

# **Passive Detection of Cutaneous Leishmaniasis in Police Personnel Deployed in the Provinces of Isfahan, Ilam, Bushehr, Khorasan and Khuzestan, Iran**

*\*MR Jahani<sup>1</sup>, MJ Gharavi<sup>2</sup>, H Hadi Shirzad<sup>3</sup>*

*<sup>1</sup>Dept. of Microbiology, School of Medical Sciences, Baghiyatollah University, Tehran, Iran*

*<sup>2</sup>Dept. of Parasitology, Iran University of Medical Sciences, Tehran, Iran*

*<sup>3</sup>Research Office, the Police Medical Center, Tehran, Iran*

---

---

## **Abstract**

Leishmaniasis is a common parasitic disease in tropical and subtropical areas of the world. Police personnel deployed in the suburbs and rural areas are the most often exposed to the potential risk of cutaneous leishmaniasis. Furthermore, since the same police personnel are sent on duty to other places, their migrations can also play a considerable role in the transmission of this disease to their various destinations. In this study, the studied population comprises those patients referred to the police public health centers, in Isfahan, Ilam, Bushehr, Khorassan, and Khuzestan provinces from 1997 to 2001. The suspected individuals were counted as having leishmaniasis after examination of the suspected lesions was confirmed by demonstrating Leishman bodies in Geimsa stained smears that prepared them and/or culture in NNN media. The results showed altogether 610 cutaneous leishmaniasis (CL) cases confirmed by Leishman bodies' demonstration in suspected lesions and promastigotes forms in NNN media. The distribution of absolute and relative frequencies of CL were 288(47.2%), 155(25.0%), 96(15.7%), 54(8.7%) and 27 (4.3%) in Khorasan, Ilam, Khuzestan, Isfahan and Bushehr provinces from 1997 to 2001 respectively.

**Keywords:** *Cutaneous leishmaniasis, Passive detection, Police personnel deployed, Iran*

---

---

## **Introduction**

The number of people from all over the world infected by *Leishmania* parasites is estimated to be about 12 millions, and an increasing number, between 2 to 3 millions, are infected each year. Researchers believe that there are about 350 million people at risk in endemic areas of the world (2). Furthermore, in addition to its usual form, it is also possible to observe leishmanic wound in cutaneous horn, Israeli, abortive and or even in erysipeloid forms. The wounds characteristic of rural leishmaniasis is usually wet and larger in size than those of urban leishmaniasis (5). Dry cutaneous leishmaniasis in urban areas was endemic in different European, African, and Asian countries as well as regions in Central Asia and the Middle East (5). In Iran, this disease is endemic in Tehran, Mashhad, Yazd, Tabriz, Shiraz, Kerman,

Neyshabour, and Bam (3). Wet dermal leishmaniasis, on the other hand, broke out in ancient times as sporadic infections in the rural areas of Israeli, Russia, Jordan, Senegal, Mali, Sudan, Nigeria and north of Angola(5). In Iran, it has been observed in the northern and northeastern parts of Isfahan, Golestan, Khorasan, Khuzestan, Ilam, Bushehr, Semnan and Fars provinces (3). According to 1999 annual report of Public Health Ministry of I.R. of Iran, the incidence of CL in Iran was 30 cases per 100,000. Obtained statistics indicate that particular areas in this study show 126 cases in Ilam, 86 in Isfahan, 68 in Bushehr, 45 in Khorassan and 25 in Khuzestan (4). Police personnel, are frequently transferred to different sites, rural areas, suburbs and also areas where leishmaniasis is highly prevalent. Considering this fact and the importance of the disease,

there is a possible danger that this disease will be transmitted throughout the country. Since there has been a study on police personnel nationwide similar to this one, we have therefore decided to survey of passive detection of CL among police units deployed in endemic areas including Isfahan, Ilam, Bushehr, Khorassan, and Khuzestan provinces of Iran.

### Materials and Methods

This study has been carried out both as a retrospective method and a descriptive manner. Through this method, patients referred to the public health centers located in aforementioned areas were daily recorded and the total numbers reported every 3 months. The subjects of this study were patients who consulted the physicians in the public health centers during the period from March 1997 to the late of 2001. Those patients, who at first were diagnosed as having leishmaniasis, were immediately treated after medical examination and laboratory diagnosis. Those suspected cases had samples extracted from their wounds. Stain, these samples were prepared and stained with standard Giemsa or Wright in the laboratory.

