



# Prevalence and Epidemiologic Profile of Acute Cutaneous Leishmaniasis in an Endemic Focus in Southeast Iran

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Received 2019 January 19; Accepted 2019 January 19.

## Abstract

**Background:** Cutaneous leishmaniasis is a zoonotic disease, which is a public health problem in tropical and subtropical countries including Iran.

**Objectives:** This study aimed to study the prevalence and epidemiologic profile of acute cutaneous leishmaniasis in an endemic focus in southeast Iran.

**Methods:** In this cross-sectional study, all patients with suspected cutaneous leishmaniasis referred to health centers and health networks in Sistan and Baluchistan province since the beginning of 2013 to March 2015 were examined. Then, the collected data were prepared in the form of tables using SPSS and were analyzed by tests.

**Results:** The percentage of leishmaniasis in men was higher than in women and there was a statistically significant difference between men and women regarding the infection rate of the disease. The results suggest a difference in the site of lesions on the body indicating confrontation with a new form of disease epidemiology. Thus, alongside the ongoing epidemiological studies, there is a need for further research in all aspects including the causes, reservoirs, hosts, prevention measures and treatments in order to control the disease.

**Keywords:** Prevalence, Cutaneous Leishmaniasis, Sistan and Baluchistan Province

## 1. Background

Cutaneous leishmaniasis is a zoonotic disease in humans and animals (1), which is currently a worldwide health problem, especially in tropical and subtropical countries (2). About 1.5 - 2 million new cases of cutaneous leishmaniasis occur in 88 countries each year. It is one of the most important and most common indigenous diseases in Iran and the second parasitic infection after malaria transmitted by arthropods (3). The disease has two forms: Dry (urban) and wet (rural) (4). Urban or Entropy of Pontic (ACL) is caused by *Leishmania tropica*, its principal vector is *Phlebotomus sergenti* and its reservoir is humans (5). Another type is rural or zoonotic (ZCL), which is caused by *Leishmania major* and its reservoir is rats (6).

The rural form of cutaneous leishmaniasis is increasing globally. However, there is no definitive cure for it and there are numerous reports on the relapse, lack of improvement and the improper effect of the existing treat-

ments (7). The World Health Organization has recommended fundamental research projects on leishmaniasis epidemiology (8). In recent years, factors such as new settlements, environmental changes, war, uncontrolled urbanization and disturbing agricultural lands have caused contact between people and vectors, and thus have significantly increased the disease cases (9).

Sistan and Baluchistan province has been one of the oldest settlements of leishmaniasis (10). The province is mostly hot and dry, but at the same time, its climate variability is great. Transmission of leishmaniasis and its epidemics in this area is completely provided, as increasing cases of the disease has turned into a health and social problem.

## 2. Objectives

This study was carried out to determine the prevalence of cutaneous leishmaniasis in Sistan and Baluchistan

province in Iran.

### 3. Methods

Sistan and Baluchistan province is located in south-eastern Iran with a population of 2534327 people. The province is about 180726 square kilometers and covers more than 11% of the country. Baluchistan includes the cities from Zahedan to Chabahar, and Sistan includes Zabul and surrounding cities. Sistan and Baluchistan has 1100 km common border with Pakistan and Afghanistan and 300 km marine border with Oman (Figure 1) (11).

This cross-sectional study was performed among all individuals (178 patients) referred to health centers in the province from April 2013 to March 2015. Samples were taken and smears were examined by microscopic observation. A checklist including items on gender, occupation, place of residence, type of lesion, number of lesions, and the lesion site was completed. First, according to the patients' statements about the lesions, nodules or papules, examination was performed on different parts of the body. Examination included observing arms to above the elbows, and legs to above the knees, head, face, neck and other body parts as well as other areas mentioned by the patients. Then, a questionnaire was filled out and the patients were introduced to the Center for Leishmaniasis Prevention and Control for laboratory examinations. Laboratory diagnosis was based on direct observation of *Leishmania* parasites by biopsy of skin lesions, Giemsa staining and observation of amastigote form of the parasite. For those with positive results, questionnaires were filled out, and the patients were referred to a general practitioner. To analyze the data, SPSS software was used.

### 4. Results

Overall, 178 patients with confirmed cutaneous leishmaniasis were examined during January 2013 to March 2015. Of the total population, 123 (69.1%) cases were male and 55 (30.9%) were female. Statistical tests showed a significant difference between the two genders in infection with cutaneous leishmaniasis ( $P < 0.05$ ; Figure 2).

