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Epidemiological survey and geographical distribution of cutaneous Leishmaniasis in North Khorasan province, 2006-2013

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ABSTRACT

Background and aims: Leishmaniasis is a widespread problem, especially in the tropical and subtropical countries. Since understanding the epidemiologic and geographical distribution of the diseases is necessary for prevention and controlling the Leishmaniasis. This study was conducted on epidemiological survey of cutaneous Leishmaniasis in North Khorasan Province, using Arc GIS Software during the years 2006-2013.
Methods: In this cross-sectional study, data of the Leishmaniasis patients between the years 2006-2013 were collected from the different districts of North Khorasan Province. The gathered data were analyzed by using SPSS16 statistical software and chi-square test.
Results: Data concerning 2831 patients with Cutaneous Leishmaniasis were collected. The maximum outbreak of the disease occurred in 2011 and the minimum occurrence was reported in 2008. The mean age of the study population was 22.80 ± 18.08 and the maximum cases of infection were observed in age group of 16-30 years. 58.6% of the patients were male and 53.5% of them lived in the villages. The maximum infection of the disease was observed in Esfarayen with 1095 people (38.7%). There was a significant relationship between the gender and age of the patients and cutaneous Leishmaniasis (P<0.001).
Conclusion: In this province, Leishmaniasis is more epidemic among men of 16-30 years of age, villagers and laborers. These factors have to be necessarily considered in prevention and controlling programs.

Keywords: Cutaneous Leishmaniasis, Epidemiology, Geographical Distribution.

Original article

INTRODUCTION

Leishmaniasis is one of the serious diseases transmitted by phlebotomus sand flies, subfamily of Phlebotominae.[1] It is a disease caused by protozoan parasites of the genus Leishmania. It is classified as zoonosis diseases.[2] Cutaneous Leishmaniasis is the most common form of this disease that causes ulcers on the skin, the sign of which remains on human skin for life. The clinical and epidemiological forms of the disease are different depending on the counter effect of various factors, parasites, hosts, vectors, and environments.[3-6] From among three clinical forms (cutaneous, visceral and mucocutaneous) cutaneous is of the highest frequency in the world.[7] The Leishmaniasis diagnosis code in ICD 10 is B55.9[8] and according to WHO report, cutaneous Leishmaniasis is still of the

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healthcare problems in the world, particularly in tropical and subtropical countries.[9,10] The spread of cutaneous Leishmaniasis in Iran is high, so that Iran is among the first 6 countries in the world challenging with the disease. An annual around 30000 people are reported to catch cutaneous Leishmaniasis in Iran.[11,12] Based on research, the real figure is 4-5 times more than reported data.[13] Leishmaniasis is endemic in 98 countries of the world and 350 million people are subjected to the infection by the disease. It is estimated that 14 million people have already inflicted with the disease and almost 95% of the disease occurs in the United States, Mediterranean area, Middle East and Central Asia. Over two-third of new cutaneous Leishmaniasis occurs in six countries including Afghanistan, Algiers, Brazil, Columbia, Islamic Republic of Iran and Syria.[14] The disease is endemic to the majority of provinces in Iran.[15] Cutaneous and visceral Leishmaniasis are among the important parasitic diseases in Iran. Both urban and rural cutaneous Leishmaniasis are common in Iran. The rural cutaneous Leishmaniasis with wet ulcers is most common in the provinces of Isfahan, southern Fars Province, North Khorasan, South Khorasan, Khorasan Razavi, Mazandaran, Khuzestan, Ilam, Bushehr, Hormozgan and Semnan, while urban cutaneous Leishmaniasis with dry ulcers is most common in the provinces of Tehran, Khorasan Razavi, Yazd, Fars and Kerman.[16] Due to long period of injury, the disease leaves bad scar on face, and there is possibility of recurrence and thus imposes heavy cost on the society and on the patients after using various medicines and suffering their side effects.[17,18] Cutaneous Leishmaniasis in Iran is on the rise and it has laid a heavy burden of healthcare and economic problems on the society. Since there is no effective vaccine against this disease, it has absorbed a huge budget from the Ministry of Health.[19] In a study, carried out in Marvdasht, Fars Province, on 2627 patients, 1337 and 1290 patients had caught the disease in 2008 and 2009, respectively. The occurrence of the disease in men was 60.3%, and in fall 53.8% and in the age group of 15-30 (40%) above the other groups and the majority of the people living in the cities (57.5%), lived mostly in the newly constructed buildings (72%).[20] In the past, the centers for the spread of cutaneous Leishmaniasis were quite known, but with the population growth, expansion of the cities, and construction of the residential areas close to the habitat of the rodents (resources of the disease) and establishment of the towns have brought about development of this disease so that over half of the provinces in Iran challenge this problem, including North Khorasan Province. North Khorasan Province is located in northeast of Iran and some cities like Jajarm and Esfarayen are among the recognized centers of cutaneous Leishmaniasis. Since epidemiological and geographical factors are very important in prevention and controlling of the disease, this study has focused on the factors that can help to prevent and control the cutaneous Leishmaniasis, and helping for identification of the patients in order to promote and concentrate the controlling activities and presenting data to the authorities in charge.

