

## **"Public Health Challenges of the 2023 Cutaneous Leishmaniasis Outbreak in Sherani: Patterns, Risks, and the Role of Environmental Factors"**

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### **Abstract:**

Investigating the growing problem of Cutaneous Leishmaniasis (CL) in rural Sherani, Baluchistan, Pakistan, on the border of Khyber Pakhtunkhwa province, where the Toti Mountains form a distinct terrain with variable climates, is the focus of this study. May through August is the region's clearly defined rainy season. This creates an atmosphere that is favorable for sand-fly proliferation, which in turn amplifies the spread of CL. A detailed examination of 30 survey participants showed an alarmingly high frequency of CL, with a large majority (66.7%) displaying enduring lesions on the nose, face, and feet that sometimes go untreated for years because there are few available traditional medical therapies.

Notably, our research reveals that vulnerable populations, such as women and children, bear an excessive burden of CL due to chronic infections that may cause harm to other organs.

Moreover, carriers of the agent are affected patients who transfer it to healthy sand flies, thus continuing the transmission cycle. Due to the lack of effective therapies, conventional methods must be used, which frequently fail to effectively address the illness. The results of this study highlight the necessity of focused therapies to stop the progression of CL, lessen its effects on this vulnerable group, and avoid long-term consequences. Our research intends to inform evidence-based methods and resource allocation to tackle this debilitating disease by illuminating the nuances of CL in this region.

**Keywords.**

**Leishmaniasis, Cutaneous Leishmaniasis, visceral Leishmaniasis, stigma, phlebotomine, protozoan, Kaal daana, Kala-azar. Hemorrhages, thrombocytopenia.**

**Introduction:**

The disease leishmaniosis is spread by the bites of female phlebotomine sandflies carrying the protozoan parasites of the genus *Leishmania*. Every culture has different local names for various diseases. Three main manifestations of the disease are existent, cutaneous, mucocutaneous, and visceral Leishmaniasis (kala-azar). The most severe form of leishmaniosis affects internal organs including the spleen, liver, and bone marrow. Fever, anemia, enlargement of the spleen and liver, and weight loss are some symptoms. The most prevalent type, cutaneous leishmaniosis, causes skin lesions that develop gradually, starting as lumps and possibly expanding into ulcers. The mucous membranes of the mouth, throat, and nose are the targets of mucocutaneous leishmaniosis, which results in severe tissue damage and deformity. (1).

The illness known as leishmaniosis is spread by the biting of female phlebotomine sandflies (1.5–2 mm in length (body)) carrying the protozoan parasites of the genus *Leishmania* (2) (3). The most prevalent type, cutaneous leishmaniosis, causes skin sores that develop over time.

They may start as lumps and eventually develop into ulcers (4) . The mucous membranes of the mouth, throat, and nose are the targets of mucocutaneous leishmaniosis, which results in severe tissue loss and deformity (5). Sometimes misdiagnosed cases of eyes ocular Leishmaniasis A total of 57 published publications were found to describe cases of OL involving the following anatomical regions: adnexa (n = 26), orbit (n = 1), retina (n = 7), uvea (n = 18), and cornea (n = 6). Palpebral Leishmaniasis is a well-known disease that is treatable, although it is frequently misdiagnosed and can cause long-term problems if left untreated. Leishmaniasis causes self-resolving hemorrhages in the retina that are caused by thrombocytopenia. There are now two primary etiologies for uveitis: (6)

The *Leishmania* parasites infecting sandflies are first transmitted by promastigotes that live in a mammalian host. A sandfly that bites an infected mammalian host consumes blood that contains

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macrophages that are loaded with amastigotes, the parasite's intracellular form (7). These amastigotes change into the extracellular, flagellated promastigotes inside the sandfly's midgut (2013), this transition is essential to the parasite's life cycle and spread. To inject themselves into a new host during the sandfly's subsequent blood meal, promastigotes proliferate and move to the proboscis (8). Promastigotes are injected into the mammalian host, where they undergo phagocytization by macrophages, reverting to amastigotes to complete the cycle (9).

