



Epidemiological Study of Cutaneous Leishmaniasis during 2009 to 2014 in Kashan, Iran: A Potential Intra-domiciliary Transmission of the Disease

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Authors' contributions

This work was carried out in collaboration between all authors. Authors SMT, NR and AAS designed the study and wrote the proposal. Authors NR, SMT and RD collected the data. Authors HN, RD, FMM and KFM managed the literature searches and wrote the draft of the manuscript. All authors approved the final manuscript.

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Short Communication

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ABSTRACT

Aims: In this research, the epidemiological status of cutaneous leishmaniasis was investigated in Kashan city, central of Iran.

Study Design and Setting: A cross-sectional study was carried out in Kashan city, central of Iran.

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Study Duration: The study was conducted over 2009 to 2014.

Methods: In this study, the demographic and epidemiological data including age, sex, nationality, duration of the disease, number and site of the ulcers for all the patients during 2009 to 2014 were collected from the healthcare centers of Kashan city. The data were finally analyzed by Excel software.

Results: The results indicated that 897 persons were suffered from cutaneous leishmaniasis during this 6-year period in Kashan city. Of these patients, 486 (54.2%) and 411 (45.8%) persons were females and males, respectively. The results also showed that the highest and lowest contamination frequencies were occurred in April and in March, respectively. The most burden of this disease was allocated to patients more than 25 years old and the lower rate was occurred in infants less than one year age.

Conclusion: The results presented that the prevalence of the urban type of cutaneous leishmaniasis was high in Kashan city. Therefore, the prevention and control measurements should be applied to minimize the prevalence of the disease.

Keywords: Kashan; cutaneous leishmaniasis; sandfly; epidemiology.

1. INTRODUCTION

Leishmaniasis has been found as one of the top ten tropical diseases in the world [1]. Leishmaniasis is caused by an intracellular flagellated protozoan, namely *Leishmania*, which belongs to *Trypanosomatidae* family. The parasite is transferred by female sandfly bite of *Phlebotomus* genus [2,3]. This disease is classified in three forms of cutaneous, mucocutaneous and visceral. The most common clinical form of the disease is cutaneous leishmaniasis which has been reported in two epidemiological forms of urban and rural. The urban type (dry type) of leishmaniasis causes by *Leishmania tropica* and its main vector and reservoir are *Phlebotomus sergenti* and human and dog, respectively [4]. The centers of urban leishmaniasis in Iran are Mashhad, Tehran, Nishabur, Shiraz and Kerman cities [5,6]. Rural leishmaniasis (wet type) is caused by *Leishmania major* and it is transmitted by vector of *Phlebotomus papatasi*. The main reservoir of rural leishmaniasis is desert rodents [4]. Rural leishmaniasis also has been extensively found in Isfahan, Khuzestan, Khorasan and Shiraz provinces [6-10]. Leishmaniasis is one of the main problems of the public health in many countries, especially developing countries [11,12]. It has been estimated that two million people are annually infected worldwide with leishmaniasis, which 1.5 million and 500,000 of the cases are suffered from cutaneous and visceral leishmaniasis, respectively. Also, this disease is the second largest parasitic killer disease after malaria which is responsible for 500,000 mortalities in the world annually [13,14]. About 90% of the cutaneous leishmaniasis in the world has been reported from Afghanistan,

Brazil, Iran, Peru, Saudi Arabia and Syria [13,15,16]. Mansueto et al. [17] reported that one of the main causes of the increase of leishmaniasis in the world is indirect transmission of the disease through the migration of the infected people from endemic regions to other areas. Salahi Moghaddam et al. [18] reported that the prevalence of cutaneous leishmaniasis in Iran country was 26,824 cases in 2007. Of this number, Fars province with 215 patients per 100,000 people and then Ilam and Kerman provinces (124 patients per 100,000 people for each province) had the maximum cases of cutaneous leishmaniasis in Iran [18]. Kashan is the second most populous County in the Isfahan province that because of the proximity to infected areas of Isfahan and Qom cities has been exposed to cutaneous leishmaniasis [19]. According to the Kashan healthcare systems reports, cutaneous leishmaniasis is one of the major health problems of this region in recent years. Ahmadi et al. [20] reported that the number of positive cases of cutaneous leishmaniasis in Kashan city, Iran was increased from 192 patients in 2005 to 405 patients in 2009. With regard to the importance of the issue and lack of the updated data, this study was carried out to investigate the prevalence of cutaneous leishmaniasis in Kashan city, Iran during 2009 to 2014.