The results revealed that the prevalence of cutaneous leishmaniasis was higher in rural areas (51.7%) than in urban areas (48.3%). The cities of Zahedan (87 patients), Mirjaveh (34 patients) and Chabahar (29 patients) had the highest rates of infection. Fenouj with one patient and Nikshahr with two patients had the lowest infection rates. Statistical analyses suggested a significant relationship between the disease and living area ( $P < 0.05$ , Figure 3).

In this study, the most frequent sites of the lesions were on the hands with 52 cases, followed by the legs with 39 cases and the face with 35 cases. The least affected body parts included concurrent lesions on the face and arms

with one case and lesions both on the head and face with two cases (Table 1). Most of the patients ( $n = 86$ , 48.3%) had only one lesion, 31 (17.4%) patients had two lesions and 28 (15.7%) patients had three lesions on their bodies (Figure 4).

In the present study, the highest prevalence of the disease in 2013 was in December (3.4%) and the lowest prevalence in this year was in February and March (0.6%). In 2014, the highest prevalence was in December (27.5 percent) and the lowest prevalence was in April (1.1%). In 2015, the highest prevalence was in February (6.2%) and the lowest prevalence was in May (0.6%). In this study, the highest prevalence rate during the three years was in 2014 when more people were diagnosed with cutaneous leishmaniasis; however, in 2013, fewer people had the disease (Figure 5).

### 5. Discussion

*Leishmania* is a parasitic protozoan of the Trypanosomatidae family and is the pathogenic agent of leishmaniasis in humans. According to the World Health Organization, about 14 million people worldwide are infected with *Leishmania*, 350 million people are at risk of contracting the disease and 2 million people (1.5 million cases of cutaneous leishmaniasis and 500 thousand cases visceral leishmaniasis) are affected annually (2). In the past, leishmaniasis was not detected on the basis of clinical appearance, but due to the large variety of *Leishmania* species, vectors, hosts and reservoirs, it was determined according to different patterns of epidemiology. Today, changes in the epidemiology of the disease in several endemic areas are reported in the old and new world. These changes include the emergence of new focus of endemic leishmaniasis, parasite spread to new areas, the presence of several species of *Leishmania* with the same clinical appearance, diagnosis of new connections between parasites and vectors, reports of *Escherichia pontic* transmission of *Leishmania infantum*, zoonotic transmission of *Leishmania tropica* and unknown and unclassified cases of cutaneous leishmaniasis (12).

Cutaneous leishmaniasis is epidemic in Sistan and Baluchistan province and differences are observed in the prevalence rate among males and females. Also, the number and locations of lesions are diverse probably because the epidemiologic features of the disease have changed. Environmental changes and migration have a significant effect on the epidemiological trend of cutaneous leishmaniasis (13). The results of this study showed that 29.2% of the lesions were on the hands, 21.9% were on the legs and 19.7% on the face. The difference was significant in all cases ( $P < 0.05$ ), which is probably due to environmental changes and social behaviors of the population. In this study, both wet and dry lesions were clinically observed and even the form of lesion was assessed in two cases.

