the management protocol and scientific knowledge, how patients receive close follow-up, and the technical aspect of care. In this regard, the respondents provided mixed responses.

Most respondents from the VL treatment centers stated that the care they provide for their patients is based on the recommended approach or protocol. However, some contradicted this view and stated that many gaps need to be filled. In particular, those involved in mentoring activities highlighted what they observed during their experience.

Patients are referred from other centers to the referral VL center with various complications, which are usually due to the failure of healthcare staff to follow the recommended approach, such as stabilizing the patient or baseline assessment and drug selection problems. As a result, most deaths from VL are among patients referred from other centers.

*“We are providing mentoring to other centers, especially in... the biggest problem is that they start paromomycin without an organ function test and refer them to our center when patients develop complications. Or they assess the first day for medication initiation and then they are treated without any update. Because the drug is toxic, organ function tests should be updated weekly; this is not done.” [KII-7, Head, treatment center].*

Others also questioned the technical aspect of care and the competence of healthcare providers. They stated that the care is not comprehensive and that there is a tendency to focus only on the administration of drugs. Healthcare providers lack the skill to understand the psychosocial aspects of their patients and manage them accordingly. Despite differences among treatment centers, care providers were also blamed for inadequate patient counseling, in particular, at the time of discharge.

*“Apart from injecting the drug, they cannot manage other infections, understand the psychological and similar problems they have, and things like that. There is a tendency to focus only on the administration of their drug within the prescribed time limit. It needs comprehensive management. There are issues to be raised concerning supportive care.” [KII-2, Hospital CEO].*

#### **Discussion**

This study explored factors that constrain and facilitate the success of VL case management from the viewpoint of patients and healthcare providers in Ethiopia’s Amhara region. Early diagnosis and comprehensive case management is an essential strategy to reduce mortality and morbidity and to eliminate VL. Despite a variety of prerequisite efforts theoretically already in place for the success of this strategy, we identified a variety of factors that could contribute to the effectiveness of VL case management.

Government engagement and commitment are critical for the control and elimination of VL. For example, the regional VL elimination program in Southeast Asia has benefited from a strong political commitment [32]. Sustained governance, including effective oversight, collaboration with stakeholders, and an adequate health workforce and funding at all levels were identified as key supporting issues in the effort to accelerate and sustain kala-azar elimination [33]. Our study highlights a number of issues that demonstrate a lack of engagement on the part of the healthcare system. The comprehensiveness of current efforts is questionable, from surveillance and the generation of awareness to case management and evaluation of ongoing efforts to take corrective measures. The biggest challenges that impede the effectiveness of the VL treatment centers are a lack of support, interruptions in the supply of drugs and diagnostic tests, a lack of budget, and inadequately skilled healthcare providers.

The frequent interruption of the supply of diagnostics and drugs results in healthcare facilities being unable to provide prompt service to their patients. Patients are either forced to be referred to other centers or to wait until the drugs are readily available. In the context of a

weak healthcare system, challenges related to drugs and diagnostics, supplier limitations, and fragile supply chains threaten VL case management in East Africa [15]. In Sudan, a significant difficulty that impedes the ability of the VL program to achieve its goals is a lack of good governance and budget allocation, which is demonstrated by low drug availability [17]. Drug scarcity is viewed as a major barrier to VL treatment in India by health workers [34]. On the contrary, the success of Nepal in eliminating VL was partly due to adequate access to essential medicines [35]. New threats to the availability of diagnostic and drug supplies are looming in East Africa as a result of foreign aid budget cuts, a global shortage of AmBisome, and the intention of the manufacturer to cease production of the only effective rapid test [36].

Although the Ministry of Health and partner organizations are undertaking capacity-building efforts, they are insufficient to fill existing deficiencies. Such efforts are not continuous and they do not take into account the needs of the treatment centers. Furthermore, due to significant turnover and hospital work routines, which are based on shifts, it is difficult to exploit the full capability of skilled healthcare workers. Indeed, the lack of qualified health workers, combined with high turnover, is among the obstacles of the healthcare system that is hampering VL elimination attempts in east Africa [16]. We found treatment complications and subsequent mortality in VL treatment centers to be attributable to the lack of skill and competency of healthcare workers in managing patients in accordance with existing treatment protocols.