Particularly in tropical and subtropical areas, it is a significant source of illness and mortality, with an estimated 1.5 million cases recorded annually. (10). This disease, which can range in severity from self-healing cutaneous lesions to life-threatening visceral disease, is spread by the bite of an infected sandfly (11). With a 40% increase in cases recorded between 2000 and 2019, recent research has emphasized the concerning rise in leishmaniosis cases (12). With an estimated yearly global economic effect of \$1.4 billion, the condition places a heavy load on healthcare systems (13). Furthermore, women, marginalized communities, and children are among the vulnerable groups that leishmaniosis disproportionately impacts (14). In Pakistan, Leishmaniasis has been reported in human and animal populations (15). Human CL is endemic in several parts of Pakistan and is the second most prevalent vector-borne disease in the country after malaria (16). There are 37 out of 70 species of sand-fly inhabitants in Pakistan, which can transmit disease to healthy hosts (17). Endemic disease areas in Pakistan include Baluchistan, Interior Sindh, South Punjab, and Khyber Pakhtunkhwa.

### **Methodology:**

Qualitative data is gathered through questionnaire-based interviews, leading to probe questions written in English and Pashto to facilitate easy understanding by local participants.

### **Design of Study.**

The outbreak of cutaneous Leishmaniasis in Kurri Wasta village, Sherani District 2023, specifically in rural areas Karama, Zarkai Landawar, Shinghar, Tsappar Kili, Ahmadi Dirga (Ahmadi Derga), and Manikhwa (Mani Kwa) (18). The data collection is collected in Kurri Wasta one of the popular rural areas of district Sherani investigated in this study using a qualitative research design. According to Creswell (2013), qualitative research is a valuable method for comprehending intricate social phenomena and the viewpoints of those impacted by

them. This design makes an extensive investigation of the community's attitudes, knowledge, and experiences with Leishmaniasis possible.

### **Population and Study Area.**

The study is being carried out on the population of the Sherani District. according to the 2023 census, is (191,687) has increased and consists of the union council which randomly changes as per the govt policies, in UC only one Kurri Wasta hamlet is selected for the study area, where cutaneous Leishmaniasis is reported. Children between the ages of 3 and 14+ make up the population of interest; the illness heavily impacts this group. For added perspective, parents and guardians are also included.

### **Data Gathering.**

A questionnaire created especially for this study was used to conduct semi-structured interviews. For communication purposes, the questionnaire had been translated into Pashto. Field notes and audio recordings of interviews were made to record nonverbal cues. To obtain more precise information, probing questions were employed.

(19)). This study investigated The cutaneous Leishmaniasis epidemic in Kurri Wasta village, Sherani District, using a questionnaire. In addition to gathering demographic data, it examined treatment methods, evaluated participants' knowledge of the illness, and determined which forms of Leishmaniasis were present. It also gathered opinions on the efficacy of free medical care and facilities supplied by the government from participants. Along with covering disease progression and recurrence, the questionnaire also looked at infection frequency and reported gains in health over time.

### **Analyses Data.**

A technique suitable for locating, examining, and summarizing patterns within qualitative data, thematic analysis will be used to examine the data obtained from the questionnaires (20)

The invention of themes, coding, modification, and familiarization with the data are all part of this process to make sure the themes appropriately represent the data.

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### **Ethical Considerations.**

Permissions from the parents of the participants and the local community leader were obtained before the survey's administration. Additionally, with his permission, Hafiz ullah Stouri, a Pashto anchor from Voice of America's Dewa Radio program, provided the majority of the patient Snapshot photos of endemic. (21)

