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ORIGINAL ARTICLE

# Demographic and clinical patterns of cutaneous leishmaniasis in patients reporting to a Tertiary Care Hospital in Quetta, Balochistan.

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**ABSTRACT… Objective:** To investigate the demographic profile and clinical patterns of cutaneous leishmaniasis (CL) patients presenting to a tertiary care hospital in Quetta. **Study Design:** Retrospective Cross-sectional study. **Setting:** Department of Dermatology, Combined Military Hospital (CMH), a Tertiary Care Hospital in Quetta, Balochistan, Pakistan. **Period:** June 1st, 2024, to May 31st, 2025. **Methods:** All confirmed cases of CL attending the outpatient department for the first time during the study period were included in the study. Incomplete records and repeat visits were excluded. Parameters including age, gender, occupation, month of presentation, duration of disease, number and site of lesions, and clinical morphology were recorded. Statistical analysis was performed using Statistical Programme for Social Sciences (SPSS) version 29. Continuous variables (age, duration of lesions) were presented as mean ± standard deviation (SD). Categorical variables (gender, lesion type, location, diagnostic method) were presented as frequencies and percentages. Seasonal variation was assessed by mapping monthly distribution trends. **Results:** A total of 360 confirmed CL cases were recorded during the study period. The mean age of the patients was 30.1 ± 6.2 years, with a range from 2 to 78 years. The most frequently affected age group was 21-40 years. The gender distribution showed that 89.44% of the patients were male and 10.56% were female. The mean duration of lesion was 2.3 ±1.1 months. The majority of the patients had single lesion, mostly on lower limbs. The clinical presentation exhibited a spectrum of manifestations. The predominant morphological pattern was nodulo-ulcerative, accounting for 66.67% of cases. The monthly distribution of cases demonstrated a distinct seasonal pattern, with higher number of cases in winter season. **Conclusion:** This retrospective study highlights the unique demographic profiles, clinical patterns, and seasonal trends of cutaneous leishmaniasis cases reported from a tertiary care hospital in Quetta. The findings offer valuable insights into disease patterns that are often underrepresented in regional datasets and can inform localized control strategies.

**Key words:** Cutaneous Leishmaniasis, Demographics, Epidemiology, Pakistan, Public Health.

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## INTRODUCTION

Cutaneous leishmaniasis (CL) is a parasitic skin disease caused by protozoa of the genus Leishmania. More than twenty species of Leishmania are known to cause cutaneous disease[1], which is transmitted by the bite of infected female sandflies.[2]

Cutaneous leishmaniasis is endemic in over 90 countries and contributes significantly to the global burden of disease, with approximately 4.3 million cases reported annually.[3] Each year, an estimated 700,000 to 1 million new infections are reported, primarily originating from four eco-epidemiological regions: the Americas, East Africa, North Africa, and West and Southeast Asia.[4] Pakistan ranks amongst the high-burden countries, with endemic regions spanning Balochistan, interior Sindh, South Punjab, and Khyber Pakhtunkhwa.[5] In 2023, the World Health Organization recorded over 59,255 reported cases from Pakistan, highlighting the significant burden of disease.[6]

Cutaneous leishmaniasis continues to be a significant public health challenge in Pakistan, with Balochistan being a well-recognized endemic region.[7,8] While numerous epidemiological studies have been conducted across Balochistan, many have primarily focused on community-based prevalence rates, age-specific patterns, or ecological risk factors.[9] These studies, while valuable, often concentrate on community-based prevalence and data from primary care settings or field-based surveys[10], thus not fully capturing the comprehensive demographic and clinical profiles of patients presenting in a tertiary

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care hospital.

There is a need for studies focusing on clinical patterns, seasonal trends and socio-demographic patterns in the regional population. This study aims to fill that gap by retrospectively analyzing patient profiles at a tertiary care hospital in Quetta. Our focus will be on demographic profile, lesion characteristics, and temporal trends. By enhancing this specific clinical and epidemiological insight, our findings may support more locally tailored public health planning, resource allocation and awareness efforts in a high-burden region.

## METHODS

The cross sectional study was conducted at Combined Military Hospital (CMH), Quetta, Balochistan, Pakistan. after approval from ethical committe (CMH QTA-IERB/113/2025 Dated: 23 Jul 2025) The hospital serves as a major referral center for the region, serving both military personnel and civilians.

The study population included all patients attending the dermatology outpatient department with a clinical and histopathological diagnosis of cutaneous leishmaniasis from June 1, 2024 to May 31, 2025.

Inclusion criteria included confirmed diagnosis of cutaneous leishmaniasis based on both clinical presentation and histopathological findings and first-time consultation during study period.
Exclusion criteria were incomplete medical records and repeat visits.

### Data Collection

Approval was obtained from the Institutional Ethical Review Board. Data of eligible patients were extracted from hospital records. The following key variables were recorded.

- Age
- Gender
- Occupation
- Month of presentation (for seasonal analysis)
- Duration of disease
- Site of lesions
- Number of lesions
- Clinical morphology (plaque, nodule, ulcer, nodulo-ulcerative, etc.)