Macrophages and histiocytes infected by *Leishman* bodies were identified in the stained slides (5), and then the patients were definitely diagnosed as cases of leishmaniasis. In cases that the parasites were not observed but showed clinical signs of the disease, the samples were cultured in NNN medium for 10 days(1). After this period, if a microscopic examination showed the promastigotes forms of the parasites in the culture, the patient was included in the study.

### Results

According to the data from 1997 until 2001, there were 610 confirmed reported cases of cutaneous leishmaniasis by laboratory diagnosis. The distribution of absolute and relative frequencies of CL were 288(47.2%), 155 (25.0%), 96 (15.7%), 54(8.7%) and 27(4.3%) in Khorassan, Ilam, Khuzestan, Isfahan and Bushehr provinces respectively (Table 1). Frequencies of CL in Police personnel in different cities of examined provinces are expressed in tables 2 to 5.

**Table 1:** The distribution of absolute and relative frequencies of CL reported in police personnel deployed in some areas of Iran during 1997-2001.

| Provinces | 1997 |      | 1998 |      | 1999 |      | 2000 |      | 2001 |      | Total |      |
|-----------|------|------|------|------|------|------|------|------|------|------|-------|------|
|           | No   | %    | No   | %    | No   | %    | No   | %    | No   | %    | No    | %    |
| Isfahan   | 5    | 9.3  | 32   | 59.2 | 2    | 3.7  | 11   | 20.4 | 4    | 7.4  | 54    | 8.7  |
| Ilam      | 69   | 44.5 | 23   | 14.8 | 22   | 14.2 | 15   | 9.7  | 26   | 16.9 | 155   | 25.0 |
| Bushehr*  | 14   | 51.9 | 5    | 18.5 | 3    | 11.1 | 5    | 18.5 | 0    | 0    | 27    | 4.3  |
| Khorasan  | 85   | 29.5 | 61   | 21.2 | 45   | 15.6 | 47   | 16.3 | 50   | 17.4 | 288   | 47.2 |
| Khuzestan | 27   | 28.1 | 37   | 38.5 | 7    | 7.3  | 20   | 20.8 | 5    | 5.3  | 96    | 15.7 |
| Total     | 200  | 32.3 | 158  | 25.4 | 79   | 12.7 | 98   | 15.8 | 85   | 13.8 | 620   | 100  |

\* Only Busher city

**Table 2:** Frequencies of cutaneous leishmaniasis reported in police personnel deployed in Khorasan Province during 1997-2001.

| Cities     | 1997 |       | 1998 |      | 1999 |      | 2000 |      | 2001 |      | Total |      |
|------------|------|-------|------|------|------|------|------|------|------|------|-------|------|
|            | No   | %     | No   | %    | No   | %    | No   | %    | No   | %    | No    | %    |
| Birjand    | 4    | 66.7  | 2    | 3.3  | 0    | 0    | 0    | 0    | 0    | 0    | 6     | 2.1  |
| Taybad     | 11   | 28.2  | 6    | 15.4 | 1    | 2.6  | 13   | 33.3 | 8    | 20.5 | 39    | 13.5 |
| Torbat-jam | 0    | 0     | 16   | 69.6 | 5    | 21.7 | 2    | 8.7  | 0    | 0    | 23    | 8.1  |
| Khaf       | 2    | 100   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2     | 0.7  |
| Dargaz     | 0    | 0     | 2    | 3.4  | 0    | 0    | 22   | 37.3 | 35   | 59.3 | 59    | 20.5 |
| Sarakhs    | 65   | 49.2  | 30   | 22.7 | 24   | 18.9 | 8    | 6.1  | 4    | 3.0  | 132   | 45.8 |
| Gezik      | 0    | 0     | 4    | 80.0 | 0    | 0    | 0    | 0    | 1    | 20.0 | 5     | 1.7  |
| Nehbandan  | 1    | 100.0 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1     | 0.3  |
| Neyshaboor | 2    | 9.5   | 1    | 4.8  | 14   | 66.7 | 2    | 9.5  | 2    | 9.5  | 21    | 7.3  |
| Total      | 85   | 29.5  | 61   | 21.2 | 45   | 15.6 | 47   | 16.3 | 50   | 17.4 | 288   | 100  |

