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Cutaneous leishmaniasis in Iran: Results from an epidemiological study in urban and rural provinces

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ABSTRACT

Objective: To examine the prevalence and clinical manifestations of cutaneous leishmaniasis (CL) in Iran.
Methods: This study was conducted in Iran between 2011 and 2013. Sampling, preparing, developing, and fixing of suspicious skin lesions were completed in healthcare centers in 31 Iranian provinces as well as in the Academic Reference Laboratory and the National Reference Laboratory. The information was then analyzed at the Ministry of Health's Information Management Center of Contagious Diseases.
Results: Over a three-year period, the number of people identified with CL was 56 546. The highest incidence was reported in 2011 (27.5 per 100 000). Wet CL accounted for 43.7% of cases while 43.3% resulted from sporotrichoid leishmaniasis. The results showed that there was a higher incidence of CL due to *Leishmania major* (50.2%) than to *Leishmania tropica*. The results of this study found that the highest incidence of CL had happened respectively in Ilam, Fars and, Khorasan Razavi Provinces between 2011 and 2013.
Conclusions: Although the incidence of the disease is declining, CL is still a public health concern and disease control protocols need to be established. Therefore, further studies are needed to identify the vectors, reservoirs, and disease species as well as to develop appropriate disease control strategies.

1. Introduction

Cutaneous leishmaniasis (CL), caused by several *Leishmania* species, is a complex disease with a wide spectrum of clinical features [1]. This parasitic disease is one of the most common zoonotic diseases and a major public health problem worldwide. Leishmaniasis occurs in three forms: cutaneous (oriental sore), visceral (kala-azar), and mucocutaneous [2].

Although leishmaniasis is endemic in over 88 countries, it mostly occurs in tropical and subtropical areas [3]. Annually, about 700 000–1 300 000 new cases [4] and 20 000–30 000 deaths occur worldwide. About 95% of CL cases occur in the Americas, the Mediterranean Basin, the Middle East, and Central Asia and over two-thirds of new cases occur in six countries: Afghanistan, Algeria, Brazil, Colombia, the Islamic Republic of Iran, and the Syrian Arab Republic.

CL is one of the most common endemic diseases in Iran [5] and the second most frequently transmitted arthropod-borne parasitic disease after malaria [2].

Although about 20 000 CL cases are reported in Iran each year, the actual number of cases is most likely four or five times higher. CL is observed in both rural and urban areas and can present as either wet or dry lesions. In Iran, the rural type is prevalent in 15 provinces of Iran while the urban type is affecting almost all of the country's urban areas [6].

Iranian researchers have conducted several epidemiologic studies of leishmaniasis since 1941. For example, in 2007, 26 493 cases of leishmaniasis were reported (a rate of 37 per 100 000). In 2010, this number had decreased to 21 211 (a rate of 27 per 100 000 people). More than 90% of the cases

occurred in 88 cities and CL transmission has been reported in 17 provinces [6]. In addition, research has reported that the incidence of CL is ≥ 5 000 people. The trend for CL indicates that the number of cases has increased from 20 718 in 1994 to 21 211 in 2010 (Figure 1). Several factors have contributed to the spread of CL worldwide. For example, urbanization, migration, warfare, and environmental modification have resulted in the dispersion of the disease while improved diagnosis and case notification have resulted in increased reporting. Outbreaks of CL have recently occurred throughout Iran where there is a suitable environment for breeding of the vector, propagation of the organism, and transmission of the causative agent [7–9]. Furthermore, leishmaniasis has caused considerable morbidity and mortality in many countries including Iran [3,10] and has had a considerable, global health impact [11].
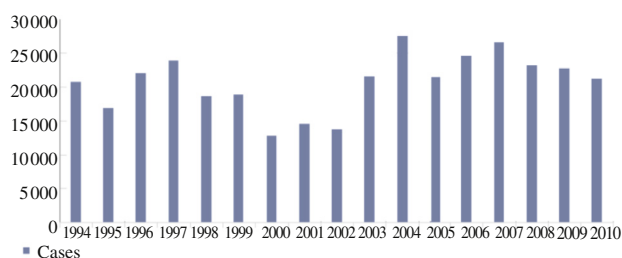

Figure 1. CL trend of 1994–2010.
Sources of information: World Health Organization Consultative Meeting on Cutaneous Leishmaniasis in EMRO countries, Geneva, April 30, 2007 to May 2, 2007.

