

An eco-epidemiological study of cutaneous leishmaniasis in Dezful, Iran, during 2004-2011

Hashemi H, PhD¹, Khodabakhshi A, PhD², Sepasian M, MSc^{3*}

1- Assistant Prof., Research Center for Health Sciences, Shiraz University of Medical Sciences, Shiraz, Iran. 2- Assistant Prof., Health Faculty, Shahrekord University of Medical Sciences, Shahrekord, Iran. 3- MSc of Medical Geography, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran.

Abstract

Received: July 2015, Accepted: August 2 015

Background: Due to annual increases in cutaneous leishmaniasis (CL) in different regions of Iran and the resulting health problems and high economic costs, this study was performed with the aim to determine the prevalence of CL in Dezful city, Iran.

Materials and Methods: This descriptive study was performed on all patients who were directly referred to clinics and clinical laboratories of Dezful city during 2004-2011. Age, sex, occupation, and area of residence of the patients were recorded. Biopsy was conducted on patients who had suspicious lesions. The biopsy was evaluated by a parasitologist using Giemsa staining, and then, light microscopy.

Results: The number of CL cases was 1192, among which 64% were men and 36% were women. Among them, 592 people lived in rural areas and 600 people lived in urban areas. Most cases of disease were in the age group of 20-29 years (35%). The maximum prevalence of disease was observed in 2008. Most cases of the disease were in the military occupational group with a frequency of 366 cases. Furthermore, most cases occurred in the months of November and December.

Conclusions: Considering the prevalence of CL in the study area in different years, it is necessary to take effective and comprehensive public health measures to control and prevent the spread of this disease.

Keywords: Cutaneous Leishmaniasis, Epidemiology, Iran.

Introduction

Leishmaniasis is a zoonotic infection in which parasites of the genus *leishmania* are transmitted from rodents and small mammals to phlebotomus species and fly vectors. Humans may inadvertently enter the zoonotic cycle and contract cutaneous leishmaniasis (CL) (1, 2). It is caused by an obligate intramacrophage protozoan, characterized by diversity and complexity (3). The different clinical forms of leishmaniasis cause severe public health problems. Visceral leishmaniasis (VL) is usually fatal when untreated, muco-cutaneous leishmaniasis (MCL) is a mutilating disease,

diffuse cutaneous leishmaniasis (DCL) is a disabling disease, and cutaneous leishmaniasis (CL) is also disabling when multiple lesions are present (4, 5). In temperate areas of the Old World, there is a seasonal appearance of sandflies. There are two peaks in the density curve of most species; one in June or July and the other in August or September (6). This disease manifests as a chronic ulcer, potentially leaving unattractive scars (7). CL is a worldwide public health and social problem in many

* **Corresponding author:** Mahsa Sepasian, Faculty of Geographical Sciences and Planning, University of Isfahan, Isfahan, Iran.

Email: chitra_tetra@yahoo.com

developing countries. It can affect the skin and mucous membranes, and is caused by different *Leishmania* species widespread in 88 countries in the New and Old World. Old World CL is present in many endemic areas in North Africa, the Mediterranean, the Middle East, the Indian subcontinent, and Central Asia. The World Health Organization (WHO) considers leishmaniasis to be one of the most serious parasitic diseases and the World Health Assembly (WHA) has advocated conservation for its control (8). The overall prevalence of CL is 12 million with an estimated 1.5 million new cases of CL per year. Approximately 350 million people, who are often impoverished, are at risk of contracting the disease (9).

Old World CL is also increasingly seen in immigrants, military personnel, humanitarian aid workers, tourists, and travelers from endemic areas. However, imported CL is still missed by most western physicians. Suspected skin lesions must be analyzed through biopsies and tissue smears in order to make an accurate diagnosis (10). Dezful city in the North of Khuzestan Province, Iran, is an endemic area of CL. Thus, this study was performed with the aim to determine the prevalence of CL and its characteristics in patients who were referred to health centers in Dezful due to skin problems. The study results can be effective in treatment of

infected individuals, prevention of infection prevalence in the society, and health centers' short-term and long-term planning for disease prevention and control.

Material and methods

This descriptive study was conducted over a period of 8 years from April 2004 to 2011 in the clinical laboratories of Dezful using convenience sampling. All patients referred to clinical laboratories of health centers in towns and villages around Dezful and in the city of Dezful and diagnosed with leishmaniasis due to injury were investigated. The data on these patients was recorded in the health center within the city and under the supervision of Dezful University of Medical Sciences.