2. MATERIALS AND METHODS

2.1 Study Location

Kashan County (with coordinates of 33°59'20"N and 51°28'38"E) is placed in Isfahan Province, central of Iran. Fig. 1 shows the location of Kashan County in Iran. The capital of the county is Kashan city. At the 2011 census, the County



Fig. 1. The location of Kashan County (Red area) in Iran [21]

population was 323,000 people. Of this population, 293,000 and 30,000 people live in Kashan city and other regions of the County, respectively.

2.2 Study Method

In this study, all the persons referred to the healthcare centers of Kashan County to diagnose and treat of cutaneous leishmaniasis were investigated from 2009 to 2014. The numbers of the patients were 897 persons over this 6-year period. Then, the data for each patient including age (<1, 2-7, 8-25 and >25 years), gender, job (worker, employee, housewife, student, retired and other), nationality (Iranian or Afghan), duration of the disease (1-3, 3-6, 6-12 and >12 months), number of ulcers (1 to more than 3), ulcers location (hand, foot, face and other), etc were extracted from the documents of the patients. The data were finally analyzed by Excel software.

3. RESULTS

The present study showed that 897 cases were infected by cutaneous leishmaniasis during 2009 to 2014. Of these, (Table 1), 486 (54.2%) and 411 (45.8%) patients were females males, respectively. Also, 717 (79.9%) cases were Iranian and 180 (20.1%) patients were Afghan. As presented in Table 1, the maximum cases of this disease among various jobs were allocated to housewives (35.79%). The properties of the patients on the basis of age (year) and disease duration (month) are shown in Table 2. As seen, the highest and lowest age groups of the patients with cutaneous leishmaniasis were more than 25

years old (60.31%) and less than 1 year age (1.56%), respectively. Also, Table 2 indicates that the maximum duration of this disease among the cases was lasted 1 to 3 months (47.49%) and the minimum duration was hanged on more than one year (2.90%). Also, 88.18% of the cases had one ulcer on the body and only 2.68% of the patients had 3 or more ulcers on the body (Table 2). The results showed that most of ulcers due to sandflies bite occurred on the hands (68.34%) and then feet (18.39%) of the cases. 861 patients (95.98%) were infected with cutaneous leishmaniasis without traveling to outside of the Kashan city and only 36 persons (4.01%) of them were infected in other endemic areas. The findings also revealed that, of the patients, 836 cases (93.19%) were infected by this disease for the first time and only 61 patients (6.81%) were formerly infected by cutaneous leishmaniasis (tables not shown).

Table 1. The characteristics of the patients in this study

Characteristic	N	(%)
Gender		
Male	411	45.82
Female	486	54.18
Nationality		
Iranian	717	79.93
Afghan	180	20.03
Job		
Worker	165	18.39
Employee	46	5.13
Housewife	321	35.79
Student	202	22.52
Retired	38	4.24
Other	125	13.94

Table 2. The features of age and disease time of patients

Characteristic	N	(%)
Age (year)		
<1	14	1.56
2-7	89	9.92
8-25	253	28.21
25>	541	60.31
Disease period (month)		
1-3	426	47.49
3-6	287	32.00
6-12	158	17.61
12>	26	2.90
Ulcers number		
1	791	88.18
2	82	9.14
3≥	24	2.68

Fig. 2 depicts the numbers of cutaneous leishmaniasis patients over 2009 to 2014. The results shows that the highest and lowest prevalence of the disease were happened in 2010 (211 patients) and 2011 (106 patients), respectively. Fig. 3 also presents the disease burden in the various months. As can be seen, the contamination with cutaneous leishmaniasis was occurred in all months of the year; with the maximum and minimum morbidity in April (113 cases) and February (58 cases), respectively.

4. DISCUSSION

Leishmaniasis is an endemic disease in Kashan County, Iran [5,6,8,22]. Our study showed that the appearance of the disease has been changed in recent years. The comparison of the present study with other studies conducted in Kashan County indicated that the cutaneous leishmaniasis in this County is being increased.