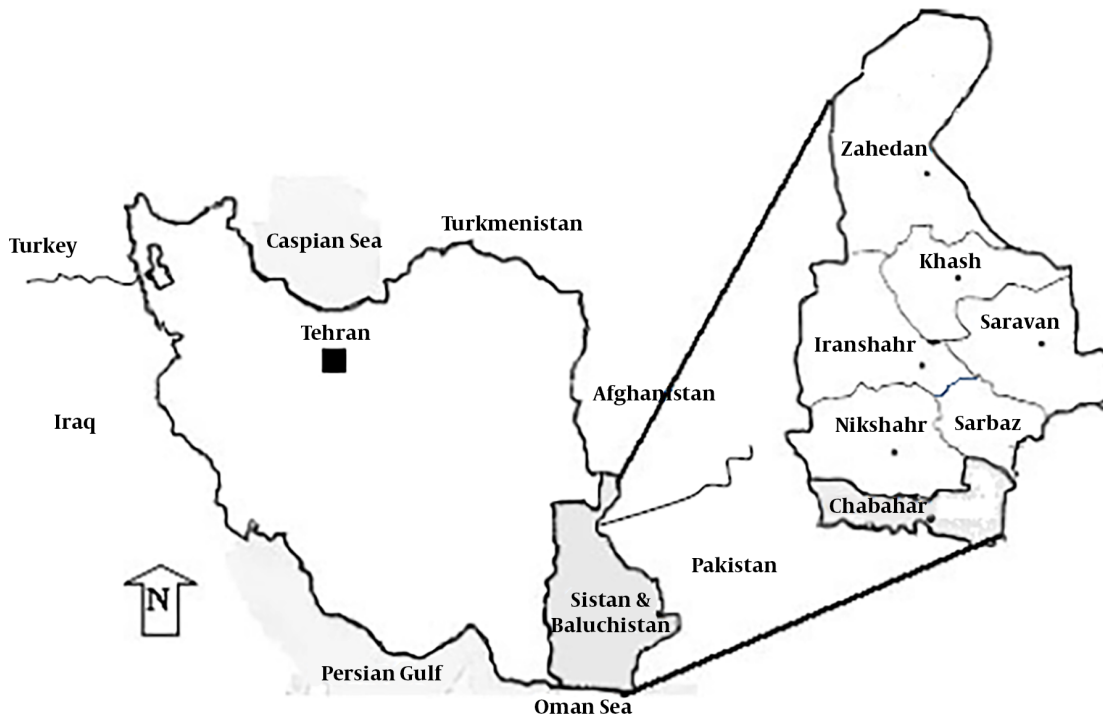


Figure 1. Locations of Baluchistan and Zahedan Within Iran

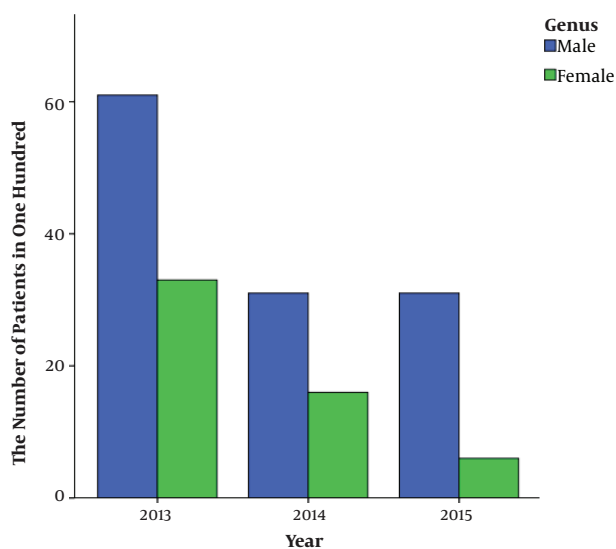
Table 1. Site of Lesion and Scar on the Patients' Bodies<sup>a</sup>

Site of the Lesion	Year			Total
	2013	2014	2015	
Face	3 (8.58)	22 (62.85)	10 (28.57)	35 (100)
Hands	7 (13.46)	35 (67.30)	10 (19.23)	52 (100)
Legs	5 (12.82)	25 (64.10)	9 (23.08)	39 (100)
Hands and face	2 (28.58)	4 (57.14)	1 (14.28)	7 (100)
Hands and body	1 (16.67)	4 (66.66)	1 (16.67)	6 (100)
Body	2 (14.28)	9 (64.29)	3 (21.43)	14 (100)
Hands and legs	0 (0)	3 (42.85)	4 (57.15)	7 (100)
The whole body	1 (16.66)	3 (50)	2 (33.33)	6 (100)
Heads and face	0 (0)	2 (100)	0 (0)	2 (100)
Nose	2 (40)	2 (40)	1 (20)	5 (100)
Face and arms	1 (100)	0 (0)	0 (0)	1 (100)
Head and hands	0 (0)	2 (50)	2 (50)	4 (100)
<b>Total</b>	<b>24 (13.49)</b>	<b>111 (62.36)</b>	<b>43 (24.15)</b>	<b>178 (100)</b>