Sampling was carried out and samples with Giemsa staining and microscopy were examined by a parasitologist. Then, questionnaires were completed for patients with CL. The questions obtained information on age, sex, occupation, place of residence, and the number and location of lesions. In this study, patients with CL were those who had amastigote forms in the leishmania antigen mixture (LAM) prepared for them. Data were collected and classified and graphs were prepared using Excel software.

Table 1: The number of patients with cutaneous leishmaniasis (CL) based on months and years in Dezful

Month Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2004	16	1	4	8	7	6	2	9	10	15	37	41	156
2005	43	28	12	2	4	1	4	7	15	26	25	40	207
2006	16	8	12	16	2	5	5	3	8	11	21	22	129
2007	25	7	3	7	5	2	2	2	2	7	7	23	92
2008	52	33	15	3	0	4	0	9	23	18	43	54	254
2009	11	9	3	10	3	3	2	13	19	13	20	11	117
2010	6	2	1	2	1	1	4	12	6	12	21	15	83
2011	7	7	14	2	0	3	3	10	12	37	36	23	154

Results

According to data recorded by the Dezful City Health Center, 1192 cases of this disease were observed during the years 2004-2011 (Table 1),

767 of which (64%) were men and 425 (36%) women (Figure 1). Among them, 592 patients lived in rural areas and 600 patients lived in urban areas. Most cases were observed in 2008.

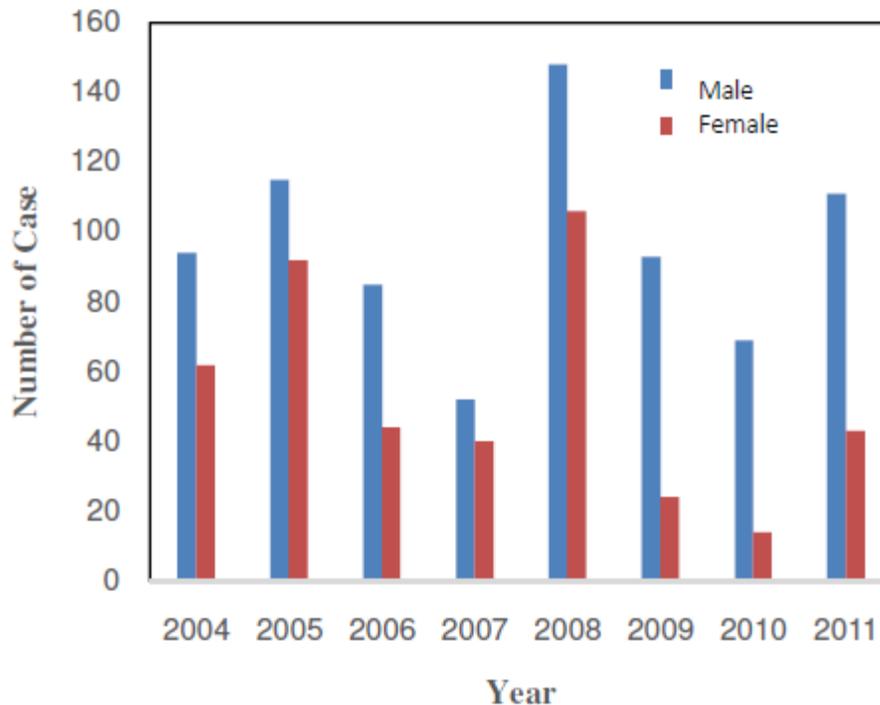


Figure 1: Cases of cutaneous leishmaniasis (CL) in Dezful during the study period

In this study, patients with CL are grouped in terms of age. Thus, most of the cases (35%) were in the age group of 20-29 years (Table 2). According to figure 2, most of the people in this region who suffer from this disease have been in the military. The city has several military garrisons that the data showed to be endemic areas of CL during 2004-2011. This finding is justifiable as the people in these garrisons were mostly nonnatives. The garrison building environment is suitable for the growth and multiplication of vectors of CL, because

sandflies generally live in wall cracks and wet and warm places.

After military personnel, housewives and students, respectively, were the groups with the highest number of cases of this disease. Moreover, 163 children and babies who could not be entered into occupation or education classifications had this disease. It should be mentioned that the “other jobs” group included 56 self-employed, 17 unemployed, and 9 employed individuals (Figure 2).

