Epidemiological Study of an Outbreak of Cutaneous Leishmaniasis in Five Endemic Foci, Yazd Province, Iran March 2015–March 2016.

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ARTICLE INFO	ABSTRACT

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Introduction: Iran is majorly affected by the Cutaneous Leishmaniasis (CL). Despite continued efforts toward control, the incidence of CL has increased in the many areas of Iran. The counties of Ardakan, Khatam, Bafgh, Abarkuh, and Yazd are endemic places for CL. An outbreak occurred in the Yazd province them between March 2015 and March 2016.The aim of this paper was to identify the epidemiological and clinical aspects of leishmaniasis in patients that were reported from these five endemic foci during the outbreak.

Methods: This descriptive study was conducted on 150 patients suffering from CL who were referred to the provincial health center during the period of outbreak. Clinical and demographic information of the patients were registered and analyzed by the SPSS 23 software.

Results: From the 150 cases considered, 121 subjects (80.2%) lived in urban areas. 93 (62%) patients were male. The most frequent age group was 21–30 years old (18.7%). Housekeepers had the highest incidence (22.6%) of CL. 41.3% of patients had elementary education. Monthly family income in over half of the patients was less than a million tomans per month. The maximum number of CL cases was reported in the autumn with (62 patients; 41.3%). 98 (65.3%) patients reported a history of travel in the past year. The highest rates of CL lesions were seen in the feet (18.7%). In over half of the cases (52.7%), the wound size was over than one centimeter and 82 (54.7%) patients had only one wound. **Conclusion:** In order to further outbreak control, basic measures such as public education and education for people who travel to endemic areas as well as the treatment of patients infected with urban type leishmaniasis (as a reservoir), according to the geographical condition and carrier, can be useful.

Keywords: Epidemiology, Disease outbreak, Cutaneous Leishmaniasis, Yazd

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Introduction

Leishmaniasis is a parasitic disease that is responsible for major morbidity and mortality worldwide; it is endemic in 88 countries, with almost 0.9–1.6 million new cases per year [1]. It is estimated that almost 350 million people live in places with the risk of contracting leishmaniasis [2]. Leishmaniasis is a major health problem in some countries in the southern and the eastern parts of the Mediterranean, with a diversity of clinical characteristics from simple and single wounds to extensive wounds. Despite the spontaneous healing of these wounds, the retained facial scars can cause a lot of psychological problems, especially for women [1]. Three forms of Cutaneous Leishmaniasis (CL), consisting of Zoonotic Cutaneous Leishmaniasis (ZCL), Anthroponotic Cutaneous Leishmaniasis (ACL), and Visceral Leishmaniasis (VL), have caused many health and medical problems in Iran [3]. Iran is among the seven countries with a high incidence of CL [4]. About 17 out of the 31 provinces of Iran are endemic foci for CL. According to the official reports of the Ministry of Health, the number of CL cases increased from 13,729 in 2002 to more than 24,000 in 2006 and thereafter. The endemic regions in the central and southwestern parts of the country including Yazd, Semnan, Fars, Ilam, Khoozestan, and Isfahan have the highest rates of CL [5]. Yazd is one of the main endemic foci of CL in Iran and the disease prevalence is increasing in this province [4]. Outbreak of CL in endemic areas is increasing by more than the average number of cases in recent years [6]. According to this definition, the counties of Ardakan, Khatam, Bafgh, Abarkuh, and Yazd are endemic places for CL in the Yazd province that have had outbreaks occur within their expanses (Figure 1). The aim of this paper was to identify the epidemiological and the clinical aspects of Leishmaniasis in patients who were reported from these five endemic foci during the outbreak between March 2015 and March 2016.
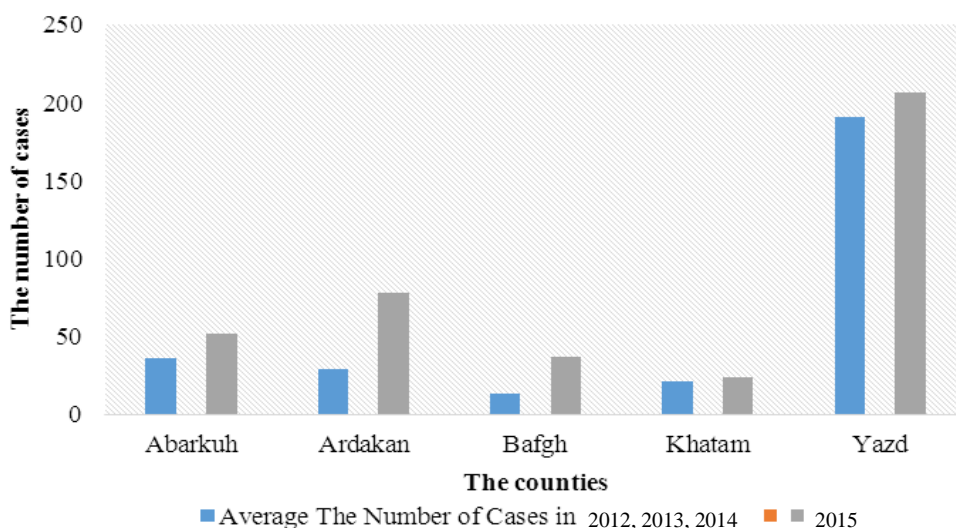