### Data Analysis

Statistical analysis was performed using Statistical Programme for Social Sciences (SPSS) version 29. Continuous variables (age, duration of lesions) were presented as mean ± standard deviation (SD) for normally distributed data or median (interquartile range - IQR) for skewed data. Categorical variables (gender, lesion type, location, diagnostic method) were presented as frequencies and percentages. Seasonal variation was assessed by mapping monthly distribution trends. Tabular and graphical representations (bar charts, pie charts, histograms) were utilized for data visualization. Statistical significance was set at a p-value of less than 0.05.

## RESULTS

This study analyzed the demographic and clinical characteristics of cutaneous leishmaniasis (CL) patients presenting to the outpatient department over a one-year period (June 2024 – May 2025). A total of 360 confirmed CL cases were recorded during the study period.

### Demographic Characteristics

The mean age of the patients was 32 years, with a range from 2 to 78 years. The gender distribution showed that 89.44% of the patients were male and 10.56% were female. Demographic characteristics are presented in Table-I.

**TABLE-I**

**Demographic profile of patients of cutaneous leishmaniasis**

| Characteristics | Data |
|---|---|
| Mean Age (years) | 30.1 ±6.2 |
| **Gender Distribution** | |
| Males | 322 (89.44%) |
| Females | 38(10.56%) |

CL was observed across all aga strata, but the highest proportion of cases were seen in the 21-40 years age group. Age-specific frequency analysis is summarized in Table-II.

Regarding occupational distribution, the majority of the patients were involved in outdoor activities, suggesting potential exposure patterns related to their daily activities.

### Clinical Characteristics of Lesions

The mean duration of lesion was 2.3 ± 1.1 months, ranging from 2 weeks to 6 months. Analysis of lesion count showed that the majority of patients presented with a single lesion. The most common distribution of lesions was on the lower limbs, followed by the upper limbs and then head and neck. The clinical characteristics of study population are summarized in Table-III.

**TABLE-II**

**Age-specific frequency analysis of patients of cutaneous leishmaniasis**

| Age Groups | Frequency (Percentage) |
|---|---|
| 10 and less than 10 years | 36(10%) |
| 11-20 years | 71(19.72%) |
| 21-40 years | 218(60.56%) |
| 41-60 years | 28 (7.78%) |
| 61-80 years | 7(1.94%) |

**TABLE-III**

**Clinical profile of cutaneous leishmaniasis**

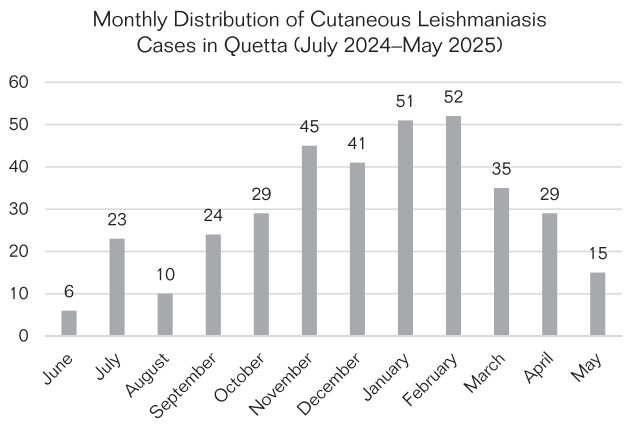
| Variables | Category | n (%) / Mean ± SD / Range |
|---|---|---|
| Duration of lesion | Mean ±SD (months) | 2.3 ±1.1 |
| | Range (months) | 0.49-4.93 |
| Site of lesion | Head and neck | 74 (20.56%) |
| | Upper limbs | 102 (28.33%) |
| | Trunk | 12 (3.33%) |
| | Lower limbs | 150 (41.67%) |
| | Multiple sites | 22 (6.11%) |
| Number of lesions | 1 | 196 (54.44%) |
| | 2 | 88 (24.44%) |
| | 3 or more | 76 (21.11%) |
| Clinical morphology | Papular/nodular | 38 (10.56%) |
| | Nodulo-ulcerative | 240 (66.67%) |
| | Plaque | 68 (18.89%) |
| | Others | 14 (3.89%) |

### Monthly Distribution of Cases

The highest number of cases were recorded during January and February. The monthly distribution of cases demonstrate a distinct seasonal pattern, with higher number of cases in winter season. The number of patients reported month-wise are summarized in Figure-1.

The clinical presentation exhibited a spectrum of manifestations. The predominant morphological pattern was nodulo-ulcerative, accounting for 66.67% of cases. The clinical spectrum of disease is depicted in Figure-2.