### **Results;**

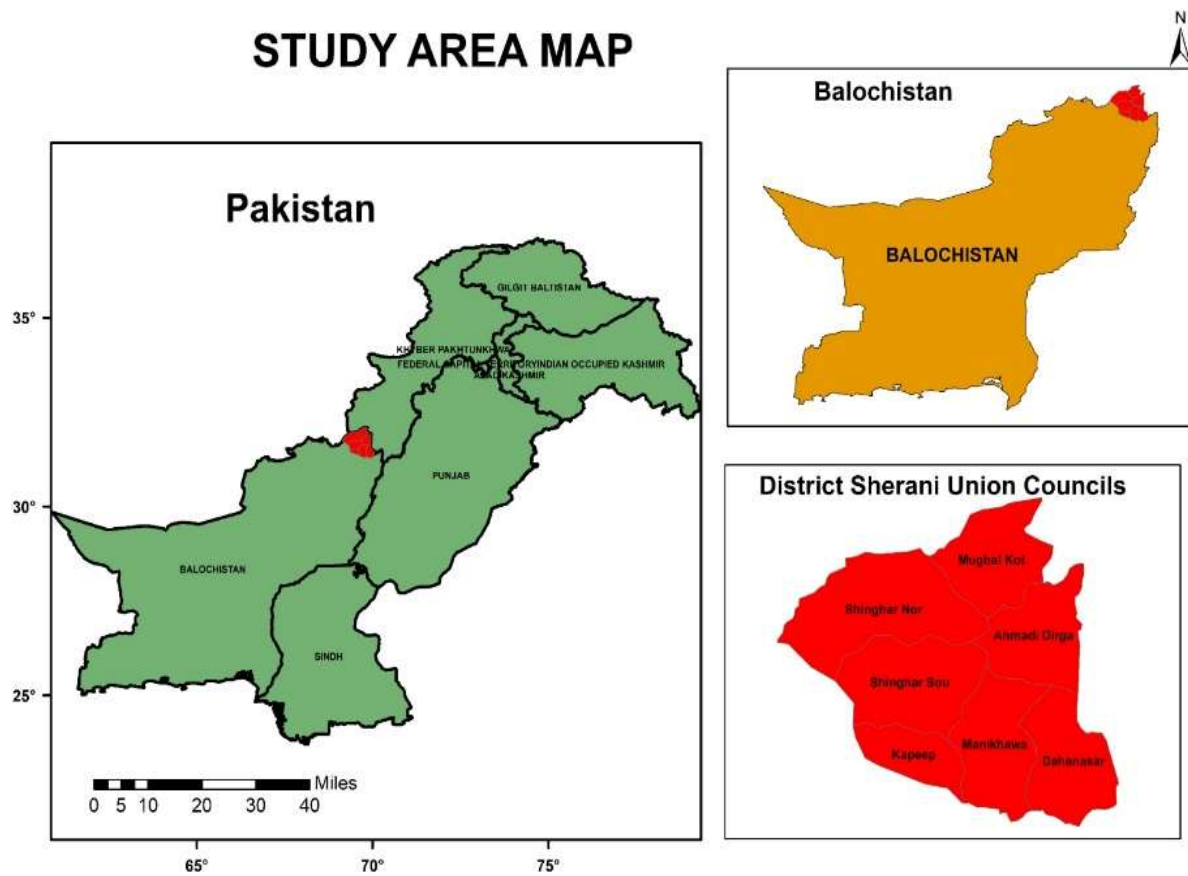
As a result, the local community has two types of perceptions about the lesion of Leishmaniasis, the local community recalls the lesion in the Pashto Language (KAAL DAANA). Which means (Kaal \_\_\_\_Year) (Daana\_\_\_Lesion) Which means again exist in new year's. And few local perceptions were that it was due to Mosquito which was due to the awareness session and little bit of knowledge. The face and nose of the boys were, where cutaneous Leishmaniasis (CL) was most commonly found. The right leg and hands of the girls were revealed to be the infection sites. The adult respondents reported comparable infection patterns but with a wider range of affected locations, such as the face, arms, and feet; local community respondents stated that mostly the vector mosquito was in between May and August. Sometimes Leishmaniasis patients are treated temporarily but the laceration again subsists in new parts of the body

In the district Sherani Baluchistan, Pakistan (Towns of Stano Raaghah, Shin Bazai, Astashai, Sher Ghali, Surlakai, Kili Khan Alam, Anzar Khezai, Aspasta Aghburga, Lehar Chopper Khail, Zara Killa, and ChajobiMore) the area is shown in (Map 0-1).