Sufficient domestic funds are required to ensure the continuous supply of high-quality goods and the implementation of plans at all levels [33]. However, the current structure hinders the VL case management program from functioning properly. Despite the fact that the program is cost-intensive and places a large burden on hospitals, they are required to manage it without additional human resources or budget allocation. The support received from higher levels of the healthcare system is primarily limited to the distribution of drugs to treatment centers, despite the fact that this has its shortcomings. With VL considered as a low priority for investment in most endemic countries, there is limited financing to address it. This is further hampered by the issue of sustainability in the implementation of already existing initiatives in East Africa [16].

Communication between treatment centers and higher-level healthcare systems is frequently poor and typically confined to monthly reporting. Another source of concern is a weak monitoring and evaluation system, as well as a poor feedback mechanism. The fact that responsible individuals are not appointed at each level of the healthcare system hierarchy to coordinate the many actors involved in this program and monitor progress

was also identified. The elimination of VL in China is mostly credited to a political will to implement various measures, including the establishment of specific VL institutions and rigorous surveillance strategies [37].

Effective surveillance through passive and active case detection has been implemented as one of the five pillars of the kala-azar elimination initiative in Southeast Asia, significantly reducing the time from disease onset to diagnosis and treatment. This clearly demonstrates that investing in the development of an effective surveillance strategy is critical for maintaining progress in the elimination of VL [38]. Despite the essential nature of surveillance in managing VL, surveillance work in Ethiopia is effectively non-functional, resulting in most patients arriving at the proper healthcare facility after a considerable time from the appearance of the first symptoms. One of the challenges underpinning Sudan's VL control effort was shown to be a lack of the ability to map the disease by district and sub-district [17].

The healthcare system also misses out on the opportunity to boost surveillance work through the use of health extension workers (HEWs). HEWs, who work at community health sites, are primarily responsible for raising awareness, screening for diseases, and linking patients to health centers. With sufficient capacity building, they would be able to screen patients with VL signs and symptoms and refer them to treatment centers. However, the relevant body has not given these community health workers the authority to actively participate in screening activities. In other circumstances, trained female community health workers played an essential role in India and Nepal in the elimination of VL by detecting fever cases suspected of having VL and referring them to appropriate health institutions [19, 39]. When combined with other measures, this substantially reduced the incidence, mortality, and under-reporting of VL [19]. Overall, despite the high illness burden, surveillance work in East Africa is fragile, and strengthening the system is recommended depending on the local circumstances [15–17, 40].

One of the most essential requirements for the success of any disease elimination and control program is community awareness. Effective disease surveillance requires sufficient health literacy, awareness, and knowledge about the disease among the population at risk [33]. In India, after eight months of behavioral change communication activities, households exposed to the program had a significantly higher awareness and were better able to identify suspected VL patients and seek timely diagnosis and treatment than unexposed households [41]. Health authorities should launch information campaigns aimed at reaching appropriate segments of the population, especially groups that are vulnerable [15].

Although occasional health education campaigns have been undertaken in urban settings of VL endemic areas, the primary target population of interest was not reached. In particular, health education efforts are limited along the Ethio-Sudan border, where many migrant workers, the most vulnerable populations, are engaged in seasonal agricultural activities. In accordance with our findings, a prior study in Ethiopia found that migrant workers were substantially less aware of VL than the resident population in endemic lowland areas. Health education was insufficient and primarily facility-based, and when it did reach the community, it was either devoid of VL information, too vague, or presented inconsistently [18]. Although there were health education efforts supported by external partners in Sudan, their sustainability was a concern because there was no clear funding available [17].