Table 2: Age distribution of cutaneous leishmaniasis (CL) cases in Dezful during the study period

Age group	0-9	10-19	20-29	30-39	40-49	50-59	60+
Number of cases	261	281	414	101	66	34	35
Percentage	22%	24%	35%	8%	5%	3%	3%

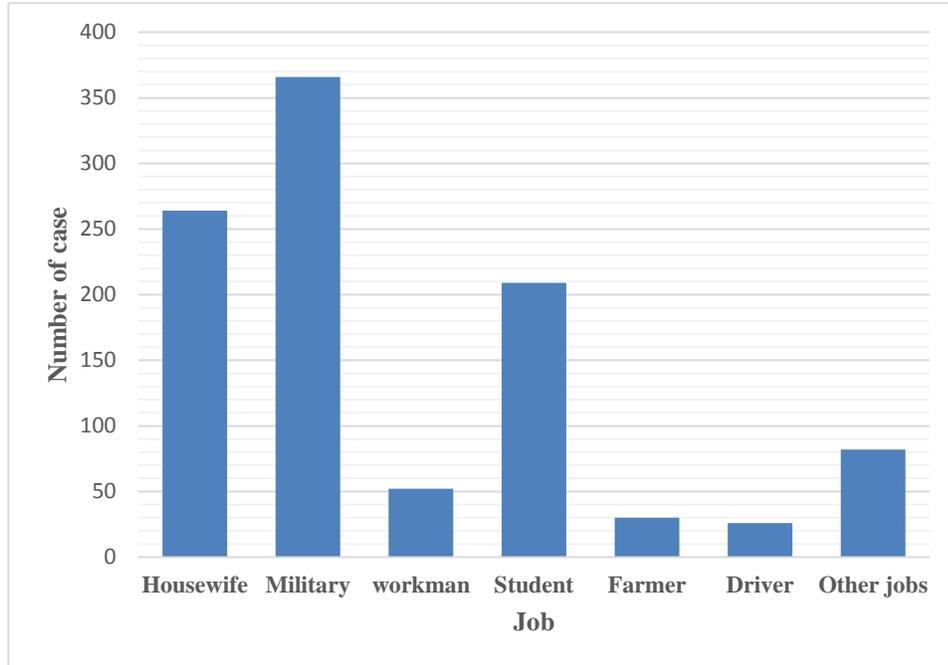


Figure 2: Occupational distribution of cutaneous leishmaniasis (CL) cases in Dezful during the study period

The obtained data show that most cases of disease occurred in autumn. In fact, few CL cases were observed in the first months of the year, and most cases were observed in October,

November, December, January, and February. The peak was in December and November (Figure 3).

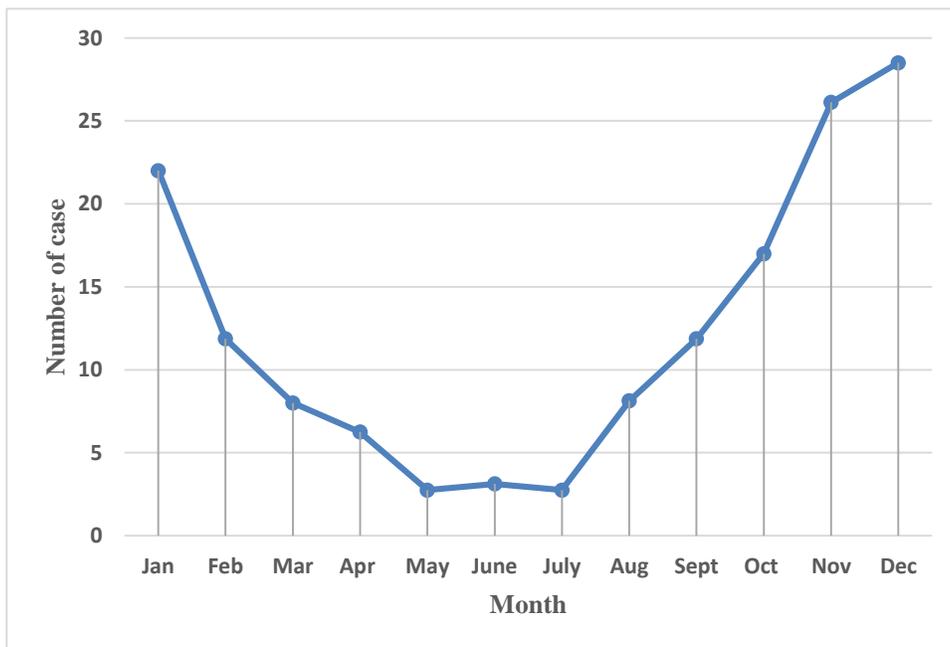


Figure 3. The average number of cutaneous leishmaniasis (CL) cases per month in the city of Dezful

Discussion

CL is expressed as a myriad of disease manifestations which depend upon parasite species, host responses, and poorly understood host-parasite-vector interactions. Several species of *Leishmania* are capable of infecting humans and causing disease (8). Leishmaniasis is In this study, the prevalence of leishmaniasis in Dezful was 64% in men and 36% women. According to previous studies, this difference can be due to the different occupational positions of men and women and difference in clothing which in women is more than men. In addition, most cases counted for low elevation areas and the least number of cases for high elevations areas (5-7).

