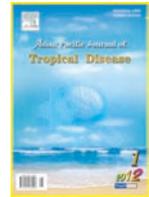


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Epidemiological aspects of cutaneous leishmaniasis in Ilam province, west of Iran (2000–2007)

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ABSTRACT

Objective: To investigate the epidemiology of cutaneous leishmaniasis in Ilam province between 2000 and 2007. **Methods:** The data of this descriptive cross-sectional study included the existing data regarding the prevalence of cutaneous leishmaniasis in different seasons, years and districts which were reported to Ilam Provincial Health center between 2000 and 2007. **Results:** The analysis of the collected data revealed that Ilam province was one of the endemic foci of zoonotic cutaneous leishmaniasis caused by *Leishmania major*. The study also showed the rate of cutaneous leishmaniasis incidence with the general rate of 1.2 per one thousand populations. It was also evident that the highest rate of incidence of cutaneous leishmaniasis was in fall and winter, which is one of the most important characteristics of zoonotic cutaneous leishmaniasis. Ulcers were present in 5161 Patients. Of these, 28.9% were female and 71.1% were male. 3447 cases (66.8%) had ulcers on hand and foot, 1213 cases (23.5%) on face and 501 cases (9.7%) on trunk. A total of 1907 patients (36.9%) had only one ulcer. But 3254 cases (63.1%) had more than one ulcer. The highest incidence was found among patients with two age groups of 20–29 years old (46.8%) and 10–19 years old (17.3%). **Conclusions:** With respect to the increased prevalence of cutaneous leishmaniasis in Ilam province, health care observers should pay further attention on preventing the disease spread.

1. Introduction

Leishmaniasis is a parasitic disease with a wide range of clinical symptoms and currently threatens 350 million persons in 88 countries[1]. Cutaneous leishmaniasis (CL) is a major public health problem in different parts of Iran and prevails in rural districts of 15 out of 31 provinces in Iran[2]. In recent years, study on CL in Iran has carried out by different scientists[3–8]. Phlebotomine sand flies are the vectors of leishmaniasis and papatasi fever in Iran[9,10]. Both zoonotic and anthroponotic cutaneous leishmaniasis (ZCL and ACL) have been prevalent in a number of rural and urban areas of Iran. They have also emerged in new foci during recent decades[11,12]. There are at least two species of old world leishmaniasis, responsible for CL in Iran[13]. CL due to *Leishmania major* is still a great and increasing

public health problem in many rural areas of 15 out of 30 provinces of Iran[10]. As CL is endemic in most parts of Iran, and the disease has been reported increasingly in all age and gender groups in some regions, the aim of this study was to determine the epidemiological factors associated with CL in Ilam province in seven years. The epidemiological aspects of CL in this province has not been examined in recent years. To control the disease more effectively and organize a control program, basic information is needed to be determined[14].

2. Materials and methods

2.1. Study area

Ilam Province with the center of Ilam city, is one of the 31 provinces of Iran, and is located in west of Iran, bordering Iraq and covering an area of 19 086 square kilometers[15]. This province has eight counties including Ilam, Mehran, Dehloran, Darreh Shahr, Sarableh, Eivan, Abdanan and Arkwaz (Figure 1). The population of the province,

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in year of 2005, was approximately 540 000 people. Ilam province is among the warmest regions of Iran, although the mountainous areas of north and north eastern Ilam are relatively cold. The average annual rainfall in province is 578 mm. In 1996, the absolute maximum temperature was 38°C in August and the minimum temperature was 0.4°C in February. The number of freezing days in winter was 27 days[15].



Figure 1. Map of Ilam province and its counties, Iran Meteorological Organization, 2012.

2.2. Clinical samples and data collection

A questionnaire was designed in the study of the clinical course in Ilam province, and a descriptive cross-sectional study was done. Clinical samples consisted of all confirmed cases that visited to all health centers of Ilam province from 2000 till 2007 with the symptoms of leishmaniasis and presence of amastigotes in Giemsa-stained smears. For each

patient in all counties, the demographic features including patient’s sex, age, clinical signs including number of scars and its location in the body, month of diseases occurrence, incidence rate, and geographical regions were recorded. Data were analyzed by using SPSS version 11.0.1 (SPSS Inc., Chicago, IL, USA).