Overall, it is apparent that the disease is still neglected, with little government attention or engagement. The responsibility is left to donor organizations and treatment centers and the efforts by the Ministry of Health are minimal. Overreliance on partner organizations is a concern, even for maintaining current levels of VL management. These findings essentially corroborate what has already been reported in the literature. In East Africa, national control programs are underfunded and deprioritized, and most work to address the problem has long relied on external support [3, 32]. On the contrary, domestic financing and good leadership and governance, as well as a strong political commitment, were shown to result in the successful elimination of VL in Nepal [35]. This could be due to the strong support of the WHO for South-East Asia VL elimination efforts [33], which may have inspired governments to prioritize the disease as a major public health issue.

Despite the importance of early detection and treatment in the VL elimination strategy [38], we observed significant delays in care-seeking, diagnosis, and the initiation of treatment for a variety of reasons. The delay in seeking care was mainly attributed to a lack of awareness among patients and the general population, a lack of an effective surveillance system, and misdiagnosis due to healthcare workers having insufficient knowledge at lower-level health facilities. Patients initially seek treatment at lower-level healthcare facilities and are frequently misdiagnosed with other febrile illnesses, most notably malaria, because other febrile illnesses with similar symptoms to VL are prevalent in the area. Furthermore, healthcare providers, in particular those in non-endemic areas, are unaware of the disease and are prejudiced toward malaria and other febrile illnesses with which they are more familiar. Many VL patients turn to traditional healers after trying several treatment options in both private and public healthcare facilities due to a

lack of trust in modern medications. A study in northwest Ethiopia provided a detailed account of the reasons for the late arrival of VL patients to the appropriate treatment center [18]. The problem of delays in seeking care has also been reported by other studies, with various reasons depending on the context [34, 42–44].

Delays in seeking healthcare correlate with poor outcomes, including treatment failure, complications, mortality, and disability [10, 45]. We found that delays in initiating treatment are associated with increased costs for patients and the healthcare system. Patients incur higher direct healthcare costs due to misdiagnosis and payment for various treatment options, as well as indirect costs associated with the loss of earnings due to illness. Our findings are also supported by the literature [18]. Patients who begin VL treatment late frequently develop vital organ dysfunction and drug toxicity as a result. The use of traditional drugs is also associated with delayed treatment, which could have an impact on the treatment outcome, in agreement with the literature, which highlights the use of traditional drugs as a reason for patient delays in seeking healthcare [16–18, 42].

Patient adherence to their medication and other medical recommendations is essential for the effectiveness of VL case management. In this respect, better adherence to antileishmanial drugs was noted, which could be due to the fact that individuals suffering from the disease as a result of a lack of early treatment are aware of its severity. However, in rare cases, patients discontinue their medications and leave the treatment centers, mainly due to intolerance to the pain associated with injectables. This is typical among VL patients who do not have family support. Elsewhere, a study showed that more than 16% of VL patients defaulted on their treatment due to drug side effects and other reasons [46].

Another barrier hindering the effectiveness of VL case management is VL-HIV co-infection, which is characterized by high rates of treatment failure, relapse, and mortality. Furthermore, the existence of other co-morbidities and conditions, such as chronic diseases, anemia, and severe malnutrition, further complicate the treatment process and result in a poor treatment outcome. Most VL patients are prone to severe malnutrition, which is exacerbated by food insecurity because most of them are indigent. It is well documented in the literature that comorbidities threaten VL elimination efforts, the most significant of which is VL-HIV coinfection [3, 19–23]. A high rate of VL-HIV coinfection has been reported in East Africa, notably in the northwest region of Ethiopia along the Sudanese border. Because of the diagnostic challenges and poor treatment responses, VL-HIV coinfection has become a very serious concern in the region [6, 24, 25]. In this region, malnutrition, co-infections, and comorbidities are widespread among VL patients [32].

Several factors, including poverty and food insecurity, lead to malnutrition among the VL-vulnerable population [16].

VL is a cost-intensive disease, incurring both direct and indirect costs, and places hospitals under a significant financial strain because treatment must be delivered over a long period on an inpatient basis. On the one hand, the therapy is extremely expensive, while on the other, hospitals experience serious budget constraints due to a lack of additional funding. In this context, hospitals are challenged to strike a balance between the two issues, which may jeopardize the quality of care. This is corroborated by the findings of a systematic review, which found that the cost of VL places considerable pressure on the healthcare system [47].