The GIS map clearly shows the borders of Sherani District and its proximity to the rugged mountain areas of Khyber Pakhtunkhwa. This visual highlights how rainwater runoff from these mountains could contribute to increased sand-fly activity in Sherani, especially during the rainy season. than 150 Leishmaniasis cases have been reported in the district's villages, according to Hafiz Ullah Sherani, (VOA Deewa) Pashto. But data from spot surveys was only gathered in

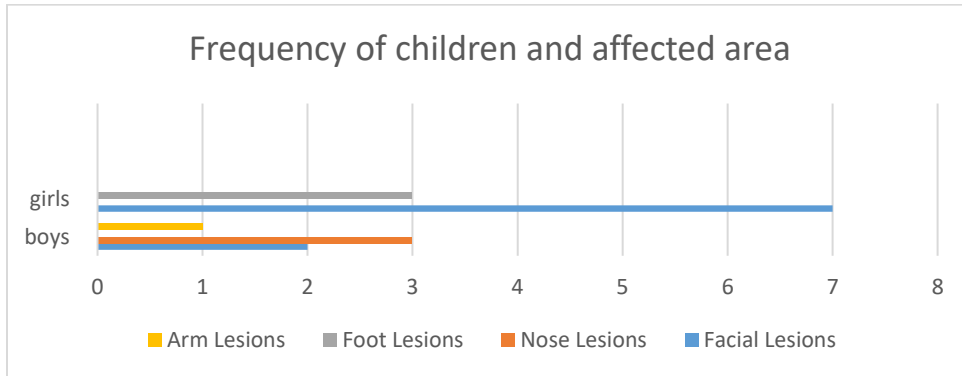
Sherani village—more precisely, in Kurri Wasta.

A recent survey revealed alarming findings about the prevalence of Leishmaniasis in rural Sherani. Out of 30 questionnaires distributed, 10 girls and 10 boys shared their experiences, and five adult men and five females provided a glimpse into the reality of this silent epidemic. The survey found that 3 boys were suffering from nose lesions, while 2 boys had facial lesions. Among girls, 7 had facial lesions, and 3 had lesions on their feet. Cutaneous Leishmaniasis was the diagnosis made in every case. Three men and seven women, who made up the remaining responders, also reported having cuts on their faces. A few of the men and children also had lesions on their arms and feet. (Graph 0-2)



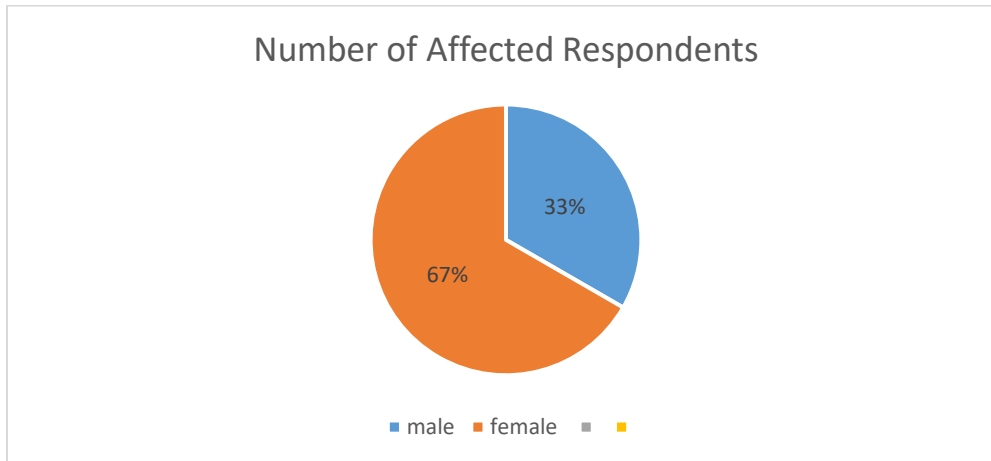
0-1 Map of district Sherani and its Union council where the endemic exists are marked red, Made by QGIS.

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0-2 Indicating the frequency of affected children and affected areas. Facial cutaneous Leishmaniasis is higher than others

These findings underscore the urgent need for awareness, prevention, and treatment efforts in this vulnerable community. In adults, women are more susceptible than men because the woman is in touch with area of animals, (Graph 0-3)



*0-3 showing. females are more susceptible than males because females are directly interlinked with livestock and its products which habitat sand-flies.*

The group of children affected by Leishmaniasis is visualized below in (Figure 0-4); This study discovered that in Kurri Wasta village, Sherani District, women were more vulnerable to the cutaneous Leishmaniasis outbreak. Adult females had a higher frequency of the condition than adult males, according to the demographic data gathered by the questionnaire.