Figure1. Comparing the number of cases in 2015 with the average number of cases in the last three years.

Methods

The Yazd province is situated in the central part of the country between the province of Khorasan, Kerman, Fars, and Isfahan, with an area 131,575 km^2, which covers 4.5% of the total land of the country and includes 10 cities and 21 sections. The climate of the Yazd province is hot and dry in the spring and the summer, and relatively cold and wet in the winter and the autumn. In this descriptive study, all patients were

collected from incident cases diagnosed with positive direct smear for CL among the individuals living in the five counties of the Yazd province including Yazd, Ardakan, Abarkuh, Bafgh, and Khatam between March 2015 and March 2016. These cases were referred for treatment to the provincial health center. Data were collected by the means of a checklist. This checklist was prepared by using similar articles and finally was confirmed with the help of hygiene experts. Clinical information of the patients were obtained from the provincial health center. The checklist used included sociodemographic information, open questions, and clinical data. In brief, questions encompassed age, sex, religion, nationality, occupation at the time of infection, medical history, income, education level, use of home remedies, the type of treatment, travel history, history of previous of leishmaniasis diseases, the location and the size of the lesion, the number of lesions, the shape of wound, and the type of treatment covering the wound. The SPSS software (version 23) was used for descriptive statistics.

Result

Overall, 150 patients were referred to the provincial health center for treatment between March 2015 and March 2016. 78 (52%) patients were residents of Yazd county, 27 (18%) patients were from Ardakan county, 20 (13.3%) patients were from Abarkuh county, 15 (10%) patients were from Bafgh county, and 10 patients (6.7 %) were from Khatam county. Some of the sociodemographic information of the patients is shown in Table 1. In the present study, 121 (80.7%) of the cases lived in urban areas. 93 (62%) of the patients were males. 41.3% of the patients had elementary education while 10% were illiterate (i.e., they were unable to read and write). 16.7% of the patients had an intermediate education. 16.7% had diplomas and 15.3 % had a college education. Monthly family income in over half of the patients was less than a million tomans. In 23% of the cases, one or more family members were simultaneously infected with leishmaniasis. 25.3% of patients used home remedies along with medical treatments. Home remedies included the use of some substances such as the honey, stool of jennet, opium, medlar leaves, henna, and apple vinegar on the wound. Some of the clinical information of the patients is shown in Table 2. 65% of the patients were covered their wounds during the night.

Delay time is the delay between the onset of the wound and time of seeking treatment. The mean delay in seeking treatment was 61.4 days. The patient's answers to the question of why they were infected with leishmaniasis were as follows: don't know (26.6%), travel to endemic areas (20.7%), agriculture activities (19.4%) , life in the old quarter (18%), the accumulation of garbage around the house (4.7%), behavior habits such as sleeping in yard (3.3%), keeping animals in house (2.7%), water reservoir around the house (1.3%), construction around the house (1.3%), existence of a garden at home (1.3%), existence of dogs and wild rodents around their homes (0.7%) .