Dezful is one of the endemic areas of CL. The high prevalence of this disease in this region can be attribute to the low elevation, gardens, agriculture, plant covering, and soil texture of the region that create the right environment for the growth of the disease reservoirs. An increase in the number of rats that are one of the main reservoirs of CL can also be observed around Dez River. On the other hand, climate factors such as humidity, rainfall, sunshine, temperature, and wind are also contributing factors to the spread of disease vectors in this region.

As data has shown, most cases (35%) were in the 20-29 years age group and many of them were soldiers. This may indicate the greater exposure of this group (Table 2). The obtained data showed a CL epidemic in garrisons in Dezful during 2004-2011. This finding is justifiable as the people in these garrisons were mostly nonnatives. . On the other hands, nonnatives who travel to this area are a reason for the spread of CL to other areas and neighboring provinces. After military personnel, housewives and students, respectively, were the groups with the highest number of cases of this

endemic in 88 countries in the world, and 350 million individuals are at risk of acquiring the disease (2). Although CL is not life threatening, it can cause morbidity due to numerous reasons such as long duration of ulcers, high cost of treatment, length of the treatment period, and side effects of treatment with existing drugs (3).

disease because these groups were exposed to fly bites.

The findings also indicated that leishmaniasis was most prevalent in November and December of every year and this is due to the existence of dominant species (*leishmania major*) in the region. During the study period, highest rate of disease cases was in 2008 and the lowest rate in 2010 (Table 1). The reduction or increase in the number of cases of disease can be attributed to occurrence of naturally acquired immunity in people who were formerly infected with leishmania. For example, there was an epidemic among soldiers in 2008 and the number of disease cases increased; this may have been due to the susceptibility of nonnatives to the disease parasite compared to native residents.

Conclusions

Although Dezful has been recognized as an endemic area of CL, no scientific research has been carried out in this region. The results of this study show that the CL is acquired every year and spreads to other non-endemic regions. In order to prevent the spreading of CL, more epidemiological studies and the establishment of many surveillance and control systems are required.

Acknowledgement

The authors would like to acknowledge the generosity of workers who agreed to participate in this research.

Conflict of interest: Non declared

References

1. Alvar J, Yactayo S, Bern C. Leishmaniasis and poverty. *Trends Parasitol* 2006; 22(12):552-7.
2. Singh VP, Ranjan A, Topno RK, Verma RB, Siddique NA, Ravidas VN, et al. Estimation of underreporting of visceral leishmaniasis cases in Bihar, India. *Am J Trop Med Hyg* 2010; 82(1):9-11.
3. Bern C, Maguire JH, Alvar J. Complexities of assessing the disease burden attributable to leishmaniasis. *PLoS Negl Trop Dis* 2008; 2(10):e313.
4. Reithinger R, Dujardin JC, Louzir H, Pirmez C, Alexander B, Brooker S. Cutaneous leishmaniasis. *Lancet Infect Dis* 2007; 7(9):581-96.
5. Singer SR, Abromson N, Shoob H, Zaken O, Zentner G, Stain-Zamir C. Epidemiology of cutaneous leishmaniasis outbreak, Israel. *Emerg Infect Dis* 2008; 14(9):1424-6.
6. Sharma U, Singh S. Insect vectors of leishmania: distribution, physiology and their control. *J Vector Borne Dis* 2008; 45(4):255-72
7. Bari AU. Epidemiology of cutaneous leishmaniasis. *Journal of Pakistan Association of Dermatologists* 2006; 16:156-62.
8. Bari AU, Rahman SB. Cutaneous leishmaniasis: an overview of parasitology and host-parasite-vector inter relationship. *Journal of Pakistan Association of Dermatologists* 2008; 18:42-8.
9. Swiss. World Health Organization. Department of communicable disease surveillance and response. WHO Report on global surveillance of epidemic-prone infectious diseases. Geneva: World Health Organization; 2000; Report No: WHO/CDA/CSR/ISR/2000.1.
10. Swiss. World Health Organization. Control of leishmaniasis. Report of a meeting of the World Health Organ expert committee on the control of leishmaniases. Geneva: World Health Organization; 22-26 March 2010; Report No: 949.