This disease imposes an economic burden on families and societies as well as countries, particularly developing countries [3]. For example, glucantime, a medicine to treat CL, is expensive and requires frequent injections increasing the economic burden at all levels. In addition, drug resistance and side effects (*e.g.*, arrhythmia, increased liver enzymes, and anemia) threaten the well-being of patient [3,12] and the injection is painful and may result in a scar that can lead to mental and emotional problems, particularly for women and children [13]. Therefore, the World Health Organization has recommended that basic research be conducted regarding CL [14].

In addition, epidemiological data are needed to establish effective control strategies in Iran. Using this information, we can integrate leishmaniasis surveillance into existing health programs, control outbreaks, investigate vector and reservoir fluctuations, inform decision makers of high-risk populations, and improve treatment strategies. However, few studies have been conducted to examine CL. Therefore, in light of this gap, this study aimed to assess the epidemic aspects of CL in Iran over a three-year period.

2. Materials and methods

This study was conducted between 2011 and 2013. Data regarding age, gender, occupation, residence, nationality, travel to endemic areas, the number of lesions and lesion sites, the type of disease, smear results, treatment type, and related complications were recorded using specific forms.

These forms were based on the CL control protocol outlined by the Center for Disease Control Department of Ministry of Health and were available for all health centers and the Academic Reference Laboratory. The importance of standardized CL identification methods and active care systems in endemic and non-endemic areas in Iran has led to the establishment of laboratory diagnosis networks. All members of the society have access to this network. The laboratory network is divided into three levels: the local level (laboratories at health centers), the middle level (the Academic Reference Laboratory), and the national level (the National Reference Laboratory). Most experiments are conducted in the Academic Reference Laboratory and laboratories at health centers in 31 Iranian provinces.

The working process is as follows: 1. Sample, smear, and fix suspicious skin lesion samples; 2. Culture the samples using a Novy-MacNeal-Nicolle medium as a complementary method; 3. Record the results of the lesion biopsy using specific forms on computers; 4. Send the recorded information in separate files to the National Reference Laboratory (Contagious Disease Management Center of the Ministry of Health); 5. Record the information in Excel at the Contagious Disease Management Center and analyze the data.

3. Results

During the three-year study period, 56 546 patients (56.4% male, 43.6% female) were diagnosed with CL. The highest incidence was reported in 2011 (27.5 per 100 000) (Table 1). Urban areas had a higher rate of infection (53.0%) than rural areas (45.9%). The frequency of CL among Iranian, Afghans, and patients from other nationalities was 95.7%, 4.1%, and 0.2%, respectively. In addition, 36.0% of the patients had traveled to a known endemic area during the last year.

The most frequent job reported among patients was housewife (20.7%) followed by student (17.1%) (Table 2). In addition, only 7 125 cases (12.6%) concerned all family members, simultaneously (*i.e.*, all members contracted CL at the same time). The data of Table 3 have been used to calculate the age specific incidence rate.

When stratified by age specific incidence rate, the highest rate was observed in 0–4 and 5–9 age groups, respectively (Table 4).

Table 1
Annual incidence rate per 100 000 population between 2011 and 2013.

Year	Number of patients	Total population	Incidence rate per 100 000
2011	20 692	75 150 518	27.5
2012	18 868	76 125 496	24.7
2013	16 976	76 941 000	22.0

Table 2
Demographic characteristics of CL patients. *n* (%).

Characteristics		Number of patients
Occupation	Housewife	11 723 (20.7)
	Student	9 662 (17.1)
	Child	8 890 (15.7)
	Worker	4 061 (7.2)
	Farmer	1 826 (3.2)
Travel history	No	31 227 (55.2)
	Yes	20 365 (36.0)