3. Results

A descriptive cross-sectional survey was performed in Ilam province. A total number of 5 161 positive cases of CL were reported in province during 2000–2007, of which 3 670 (71.1%) were male, while females accounted for 1 491 (28.9%). Out of 5 161 positive cases of CL, 2 698 patients (52.3%) resided in urban areas, while 2 463 (47.7%) lived in rural areas. Figures 2 and 3 showed sex-related CL from 2000 to 2007 and CL in urban and rural areas, respectively. Analysis of the ulcers distribution in the body showed that most of the lesions including 3 447 (66.8%) cases were observed in legs and hands, 1 213 (23.5%) cases in face and 501 (9.7%) cases were observed on other parts of the body (Figure 4). Majority of the patients had more than three ulcers (n= 2 018, 39.2%), 1 907 (36.9%) and 1 236 (23.9%) cases exhibited one and two ulcers on their body, respectively (Figure 5). Highest disease prevalence (n= 998, 19.3%) was observed in January (Figure 6, 7). The highest disease prevalence was in winter, so that 50.2% (n=2 591) of the disease cases had occurred in this season (Figure 8). The prevalence of CL by different counties in Ilam province, Iran during 2000–2007 has been shown in Figure 9. The most frequent cases of CL were observed significantly in age group of 20–29 years old (46.8%) and the least prevalence were observed in age group of 50–59 years

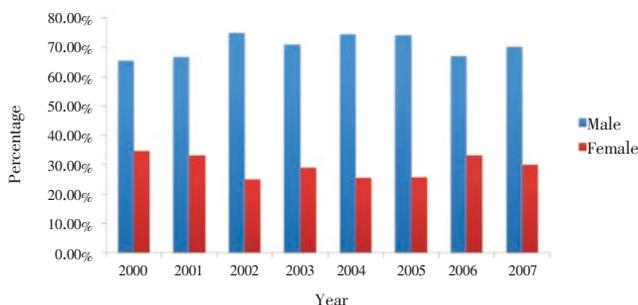


Figure 2. Sex-related cutaneous leishmaniasis in Ilam province, Iran, from 2000 to 2007.

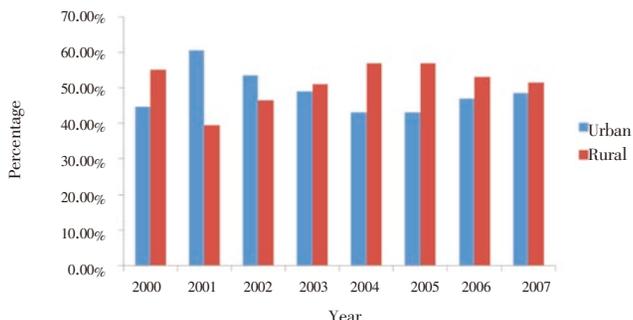


Figure 3. Cutaneous leishmaniasis in Ilam province in urban and rural areas from 2000 to 2007.

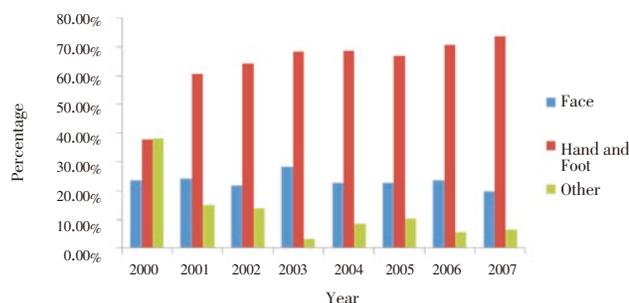


Figure 4. Site of the lesions in 5 161 patients with cutaneous leishmaniasis from 2000 to 2007 in Ilam province, Iran.

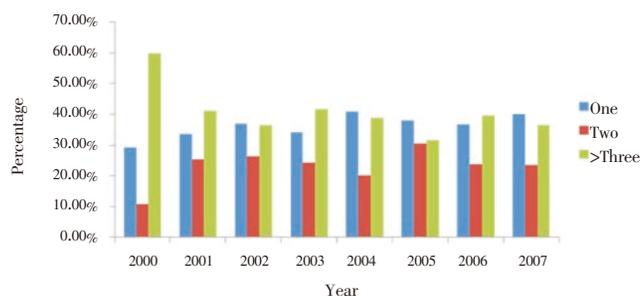


Figure 5. Number of ulcers and scars in Ilam province from 2000 to 2007, Iran.

old (Figure 11). The year of 2003 had the most prevalent cases of CL in the province (Figure 12). The incidence of the

disease in Ilam province, during 2000–2007, was calculated as 9.4%(Table 1).

