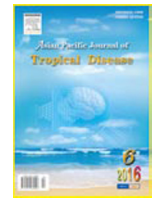




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Leishmaniasis research

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### Epidemiological study of cutaneous leishmaniasis in southwest of Iran during 2001–2011

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#### ABSTRACT

**Objective:** To examine the prevalence process and epidemiological characteristics of cutaneous leishmaniasis (CL) during 2001–2011.

**Methods:** This was a cross-sectional epidemiologic study examining 2637 patients with CL in Susangerd county during 2001–2011. The data of all patients who referred to the Prevention Unit of Susangerd Health Center were registered in CL epidemiologic data summary forms. The data and parameters included age, gender, occupation, season, residence (urban, rural), and lesion location.

**Results:** Out of 2637 patients, 1174 cases (44.5%) were females and 1463 patients (55.5%) were males. The maximum rate of infection was recorded in under 10-year-old age group (45.32%) and its minimum rate was seen among those aged over 60 years (0.87%). Among them, 1557 patients (59.0%) were living in urban and 1080 (41.0%) were in rural areas. The maximum and minimum occupational frequency distributions were seen in students (49.9%) and farmers (0.6%), respectively. The study showed that the maximum and minimum frequencies were observed in winter (52.33%) and summer (7.62%) correspondingly. The most lesion frequencies from lesion location point of view were related to hands (37.5%), faces (30.0%), feet (26.3%) and other organs (6.2%) and the number of lesions ranged from 1–5 and sized varied from 0.5–5.5 cm

**Conclusions:** Epidemiological parameters such as age, gender, occupation, season, residence (urban, rural) and lesion location in endemic regions have had significant effects on the prevalence of CL in Susangerd county and the findings can be effective for assessing disease prevention programs. In addition, CL might become a serious dermatological health problem in the near future due to a great population movement to the neighboring country Iraq with a high incidence to an endemic area.

## 1. Introduction

Leishmaniasis is a parasitic disease with extensive clinical signs. It is a zoonotic disease, which is transmitted by Phlebotomine sandflies and seen in cutaneous [cutaneous leishmaniasis (CL)], visceral (kala-azar) and mucocutaneous forms. The most common

type of CL are dry (urban) and wet (rural) forms, which are caused by *Leishmania tropica* and *Leishmania major*, respectively[1-3]. The mortality and disability risk of leishmaniasis are lower than those of any other disease. However, due to creating secondary infections, the length of the treatment of the disease with existing drugs and their side effects has created a lot of problems. Symptoms can include ulcers on the body which can persist up to one year and cause damage to the beauty of faces, hands, feet and body in throughput, which can cause some complications to the patients[4-6]. CL is one of the ten important parasitic diseases in tropical and semi-tropical regions of the world and thus the World Health Organization has recommended and supported researches on different aspects of the disease. CL in countries such

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The study protocol was performed according to the Helsinki declaration and approved by Ethics Committee of the university. Informed written consent was obtained from the patients.

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as Afghanistan, Algeria, Brazil, Iran, Peru, Saudi Arabia and Syria has a high prevalence in which Iran and Saudi Arabia demonstrate the highest prevalence of the disease[7]. It has infected millions of people in more than 80 countries in the world and is one of the most common endemic diseases to Iran which can be seen in both rural and urban forms. Approximately, 20000 cases of CL are annually reported from different parts of the country, but the actual amount has been estimated to be several times more. The figures are much less than the actual amount due to various reasons including lack of a significant number of referral patients, especially in underserved areas, problems in the diagnosis and low sensitivity of conventional diagnostic methods in laboratories. The trend of CL prevalence increases in Iran and in recent years new foci of the disease have been identified in different parts of the country[8]. In 2002, a sudden outbreak of CL happened in Mashhad, Northeast Iran. In 2003, the number of cases of CL in the country reached 21000. However, in 2004 this figure increased to 27000. The highest incidence of the disease was recorded in provinces of Yazd, Khuzestan, Ilam, Fars, Khorasan and Busher. The lowest incidence was documented in western and northwestern provinces. CL is a disease that factors such as environmental changes, population movement, uncontrolled urbanization and man-made and natural disasters (earthquakes, war) have a significant impact on its epidemiological trend[9-12]. Susangerd with the territory of 5 844 km<sup>2</sup> is one of the cities in Khuzestan Province and has 110423 residents located 55 km northwest of Ahvaz, the capital of the province, which is categorized as a hot weather area. In endemic and hyper-endemic areas of Iran, extensive studies about CL have been performed by Iranian scientists. However, to the best of our knowledge, this is the first study in relation to the epidemiologic factors in this region, such as the lack of epidemiological studies, a growing number of CL from 2002 to 2003, the trend of the disease growth in 2011, existence of potential reservoirs of the disease and favorable climate conditions. Also, due to the lack of health services and disease contagion of the neighborhood country, Iraq, after opening the border between Iran and Iraq, a large number of people pilgrimage to the Holy Shrines and visit relatives in both countries, which appears to be necessary to conduct the study of the prevalence of the disease[13,14]. This study aimed to investigate the prevalence and epidemiological characteristics of CL performed during 2001–2011[15].