Table 1. Frequency Distribution of the sociodemographic features among CL patients[a]

VARIABLE	NUMBER
Nationality	
Iranian	139(92.7)
afghan	11(7.3)
Religion	
Shia	141(94)
Sunni	7(4.7)
Hebrew	2(1.3)
Marital Status	
Single	58(38.7)
Married	86(57.3)
Separated or divorced	2(1.3)
Widow/widower	4(2.7)
Age group	
0-10	23(15.3)
11-20	23(15.3)
21-30	28(18.7)
31-40	26(17.4)
41-50	20(13.3)
51-60	15(10)
≥61	15(10)
Job	
Housekeeper	34(22.6)
Student	31(20.7)
Farmer and rancher	21(14)
Driver	6(4)
Worker	21(14)
Governmental job	6(4)
Other	21(14)
child	10(6.7)
Travel history in last year	
no	52(34.7)
yes	98(65.3)
Scar history	
No	145(96.7)
yes	5(3.3)

[a] Data presented as No. (%)

Table 2. Frequency Distribution of the Clinical features among cutaneous leishmaniasis patients[a]

VARIABLE	NUMBER
Lesion size, cm	
1 and less	71(47.3)
>1	79(52.7)
Lesion number	
Single lesion	82(54.7)
Multiple lesion	68(45.3)
Underlying disease	
Diabetes	17(11.3)
Hypertension	7(4.7)
Asthma	2(1.3)
Season of onset	
Spring	17(11.4)
Summer	53(35.3)
Autumn	62(41.3)
Winter	18(12)
Type of treatment	
Local glucantime	12(8)
Systemic glucantime	75(50)
Local + cryotherapy	32(21.3)
Cryotherapy	7(4.7)
No need of treatment	24(16)
Lesion location	
Multiple location on the body	33(22)
Hand	24(16)
Foot	36(24)
Face	19(12.7)
Forearm	21(14)
Arm	8(5.3)
Leg	6(4)
Thigh	1(.7)
Head and neck	2(1.3)

[a] Data are presented as NO.(%)

Discussion

The Yazd province is one of the main endemic foci of CL in Iran [4]. This study was conducted in the five counties of the Yazd province, including Yazd, Ardakan, Abarkuh, Khatam, and Bafgh. An outbreak of CL was reported in these regions from March 2015 to March 2016. Describing the demographic characteristics of CL patients would be valuable for a better understanding of the epidemiology and the ecology of this disease. These factors provide basic epidemiological information to identify vectors and reservoirs in order to implement control strategies and subsequently reduce the incidence of CL in these regions [7]. This study has shown that most of the affected patients comprised housewives. In the

reports from Rostami et al. [5] and Mohammadi et al. [8], most of the CL cases were observed in housewives. The reason for the abundance of CL in housekeepers can be considered due to the fact that housekeepers are primarily women, whereas the men were divided into various occupational categories. In contrast, according to the results of the study by Zahirinia et al. [9], in Hamedan, most of the CL patients were workers who were occupation seekers migrating from other counties. This study showed that CL was greater among men than women; this is consistent with finding of Vazirianzadeh et al. [3], Rostami et al. [5] Nejati et al. [10], and Nazari [11]. This is probably due to the greater contact that men have with pollution sources. In addition, jobs travels to endemic areas could have an important role in the transmission of CL to men. Our results are in contrast with the finding of Amraee et al. in Poledokhtar [7] as well as Dehghan et al. [12] and Reithinger et al. [13]. It is assumed that this difference between the studies arises from the different geography of the areas studied as well as their individual climates. In this study, most of the patients were in the age group of 21–30 years. This is consistent with the studies of Mohammadi et al. [8], Doroodgar et al. [14], and Amraee et al. [7]. In some studies, however, for example, Rostami et al. [5] and Khazaei et al. [1], other age groups had the highest incidence. This may be due to the fact that a particular age group actively participates in agricultural activities and animal husbandry more than other groups; therefore, the disease in this category is more common than in the other categories. Our results showed that the highest incidence of CL occurred in autumn; these results are consistent with the studies of Amraee et al. [7], Akbari et al. [15], Hamzavi et al. [16]., and Khazaei et al. [1]. In contrast, the results of the study of Aflatoonian and Sharifi in Bam [17] are related to disease incubation period; the commonest form of CL in the city of Bam is urban. In urban CL, the frequency of cases is stable and fixed during certain seasons of the year, and the number of cases is almost identical across all seasons. This is one of the epidemiological characteristics of this type of CL,