As per the research majority of girls were worried about the spotted area remaining permanent in the era of advanced plastic or lesser therapy. In affected children, one girl was psychologically affected and worried about her mantle status about the spot which is permanent (Figure 0-5).

The most affected area in boys was the nose because the parents commented Boys may be more likely to engage in outdoor activities, increasing their exposure to sand flies, which are most active at dawn and dusk.



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*0-4. Image of the group of children of Cutaneous leishmaniasis.*



*0-5. The affected girl's status of warrior mark Leishmaniasis may leave.*



*Fig; 1-1 Lesion may begin as little nodules or lumps that progressively. girls affected area*

Lesions may begin as little nodules or lumps that progressively turn into open sores or ulcers. At first, they might not hurt, but over time, they could become irritated, painful, and deformable. (Fig. 1-1)

Among the 30 participants, 5 were particularly open about how Cutaneous Leishmaniasis has affected their children and their emotional well-being. These parents shared their distress at seeing their children suffer from the disease. They also reported feeling psychologically unsettled by the visible impacts on their children's health.

Unfortunately, treatment options were quite limited. The injections provided by the government in collaboration with NGOs were in short supply, with only one available per patient each month. This shortage, combined with the lack of availability in local markets, left parents feeling anxious. They worried about the potential severity of the disease and the limited options for their children's treatment.

### **Discussion.**

The outbreak of cutaneous Leishmaniasis in Kurri Wasta village, Sherani District in 2023 has brought attention to the serious public health risks that neglected tropical diseases in isolated and underdeveloped areas provide. This outbreak, which has over 150 cases identified, highlights the serious deficiencies in the healthcare system and patient access to efficient therapies.

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The 2023 outbreak of cutaneous Leishmaniasis in Kurri Wasta village highlights the challenges in managing neglected tropical diseases in remote areas. Traditional healing practices, such as herbal applications and locally sourced materials, are often used for treatment, particularly in regions with limited access to medical care. The outbreak's impact on children aged 3-14 is particularly concerning, as they are vulnerable to long-term consequences. The outbreak also underscores the need for improved diagnostic and treatment facilities in Sherani District, as local healthcare workers are often overwhelmed and lack resources. Stigmatization in the community also presents barriers to effective disease management. A holistic approach, including improving healthcare infrastructure, ensuring effective treatments, and implementing culturally sensitive educational programs, is essential to mitigate the impact and enhance community resilience. Among the impacted community, using homemade medicines is one of the most notable results of the qualitative study. This dependence on conventional methods can be linked to the persistent problem of conventional medicine scarcity in comparable contexts. The shift in the population towards home remedies exposes a double problem: while it shows resiliency and inventiveness, it also emphasizes the structural flaws that are required in healthcare.

**Conclusion.**

The disastrous effects of the Leishmaniasis outbreak in the rural villages of District Sherani, Baluchistan, have been clarified by this qualitative study. The results reveal the multifaceted impact of the illness, mostly on women's and children's lives, who suffer the most from its physical and psychological effects.

One of the main issues that is brought to light is the deformity and persistence of Leishmaniasis-caused skin lesions, which frequently affect the face.

Patients have experienced considerable psychological anguish as a result of this lifelong scarring, which has negatively impacted their general wellness and sense of self. In these remote communities, the problem has been exacerbated by a lack of awareness and effective preventive initiatives, leaving many people feeling helpless and defenseless.

The noteworthy differences in access to healthcare and treatment alternatives are also highlighted in the research. Because of the lack of necessary medications and restricted access to healthcare, many sick people have gone untreated for protracted periods. This worsens their suffering and contributes to the disease's continued spread because untreated cases act as a reservoir for new

cases. To address this pressing public health issue, a multimodal strategy is needed. Priority measures should focus on improving education and awareness at the community level, increasing access to comprehensive healthcare services, and ensuring a consistent supply of effective treatments. In addition, targeted programs aimed at de-stigmatizing the condition and providing psychological support to affected individuals and their families can be crucial in lessening the serious consequences on mental health.

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