**Table 3:** Frequencies of CL reported in police personnel deployed in Khusestan Province during 1997-2001.

| Cities      | 1997 |      | 1998 |      | 1999 |      | 2000 |      | 2001 |     | Total |      |
|-------------|------|------|------|------|------|------|------|------|------|-----|-------|------|
|             | No   | %    | No   | %    | No   | %    | No   | %    | No   | %   | No    | %    |
| Abadan      | 2    | 100  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 2     | 2.1  |
| Ahwaz       | 0    | 0    | 0    | 0    | 1    | 33.3 | 2    | 66.7 | 0    | 0   | 3     | 3.1  |
| Khoramshahr | 0    | 0    | 5    | 100  | 0    | 0    | 0    | 0    | 0    | 0   | 5     | 5.2  |
| Dezful      | 1    | 100  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 1     | 1.0  |
| Susangerd   | 21   | 28.4 | 29   | 39.2 | 4    | 5.4  | 15   | 20.3 | 5    | 6.8 | 74    | 77.2 |
| Shadgan     | 0    | 0    | 2    | 28.6 | 2    | 28.6 | 3    | 42.8 | 0    | 0   | 7     | 7.3  |
| Shush       | 0    | 0    | 1    | 100  | 0    | 0    | 0    | 0    | 0    | 0   | 1     | 1.0  |
| Shushtar    | 3    | 100  | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 3     | 3.1  |
| Total       | 27   | 28.1 | 37   | 38.5 | 7    | 7.3  | 20   | 20.8 | 5    | 5.2 | 96    | 100  |

**Table 4:** Frequencies of CL reported in police personnel deployed in Ilam Province during 1997-2001.

| Cities    | 1997 |      | 1998 |      | 1999 |      | 2000 |      | 2001 |      | Total |      |
|-----------|------|------|------|------|------|------|------|------|------|------|-------|------|
|           | No   | %    | No   | %    | No   | %    | No   | %    | No   | %    | No    | %    |
| Ilam      | 1    | 11.2 | 0    | 0    | 4    | 44.4 | 0    | 0    | 4    | 44.4 | 9     | 5.8  |
| Dareshahr | 0    | 0    | 3    | 100  | 0    | 0    | 0    | 0    | 0    | 0    | 3     | 1.9  |
| Dehloran  | 64   | 57.6 | 6    | 5.4  | 11   | 9.9  | 15   | 13.5 | 15   | 13.5 | 111   | 71.6 |
| Mehran    | 4    | 12.5 | 14   | 43.8 | 7    | 21.9 | 0    | 0    | 7    | 21.8 | 32    | 20.7 |
| Total     | 69   | 44.5 | 23   | 14.8 | 22   | 14.2 | 15   | 9.7  | 26   | 16.8 | 155   | 100  |

**Table 5:** Frequencies of CL reported in police personnel deployed in Isfahan Province during 1997-2001.

| Cities  | 1997 |      | 1998 |      | 1999 |     | 2000 |      | 2001 |      | Total |      |
|---------|------|------|------|------|------|-----|------|------|------|------|-------|------|
|         | No   | %    | No   | %    | No   | %   | No   | %    | No   | %    | No    | %    |
| Isfahan | 0    | 0    | 15   | 68.2 | 2    | 9.1 | 4    | 18.2 | 1    | 4.5  | 22    | 40.7 |
| Borkhar | 5    | 21.7 | 12   | 52.2 | 0    | 0   | 5    | 21.7 | 1    | 4.3  | 23    | 42.6 |
| Kashan  | 0    | 0    | 5    | 55.6 | 0    | 0   | 2    | 22.2 | 2    | 22.2 | 9     | 16.7 |
| Total   | 5    | 59.3 | 32   | 29.3 | 2    | 3.7 | 11   | 20.4 | 4    | 7.4  | 54    | 100  |