but in areas where the rural type of CL is common, most patients contract CL in the autumn and in the winter. This is consistent with the results of our study, which showed that about 80% of the cases of CL across the five counties were reported in the second half of year—when the amount of rainfall was greater. This indicates that the rural type of this disease is dominant in these regions. In the present study, most of the wounds exist on the hands and the feet; this is in accordance with the studies of Amraee et al. [7] and Mohammadi et al. [8]. In contrast with the findings of Aflatoonian and Sharifi.[17] It is noteworthy that one of the features of the rural type of CL is that the wounds often develop in the hands and the feet. The results of this study also showed that most of the wounds were in the feet and the hands, and for this study, the disease pattern was very similar to patients in the endemic areas of a rural type of CL. Generally, most of the patients had the lesions in open parts of the body, including the hands, the feet, and the face because of sleeping outdoors without the use of bed nets and the lack of adequate cover in the summer. The results of this study show that 54.7% of the patients had just one wound and the rest of the patients had two or more than two CL wounds. These results are consistent with studies of Mohammadi et al. [8], Amraee et al. [7], Khajedaluee et al. [18], and Aflatoonian and Sharifi [17]. In contrast with our results, in the studies of Mesgarian et al. in Gonbad-e-Qabus [19] and Ayatollahi and Karimi in Abarkuh [20], most of the patients had two or more than two CL wounds. The reason behind multiple wounds could be due the biting procedure of sand flies as these insects perform several bites for each stage of the biting. The other reason for the existence of various wounds could be the abundance of infected sandflies in one area. In this study, the delay time average was 61.4 days and the delay time for 4.7% of the patients was between 6 and 12 months. These patients play an important role in the chain of disease transmission and this delay time may explain the peak that occurs in some months of the year. In a study of Ranasinghe et al. [21], the overall delay time average was 7.3 months. The current

investigation was limited by a small sample size. It is recommended that the trend of the disease be evaluated in further research with a larger sample size.

Conclusion

Regarding the results of this research, CL in Yazd is seemed to be of the rural type. Control measures regarding this type of CL should be considered to decrease the prevalence of the disease and control the CL outbreak in these areas . The large number of cases in the age group 21–30 years showed that the active population is at risk of this disease and training this group of people is essential for the prevention of this disease. Primary strategies are essential in order to reduce the incidence of this disease in these areas. To identify the risk factors by conducting analytical studies are necessary. Understanding risk factors and the implementation of control programs prevent the occurrence of a new outbreak of the disease. Furthermore, research on the field of travel to endemic areas is necessary.

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Conflict of Interest

None declared by authors.