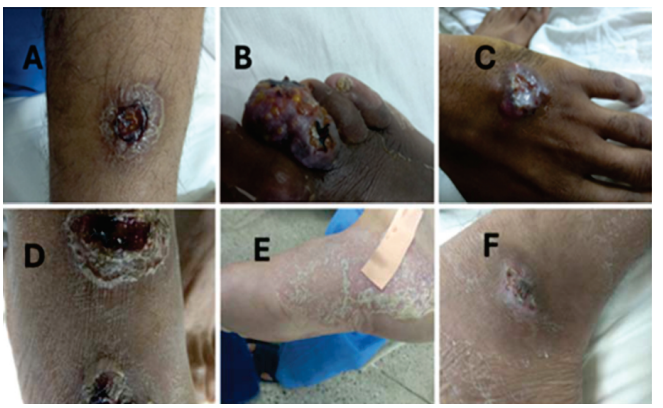
**FIGURE-1**




**Bar Chart of Monthly Case Count for Cutaneous Leishmaniasis**

**FIGURE-2.**

**Collage illustrating the morphological diversity of cutaneous leishmaniasis lesions observed in patients from Quetta. Manifestations include ulcerative plaques, crusted nodules, papular eruptions, and infiltrated plaques across varied anatomical sites.**




## DISCUSSION

This study aimed to analyze the Demographic and Clinical Patterns of patients diagnosed with Cutaneous Leishmaniasis over a one year period at a Tertiary Care Hospital in Quetta, Balochistan. Our findings demonstrated a higher incidence among young males, with nodulo-ulcerative lesions being the most prevalent clinical presentation. A distinct seasonal trend was observed, with most cases occurring between November and February.

In the present study, the majority of patients affected by cutaneous leishmaniasis belonged to the 21–40-year age group, with a mean age of 30.1 ± 6.2 years. This age distribution suggests that CL disproportionately affects young individuals, potentially due to increased outdoor exposure and occupational risk.[11] Male predominance was notable, accounting for 89.44 % of cases, which aligns with findings from multiple regional studies. For instance, a study by Rashid et al. in District D.I. Khan reported that 64.2% of patients were males.[12] Similarly, Ullah S et al. observed 60.5% male prevalence in Lower Dir District (NWFP), Pakistan.[13] While most studies have identified younger age groups (≤10 years) as most affected[14], the higher burden in adults aged 21–40 years in our cohort may reflect the demographic skew due to the study setting, which was a military hospital, where military personnel represent the majority of patients. Similar trends have been documented in previous studies conducted at military medical facilities, where males are disproportionately exposed due to deployment conditions and environmental risk factors.[15] These findings reinforce the need for tailored awareness and preventive strategies targeting high-risk occupational groups.

The predominance of nodulo-ulcerative lesions (66.67%) in our cohort aligns with previous studies.[16] This study found predominant involvement of the lower limbs, with subsequent involvement of upper limbs and head and neck regions. Our findings are closely aligned with previously reported findings by Mir et al., who documented that the lower limbs and feet were most frequently affected sites in cutaneous leishmaniasis.[17] Furthermore, their study found that the majority of patients (52%) had solitary lesions, while multiple lesions were less frequent. This pattern is similar to our findings, where solitary lesions were the most common presentation.

Our study demonstrates a clear seasonal peak in CL during winter season, with the highest numbers seen in January and February. This pattern is also reported in a study in District Khyber, Pakistan by Lu C et al. The increased number of cases in winter is likely a reflection on the incubation period of CL, where sandfly biting activity peaks during the warmer summer season, leading to the clinical manifestation of disease several months later in the colder season.[18] Variations in peak months may be attributed to local climatic conditions and behaviour of specific Leishmania species prevalent in Balochistan.[19]

The epidemiological patterns observed in our study are influenced by unique environmental and socio-demographic context of Quetta and Balochistan. Factors such as arid climate, cross-border movement, poor housing, limited access to preventive measures may contribute to the sustained transmission and clinical presentation of CL in this region.[20]

These findings have significant public health implications for CL control in Balochistan. The identified seasonal peak suggests that targeted public health interventions, such as awareness campaigns and vector control measures, could be most effective if implemented prior to and during the peak transmission season. The observed concentration of cases among young adults with male predominance identifies a high-risk population. By analyzing the local clinico-demographic patterns, this study offers valuable insight for improving surveillance systems and implementing efficient public health preventive measures to control the burden of disease.

This study has several limitations. As a single-center study, relying solely on patients presenting to a tertiary care hospital, it might not capture the full burden of disease in the community. Species identification could not be performed due to limited resources. Future research should consider multi-center studies across Balochistan to provide a more comprehensive epidemiological picture. Molecular characterization of Leishmania species in different regions would be invaluable for understanding genotype-phenotype correlations.

## CONCLUSION

This one-year retrospective study conducted at a tertiary care hospital in Quetta highlights cutaneous leishmaniasis as a persistent public health challenge in Balochistan. The demographic and clinical patterns observed, particularly the higher

prevalence among young males and seasonal peaks during cooler months reflect distinct epidemiological characteristics within a facility serving both military personnel and civilian populations in Balochistan. By emphasizing facility-level insights, this study bridges gaps in regional surveillance data typically derived from community settings. These findings highlight the need for integrated control strategies and targeted public health interventions in endemic regions.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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| AUTHORSHIP AND CONTRIBUTION DECLARATION | |
|---|---|
| 1 | **Saima Ali Khan:** Drafting, Final approval. |
| 2 | **Fareeha Imran:** Analysis. |
| 3 | **Najia Ahmed:** Revision. |
| 4 | **Maira Wajahat:** Interpretation of data. |