Despite the program's inherent constraints, it is not without features that enhance the effectiveness of the treatment. The extent to which the VL treatment center collaborates with other hospital units and is integrated within the hospital has an important bearing on the success of VL case management. Healthcare workers showed a caring attitude and a positive interaction with VL patients, attempting to understand their concerns, responding to their needs, and providing courteous service. Because the treatment modality places a significant strain on individuals, healthcare providers are frequently willing to help them. Furthermore, the fact that the treatment is free of charge and that external donor support is available is an added opportunity.

Although the study provides valuable insight to service providers, health authorities and other relevant stakeholders, it is not without limitations. A key limitation of this study is that the discussion is based on a small number of methodologically similar studies for comparison due to a lack of qualitative literature on the same topic. This narrow focus may limit the transferability of the findings and the depth of the analysis. As a result, the conclusions reached might not sufficiently convey the complexity of the situation or reflect the full spectrum of existing evidence. Another limitation of the study is the possibility of subjective bias in the responses, especially from service providers and hospital administrators. Given that these people are directly involved in managing VL programs, some of them may be tempted to emphasize the program's positive elements while downplaying or overlooking its deficiencies. This could stem from the desire to avoid exposing potential deficiencies in their own work or institution, resulting in a less critical assessment of the program's performance. This bias may skew the conclusions and limit the objectivity of the analysis.

## Conclusions

VL treatment in Ethiopia faces considerable challenges, including frequent interruptions in diagnostic and medicine supplies, insufficient funds, a shortage of competent healthcare practitioners, and poor healthcare system support, all of which hinder the program's effectiveness. Delays in treatment, weak surveillance, cultural beliefs, and VL-HIV co-infection further undermine its outcomes. Despite these difficulties, integration into hospital systems, effective patient-provider communication, and donor support help to facilitate the effective implementation of VL case management. Addressing these challenges requires more government commitment, structural reform, and the implementation of targeted and cost-effective strategies to improve collaboration and resource allocation across the healthcare system.

## Abbreviations

CEO	Chief Executive Officer
HEWs	Health Extension Workers
HIV	Human Immune Virus
IDIs	In-Depth Interviews
rk39	recombinant product of the 39 amino acids
SSG	Sodium Stibogluconate
TPLF	Tigray Liberation Front
VL	Visceral Leishmaniasis
WHO	World Health Organization

## Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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## Author contributions

YMG, JPG, and FRG Designed the work. YMG and MH. analysed and interpreted the data. YMG, AAD and MH collected the data and writing the manuscript reviewed. JPG, FRG, GDA, and WE supervised the work and reviewed the drafted manuscript. Finally, all authors read and approved the final manuscript.

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## Data availability

Additional information, including the entire statistical analysis plan and audio records will be made accessible to the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate

The Institutional Review Board of the Bahir Dar University College of Medicine and Health Science granted ethical approval. To gain permission to enter the study, additional approval was obtained from the Amhara Public Health

Institute and a support letter was sent to each study hospital. Each study participant provided verbal informed consent. During the interviews, consent was obtained for the use of a voice recorder. Confidentiality was ensured by collecting anonymous data and informing participants that their identifiers would not be disclosed to a third party.

#### Competing interests

The authors declare no competing interests.

#### Consent for publication

Not applicable.

#### Author details

<sup>1</sup>Department of Health Systems Management and Health Economics, School of Public Health, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia

<sup>2</sup>Univ Rennes, CHU Rennes, Inserm, EHESP, Irset (Institut de recherche en santé, environnement et travail), UMR\_S 1085, Rennes, France

<sup>3</sup>Department of Epidemiology and Biostatistics, School of Public Health, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia

<sup>4</sup>Amhara Regional Health Bureau, Neglected Tropical Disease unit, Bahir Dar, Ethiopia

<sup>5</sup>Department of Dermatovenereology, School of Medicine, College of Medicine and Health Sciences, Bahir Dar University, Bahir Dar, Ethiopia

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