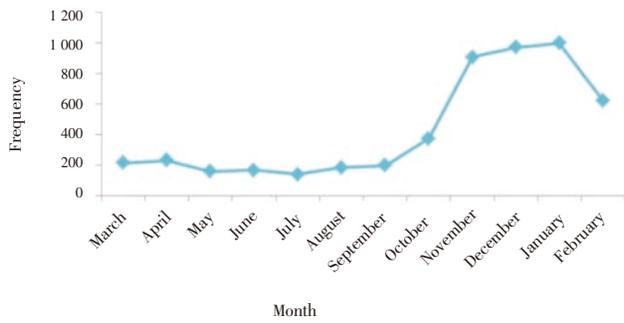


Figure 6. Monthly prevalence of cutaneous leishmaniasis in Ilam province, Iran, from 2000 to 2007.

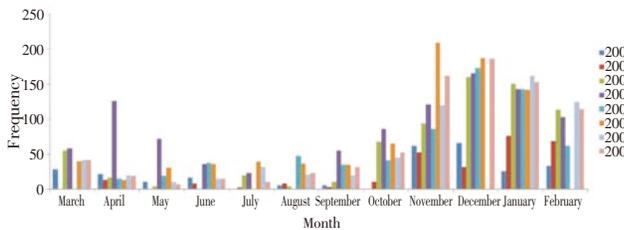


Figure 7. Monthly variation of cutaneous leishmaniasis in Ilam province, Iran, during 2000–2007.

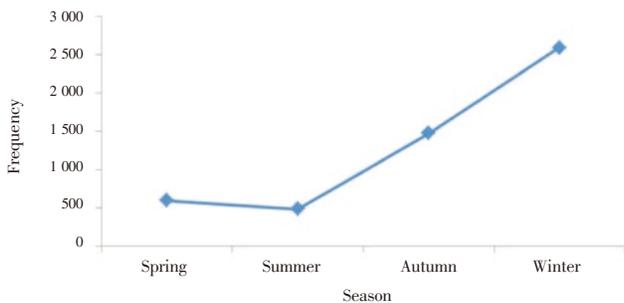


Figure 8. Seasonality of cutaneous leishmaniasis in Ilam province Iran, from 2000 to 2007.

Table 1. Comparison of the incidence of zoonotic cutaneous leishmaniasis (per thousand) in different years in Ilam province, during 2000–2007.

County	No. with CL	Incidence(%)
Ilam	225	1.1
Eivan	78	1.5
Abdanan	226	4.5
Dehloran	2 896	55.7
Darreh Shahr	161	3.3
Mehran	1 575	28.6
Shirvan Chardavol	0	0.0
Ilam province	5 161	9.4

4. Discussion

CL is a main public health problem in Iran including Ilam province, and its prevention and control is one of the health ministry priorities. In this survey main epidemiological aspects of 5 161 cases of CL were diagnosed between 2000

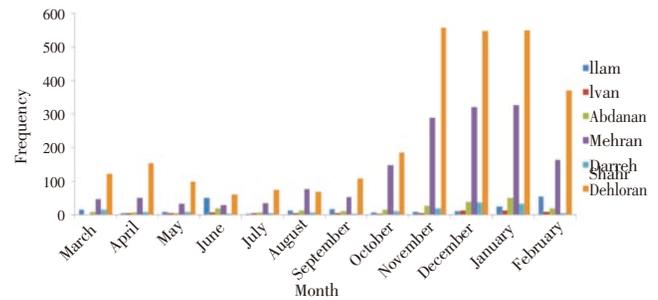


Figure 9. Prevalence of cutaneous leishmaniasis in different counties of Ilam province, Iran, during 2000–2007.

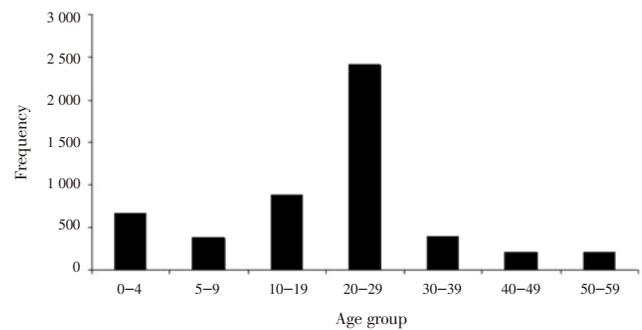


Figure 10. Comparison of the number of cases in different age groups, in Ilam province, Iran during 2000–2007.