METHODS

In this descriptive-analytical (cross-sectional) study, the Leishmaniasis patients referring to health and medical centers in North Khorasan province, whose infection to Leishmaniasis had been diagnosed in between the years 2006-2013 in clinical and laboratory procedures had been approved, were epidemiologically studied. The sampling in this study was based on census from among all patients suffering from the disease in eight years. The data on patients during the noted years was extracted from

their files and all patients were included in the study. During the past 8 years, 2831 patients were identified in the cities of North Khorasan province. All rules of ethics were observed in connection with the patients. Their names and family names were deleted and their specifications were presented in groups. The registration of data was carried out in the health and medical centers and there was no obligation to do. The required data on each patient, i.e. age, gender, residence (city, village), month and season of disease outbreak, number of ulcers, and ulcer zone were recorded in the related checklist (Table 1) and in the end, the data were analysed by SPSS statistical software and chi-square statistical hypothesis test. Also, GIS software was used to show the geographical distribution on the map.

Table 1: Month distribution of cutaneous Leishmaniasis in North Khorasan province in Iran, 2006-2013

Variable / Month	Frequency	
	Number	Percent
Mar	42	1.5
Apr	48	1.7
May	61	2.2
Jun	51	1.8
Jul	108	3.8
Aug	348	12.3
Sep	825	29.1
Oct	817	28.9
Nov	342	12.1
Dec	108	3.8
Jan	46	1.6
Feb	35	1.2
Sum	2831	100.0

RESULTS

In this study, 2831 patients of cutaneous Leishmaniasis patients living in North Khorasan province were reviewed. The mean age of the subjects of this study was 22/80 ± 18/08 and the maximum cases of infection were observed in age group of 16-30 years and minimum infection was observed in patients with 61 years of age and above (Table 2).

Table 2: Frequency of cutaneous Leishmaniasis by age and season of diagnosis in North Khorasan province in Iran, 2006-2013

Variable		Frequency		P
		Number	Percent	
	0-5 years	556	19.6	P<0.001
	6-15 years	616	21.7	
	16-30 years	766	27.1	
	31-45 years	537	19.0	
	45-60 years	260	9.2	
	+61 years	96	3.4	
Sum		2831	100	
	Spring	151	5.33	P<0.001
Season	Summer	507	18	
	Autumn	1984	70	
	Winter	189	6.67	
Sum		2831	100	

The cutaneous Leishmaniasis spread in the districts of the province was like the following: Bojnurd 385 patients (13.6%), Esfarayen 1095 patients (38.7%), Farouj 51 patients (1.8%), Garmeh 104 patients (3.7%), Jajarm 994 patients (35.1%), Maneh and Samalqan 59 patients (2.1%), Shirvan 142 patients (5.0%). The students constituted 20.1 percent of the patients of cutaneous Leishmaniasis and among various occupations; the laborers with 9.5% maintained the maximum level. Some 40% of the patients had a single ulcer on their skin created by the bite of sand flies and the maximum (38.7) bite zone was on the hand (Table 3).