The incidence of this disease in Kashan during 2002 and 2007 was 20.8 and 37.6 cases per 100,000 people, respectively [23]. While, this value for 2014 (the present study) was reported 40.2 patients per 100,000 population. The results of this study showed that the incidence of this disease in Kashan County has been increased by more than 93% during the last 12 years (from 2002 to 2014). The present study indicated that cutaneous leishmaniasis was identified in all the age groups of patients. But, as seen from Table 2, the highest prevalence of this disease (60.31%) was assigned to the patients with more than 25 years old. This can be resulted from the higher outdoor activities of this age group and subsequently more contact with the infected sandflies [24]. Healthcare systems authorities of Kashan city have conducted killing the dog as a possible reservoir of urban type of cutaneous leishmaniasis in recent years. Therefore, Kashan city can be considered as one of the important centers of urban cutaneous leishmaniasis in Iran. The present study demonstrated that most of the patients with cutaneous leishmaniasis were housewives and then workers. The reason may be because of the fact that most of Kahanian housewives perform carpet weaving in the dark rooms and basements of their homes. In such places, the persons are at risk for the infection by cutaneous leishmaniasis because the sandflies are active during all days [23]. In this study, the most of ulcers onto the patients' bodies were occurred on the hands and then feet which are uncoated areas. Various studies in Iran, Pakistan and Saudi Arabia have been also reported that hands, feet and face were more susceptible than other parts of body to cutaneous leishmaniasis [25]. In Islamic countries such as Iran, Saudi Arabia, etc. because of religious believes,

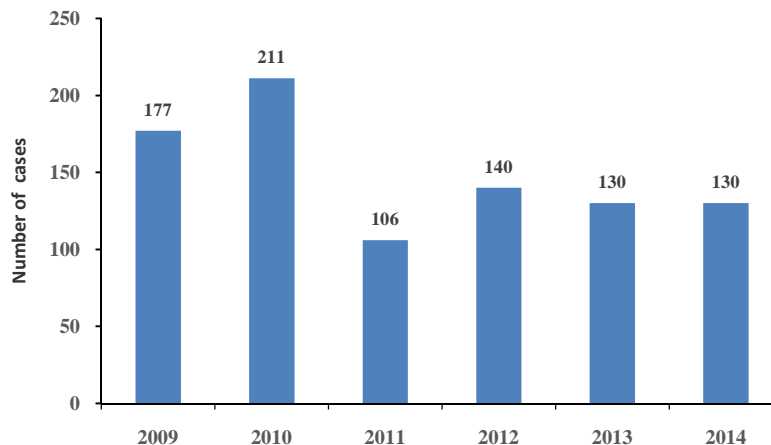


Fig. 2. Distribution of the disease on the basis of year

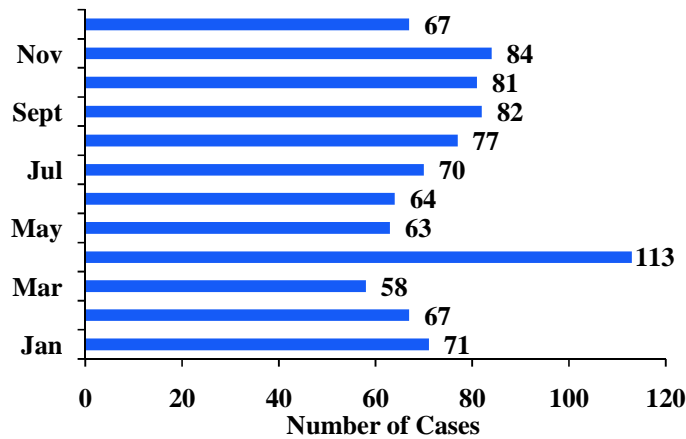


Fig. 3. Distribution of the disease on the basis of month

the most areas of the body have been covered by clothing. Because of the short oral appendages in sandflies, the blood feeding in covered parts of the body is not possible. Therefore, the most ulcers resulted from the mosquito bite were happened in hands and feet of the cases in these countries [26]. One study in Mirjaveh (South-East of Iran) showed that the cutaneous lesions due to the mosquito bite were mainly befallen on the hands and then face [27]. Contrary to our results, a study in Pakistan reported that cutaneous leishmaniasis lesions on the face were more than of other body parts [28]. The highest age groups of the patients with cutaneous leishmaniasis were more than 25 years old (60.31%) which is consistent with Razmjou et al. and Karimi et al. studies [9,29].

5. CONCLUSIONS

The findings showed that cutaneous leishmaniasis is a serious health problem in Kashan city. On the basis of the distribution of the disease throughout the year, it can be concluded that the disease is urban type of leishmaniasis. As well as, the studies suggested the possibility of intra-domiciliary transmission of the disease. Therefore, the control activities should be applied by healthcare centers with collaboration of other organizations such as municipality. The measures such as education and training of public health, using insect repellents, insecticides, screen doors and windows and also mosquito net are the appropriate methods to control of cutaneous leishmaniasis. Moreover, the environmental health actions including sanitary collection and

disposal of solid wastes, constructions and demolitions can lead to the elimination of sandflies shelters and subsequently prevent the disease morbidity.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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