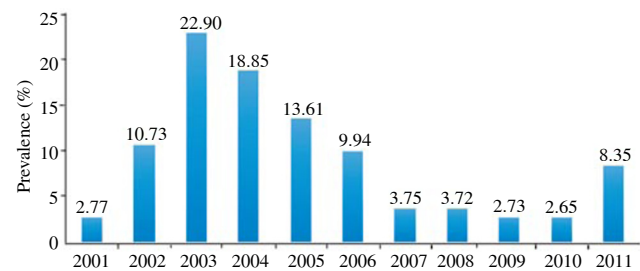
**2. Materials and methods**

An epidemiological cross-sectional study was carried out over 11 years on 2 637 patients with CL in Susangerd from 2001 to 2011. Wounds were observed using a scalpel from margins where parasites existed more likely. Samples included dermal scrapings of active indurated margins of lesions were smeared onto a glass slide for fixation (using methanol), stained (using Giemsa), and examined microscopically for the presence of *Leishmania* amastigotes. Simple

direct questionnaires about clinical and epidemiological information [including ages, genders, clinical symptoms, occupations, places of residence (urban, rural), ulcer sites, seasons and months] were filled out for those patients. The study protocol was performed according to the Helsinki declaration and approved by Ethics Committee of the university. The patients were notified of all the procedures, and a signed informed consent was given to them. Descriptive graphs and tables were used to investigate the trend of changes and ANOVA and linear trend test were applied to check the trends in the period of study and collected data were analyzed by SPSS 20.0 software.

**3. Results**

The minimum incidence of CL was observed in 2001 with a total number of 73 people, while the maximum incidence was recorded in 2003 with 604 cases. For the duration of 2003–2011, Figure 1 shows a controlled and downward trend and in 2003 a sharp increase in the incidence of the disease.



**Figure 1.** Prevalence of CL in Susangerd from 2001–2011.

Out of 2637 patients included in the study, 1463 (55.5%) were males, and 1174 (44.5%) were females (Table 1), and there was a significant difference between two genders ( $P = 0.001$ ).

**Table 1**

Distribution of cases of CL by gender [n (%)].

Year	Total number	Male	Female
2001	73 (100)	43 (58.9)	30 (41.1)
2002	283 (100)	179 (63.3)	104 (36.7)
2003	604 (100)	316 (52.3)	288 (47.7)
2004	497 (100)	257 (51.7)	240 (48.3)
2005	359 (100)	196 (54.6)	163 (45.4)
2006	262 (100)	149 (56.9)	113 (43.1)
2007	99 (100)	69 (69.7)	30 (30.3)
2008	98 (100)	56 (57.1)	42 (42.9)
2009	72 (100)	37 (51.4)	30 (48.6)
2010	70 (100)	45 (64.3)	25 (35.7)
2011	220 (100)	116 (52.8)	104 (47.2)
Total	2 637 (100)	1 463 (55.5)*	1 174 (45.5)*

\*:  $P = 0.001$ .

The age range of the study was 6 months to 85 years and the infection was most prevalent in 0–10 year age group (45.32%) while the lowest prevalence rate was to age above 60 (0.87%) years and the results of *Chi*-square test showed a significant difference between the infection and these two age groups ( $P = 0.001$ ). Besides, the collected data showed that 1 557 patients (59.0%) living in urban area and 1 080 (41.0%) were from rural areas (Table

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