References

1. Khazaei S, Mohamadian Hafshejani A, Saatchi M, et al. Epidemiological Aspects of Cutaneous Leishmaniasis in Iran. Archives of Clinical Infectious Diseases. 2015;10(3):e28511.
2. Pedrosa F de A, Ximenes RA. Sociodemographic and environmental risk factors for American cutaneous leishmaniasis (ACL) in the State of Alagoas, Brazil. The American Journal of Tropical Medicine and Hygiene. 2009;81(2):195-201.
3. Vazirianzadeh B, Hoseini SA, Pour Rezaee S, et al. Prevalence of Cutaneous Leishmaniasis in Ramshir, Iran An Epidemiological Study. International Archives of Health Sciences. 2014;1(1):37-41.
4. Barati H, Lotfi MH, Mozaffari GA, et al. Epidemiological aspects of cutaneous leishmaniasis in Yazd province within 2004-2013. Journal Of Community Health Research. 2016;5(2):131-139.
5. Rostami MN, Saghafipour A, Vesali E. A newly emerged cutaneous leishmaniasis focus in central Iran. International Journal of Infectious Diseases. 2013;17(12): 1198-206.
6. Shirzadi MR. Cutaneous leishmaniasis care manual. Tehran: Raze Nahan; 2012 [persian].
7. Amraee K, Rastegar HA, Beiranvand E. An epidemiological study of cutaneous leishmaniasis in Poledokhtar district, Lorestan province, southwestern of Iran, 2001-2011. Jundishapur Journal of Health Sciences. 2013;5(1):55-62.
8. Mohammadi Azni S, Nokandeh Z, Khorsandi A, et al. Epidemiology of cutaneous leishmaniasis in Damghan district. Journal Mil Med. 2010;12(3):131-135.
9. Zahirnia A, Moradi A, Norozi NA, et al. Epidemiological survey of cutaneous Leishmaniasis in Hamadan province (2002-2007).Hamedan University Medical Journal. 2009;16(1):43-47[Persian].
10. Nejati J, Mojadam M, Hanafi AA, et al. Epidemiological study of cutaneous leishmaniasis in Andimeshk. Scientific Journal of Ilam University of Medical Sciences. 2013;21(7):94-101[Persian].
11. Nazari m. Cutaneous leishmaniasis in Hamedan, Iran (2004-2010). Zahedan Journal Research Medical Sciences. 2012;13(9):39-42 [Persian].
12. Dehghan A, Ghahramani F, Hashemi B. The epidemiology of anthroponotic cutaneous leishmaniasis in Larestan,2006-2008. Journal of Jahrom University of Medical Sciences. 2010;8(3):8-11[Persian].

13. Reithinger R, Mohsen M, Aadil K, et al. Anthroponotic cutaneous leishmaniasis, Kabul, Afghanistan. Emerging Infectious Diseases. 2003;9(6):727-729.

14. Doroodgar A, Mahbobi S, Nematian M, et al. An epidemiological study of cutaneous leishmaniasis in Kashan(2007-2008). Journal of Semnan University of Medical Sciences. 2009;10(3):177-184[Persian].

15. Akbari E, Mayvaneh F, A Entezari, et al. Survey of the role of bioclimatic factors in the outbreak of cutaneous leishmaniasis. Iranian Journal Of Epidemiology. 2014;10(3):65-74[Persian].

16. Hamzavi Y, Sobhi SA, Rezaei M. Epidemiological factors of cutaneous lieshmaniasis in patients reffered to health centers in Kermanshah province (2001–2006). Journal of Kermanshah University of Medical Sciences. 2009;13(2):151-161[Persian].

17. Aflatoonian MR, Sharifi I. Frequency of cutaneous leishmaniasis among patients referred to the center for disease control in Bam district, 1999-2003. Rafsanjan University of Medical Sciences. 2006;5(2):123-128[Persian].

18. Khajedaluee M, Yazdanpanah MJ, Seyed Nozadi SM, et al. Epidemiology of cutaneous leishmaniasis in Razavi Khorasan in 2011.Medical Journal of Mashhad University of Medical Sciences. 2014;57(4):647-654[Persian].

19. Mesgarian F, Rahbarian N, Mahmoudi M, et al. Identification of leishmaniasis species isolated from human cutaneous leishmaniasis in Gonabad-e-Qabus city using a PCR method during 2006-2007. Tehran University Medical Journal. 2010;68(4):250-256[Persian].

20. Ayattolahi J, Karimi M. The prevalence of cutaneous leishmaniasis in the villages of Abarkuh. Infectious Disease. 2006;10(30):13-18 [Persian].

21. Ranasinghe S, Wickremasinghe R, Munasinghe A, et al. Cross-sectional study to assess risk factors for leishmaniasis in an endemic region in Sri Lanka. The American Journal of Tropical Medicine and Hygiene. 2013;89(4):742-749.