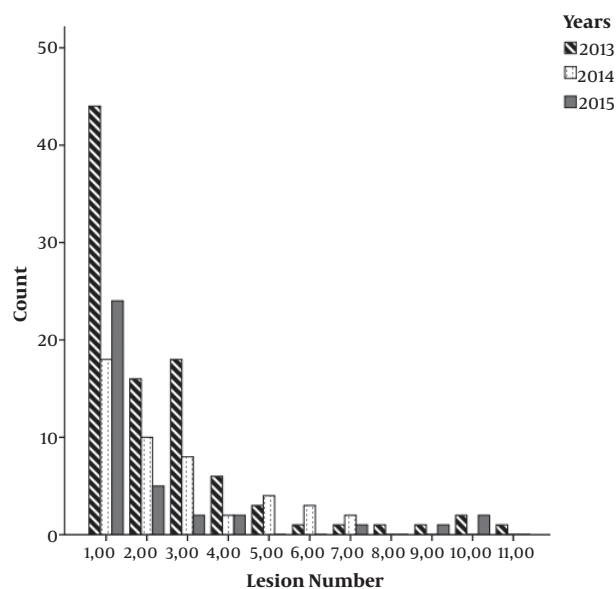
<sup>a</sup> Values are expressed as No. (%).

This study investigated the anatomical area of cutaneous leishmaniasis lesions. The results revealed that the

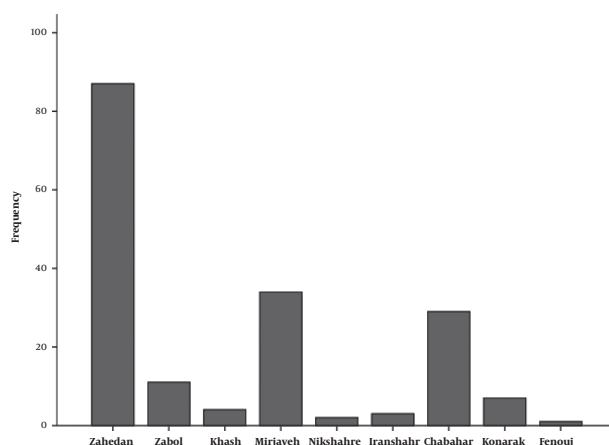
highest percentage of lesions were on the hands. Based on these findings, it could be concluded that because sand



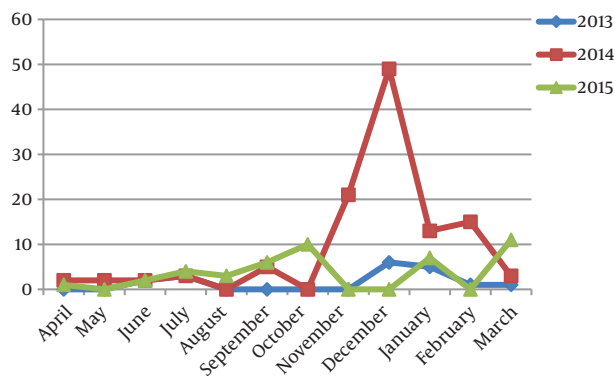
**Figure 2.** The prevalence of cutaneous leishmaniasis according to gender in Sistan and Baluchistan province in Iran during 2013 - 2015



**Figure 4.** The frequency of the number of lesions caused by cutaneous leishmaniasis



**Figure 3.** Frequency of cutaneous leishmaniasis according to the cities in Sistan and Baluchistan province



**Figure 5.** The prevalence of cutaneous leishmaniasis in different months during 2013 - 2015

flies cannot bite dressed parts, they are often attracted to the exposed parts of the body and suck the blood. Therefore, these lesions can mostly be observed on the hands and face. The present findings are in line with the results obtained by Babaei (14) and Abasi and Kazem Nejad (15). Fortunately, with the specific attention of senior management of the university and cooperation of highly qualified individuals, the Center for the Prevention, Control and Treatment of Leishmaniasis is operating along with applied and scientific research in the center. It is hoped that using the latest techniques, further studies on the risk factors, carriers, reservoirs and hosts of the disease are per-

formed along with epidemiologic surveys to help the prevention, control and treatment of the disease. Otherwise, given the present conditions, a gradual outbreak of leishmaniasis would be witnessed in this region. As this disease is a global health problem and considering the need for greater understanding of different aspects of this disease, further studies of leishmaniasis in Sistan and Baluchistan province would be valuable. With the participation of the World Health Organization and Support of Political, Social, and Health Authorities, an international center for education and research on leishmaniasis can be established in this province.

## Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

## Acknowledgments

Authors wish to thank the Deputy of Research and Technology of Zahedan University of Medical Sciences for their financial support.

## Footnotes

**Conflict of Interests:** None declared.

**Ethical Considerations:** The study received ethics approval from the Ethics Committee of Zahedan University of Medical Sciences, Zahedan, Iran (IR.ZAUMS.REC.1392.6048).

**Funding/Support:** This study was supported by School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran.

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