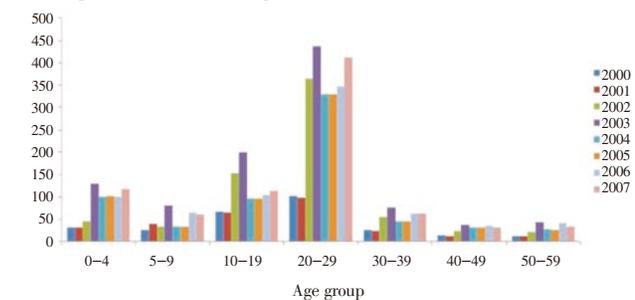


Figure 11. Prevalence of positive cutaneous leishmaniasis in different age group in Ilam province, Iran during 2000–2007.

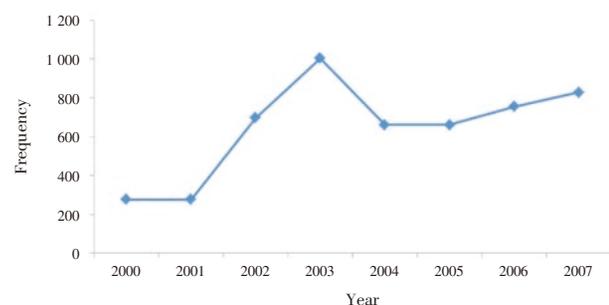


Figure 12. Variation in the prevalence of cutaneous leishmaniasis cases based on different years of study, in Ilam province, Iran, during 2000–2007.

and 2007. The present study is designed to determine the epidemiological aspects in Ilam province, west of Iran in order to give recommendations to planning a more accurate control program for leishmaniasis control. In this study, there was a relationship between gender and the incidence of disease and the incidence was higher in men than women. The reason is that more men work or sleep in open areas and is also due to men’s less covering than

women and more exposure to the infected sand flies^[16,17]. Regarding gender differences, in the study areas, CL have been reported more frequently in men in comparison to women. Some studies have hypothesized that the gender difference observed in some parasitic disease can be attributed to hormonal effects. However, controversy still exists regarding the role of sex hormones in the cellular immune response^[18,19]. Although it is believed that sex hormones may influence the establishment and the course of parasitic diseases, behavioral factors, making male individuals more likely to be exposed to vectors in fields and other transmission environments, are probably equally or more important^[20,21]. The most anatomical sites for lesions concentration are on the hands and feet. Repartition of CL positive cases according to age is also in agreement with previous findings^[6,22], that's in general CL affect more cases in 20–29 years old adult. Other studies have shown that most highly infected age group with CL is person of \leq 20 years old^[23,24]. The reason for this fact is that adults have developed resistance to CL due to their previous exposure to the parasite. The age–group of 20–29 years old included patients who mostly spend their time on farms and orchards at night without self protection. So, because some counties of the studied areas including Dehloran has hot weather and people prefer to sleep out in house yards and majority of children leave their face and hands out of the cover, exposed to the bites of sand flies, therefore, use of personal protection equipment such as insect repellent chisel, insecticides–impregnated bednets and covering open body parts is recommended in order to prevent the disease in people who are at the sand fly bites' exposure^[26,26]. Growing urbanization has strongly become one of the most important risk factors for occurring 52.3% of the cases in urban areas in comparison to rural areas. The prevalence of CL had remarkable changes in the different months of year and the highest rate was observed in January. In the present study, the highest prevalence was in winter. The reason for this fact was related to the activity of the sand flies. Results of this study showed that most ulcers (66.8%) were in hands and feet which were similar to the results of other studies^[27–29]. In most cases this parts of the body are unprotected and because sand flies are not capable of sucking the blood through clothes due to short mouth appendices and mostly attack open and unprotected parts of the body^[26,30]. Results showed that in most cases (39.2%), the number of ulcers in patients were more than three ulcers. The reason of various ulcers could be induced by both the biting way of the sand flies; since, these insects do several bites for each stage of the biting and the abundance of infected sand flies in one region^[26,30]. With regard to the findings of this study, it could be concluded that CL is posed as a health problem in Ilam province. Therefore, planning for the disease control and taking appropriate measures to reduce the incidence of the disease are necessary. Health education through the public media and individual and group training, fighting against rodents, fully protection during transmission season, environmental reform and proper disposal of garbage and sewage, using impregnated mosquito nets should be also included in the planning. According to the results of the

study and high incidence and prevalence of the disease in the study it is concluded that serious public health monitoring should be considered in the study area.

Conflict of interest statement

We declare that we have no conflict of interest.

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