## Discussion

In order to facilitate the prevention of the spread of disease and to enable its control, information about them as well as accurate data should be collected and prepared. Unfortunately, since the data in this study was collected through a passive patient identification method, it cannot be used to determine the frequency level of the spread of the disease and its true prevalence rate. Cutaneous leishmaniasis can be found in all parts of Iran in either of its forms: rural (wet) and urban (dry), with varying frequency in the past years. A glance at statistics from the center of diseases management in 1989, the frequency level of this disease (14 cases per 100,000 populations) showed a downward trend. However, this trend significantly changed into an upward course, reaching its highest level in 1993 with 91 cases reported out of a population of 100,000. National statistics in 1999 indicated a prevalence rate of 30 cases per 100,000 populations (4). Not only leishmaniasis is a high risk to public health in Iran, but also it is important to some countries in the Middle East and Central Asia; yet, information related to its epidemiological factors is insufficient and incomplete. An analysis of the given tables shows similar patterns of this disease during the years of the study and significant frequency levels are generally concentrated in Sarakhs, Susangerd, Dehloran, Barkhovar and Meyme. Therefore, these centers should be subjected to preventive and control measures. In addition, considering the effects of this disease, preventive measures should include the training of individuals for personnel hygiene and taking advantage of medical care. For prevention, attention should be given to the three main factors: humans, reservoirs, and vectors of this disease. Therefore, the training of individuals in personnel hygiene will significantly facilitate the decrease in the number of people infected by dermal leishmaniasis, especially the Anthroponotic Cutaneous Leishmaniasis (ALC)

type, which includes the human source. The diagnosis and immediate treatment of the disease can greatly help to decrease and eliminate the sources of infection. Other effective measures include having information about the transmission route of human and environment and the potential places which help *Phlebotomus* increase (egg trash / animal fertilizer )keeping an appropriate distance between residential areas and the areas where livestock are kept, keeping infected *Leishmania* wounds clean and dressed, continuing treatment of infected patients, ruining of left residences, using bed nets, spraying contaminated places with insecticides, and keeping children away from playing in or near contaminated places during the afternoon and evening hours (4 to 6 PM). With regards to medical personnel like physicians, nurses and other specialists, it is important that they have the necessary training to classify the disease, understand the status of the disease in their particular area, the mode of transmission and spread, preventive measures, and proper medical care. They also need to record data and report such data to the concerned authorities in accordance with current instructions (5). Considering the elimination of sources of contamination in cities, another measure which should be taken is to provide proper treatment for infected patients with the use of antimoniousal compounds. With attention paid to the epidemiological aspect of this disease, the role of various rodents play as reservoir, the varying species of sand flies with different genetic specifications, and the role of major and minor causative agents, as well as the factors which lead to the increase of sources and carriers of this disease such as accumulated rubbish, poor environmental sanitation, low levels of public awareness, the increasing number of people living in the suburbs of cities, the destruction of deserts with the cultivation of vegetation. The data indicates that the spread and emergence levels of cutaneous dermal leishmaniasis in the areas under study have been decreasing

significantly ( $P < 0.05$ ). The main reason is probably ecological changes in addition to having educated medical staff and people exposed to the risks of infection, the spraying of areas with insecticides, the relative eradication of animal reservoirs such as dogs and rodents, and the identification of patients and their treatments in public health centers of police forces.

### **Acknowledgements**

The authors are grateful to all the staff of the Dept. of Parasitology, Iran University of Medical Sciences, Tehran, Iran who sincerely cooperate in performing this research.

### **References**

1. Mahajan RC, Mohan K (1996). Epidemiology of visceral leishmaniasis and its control. In ozcel, M.A. Alkan, M, Z.CAB (eds). *Parasitology for the 21<sup>st</sup> century international*, 41-9.
2. WHO technical report series (1990). Control of the leishmaniasis. Report of WHO expert committee, technical report series, No: 793:56
3. Nadim A (2000). Leishmaniasis in: *epidemiology and control of prevalent diseases in Iran*. Edited by Azizi, F. et al. Endocrine and Metabolism research center, 2<sup>nd</sup> ed., 524-34.
4. Center of Diseases Management. Ministry of Health, Treatment and Medical Training (1999), Statistics of the spread and emergence of dermal leishmaniasis in Iran.
5. Evans D (1989). Handbook of isolation, characterization and cryopreservation of Leishmania. Geneva, UNDP / World Bank WHO/ special programme for research and training in Tropical Medicine, 14-32.