Table 3: Frequency of cutaneous Leishmaniasis by Number and location of lesions in North Khorasan Province, Iran: 2006-2013

Variable		Frequency	
		Number	Percent
Number of lesions	One	1133	40
	Two	738	26.1
	Three	224	7.9
	Four and more	736	26
	Sum	2831	100
location of lesions	Face	899	31.8
	Hand	1097	38.7
	Foot	690	24.4
	Other	880	31.1
	Sum	2831	100

There was no significant relationship between the residence (city, village), month and season of catching the disease, number of ulcers, and ulcer zone. Figure 2 depicts a GIS map of the reported cutaneous Leishmaniasis in North Khorasan province during the years 2006-2013 and Figure 3 depicts a GIS map of prevalence of cutaneous Leishmaniasis in North Khorasan province during the years 2006-2013.

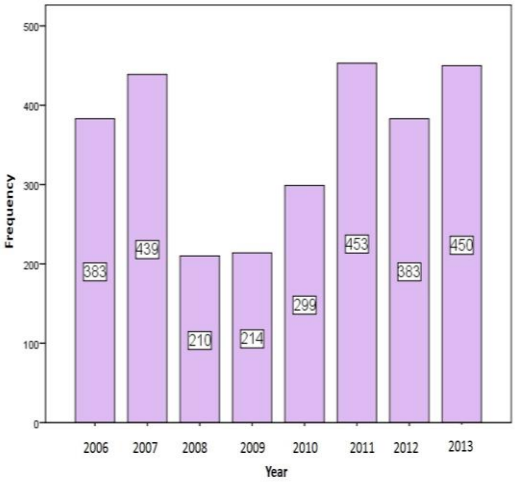

Figure 1: Frequency of cutaneous Leishmaniasis by year of diagnosis in North Khorasan province in Iran, 2006-2013

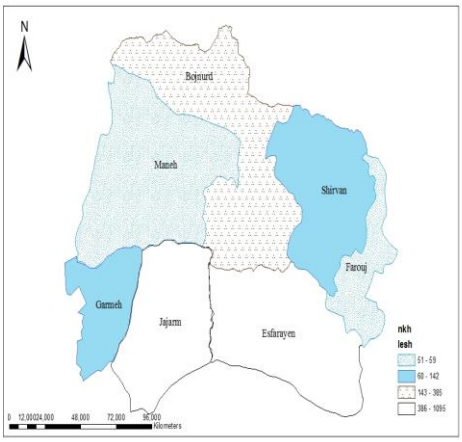

Figure 2: Distribution cutaneous Leishmaniasis in different districts of North Khorasan province in Iran, 2006-2013

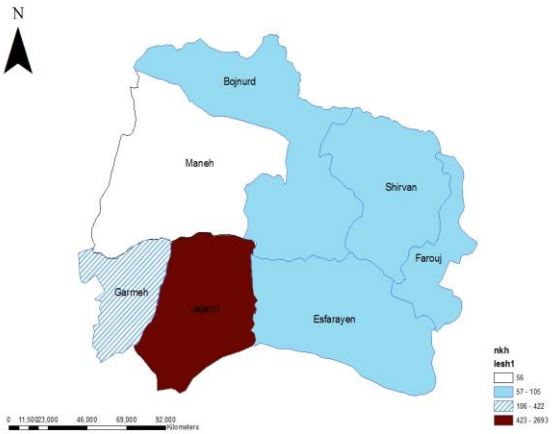

Figure 3: Prevalence (per 10000) cutaneous Leishmaniasis in different districts of North Khorasan province in Iran, 2006-2013

DISCUSSION

Cutaneous Leishmaniasis is one of the endemic diseases to the majority countries of the world, including Iran. Various studies have been conducted across the world, including Iran, on diversified aspects of the disease including the epidemiological aspects with an emphasis on descriptive epidemiology of age, gender, occupation, etc. with similar and chiefly different results. In the present paper, that was carried out in sectoral (descriptive-

analytical) method, we have tried to use available data and statistics on population, to study the status of cutaneous Leishmaniasis disease in terms of some epidemiological aspects among 2831 approved patients during the eight years. In carrying out this study, there are some limitations that must be taken into consideration. First, it was used the data available at the medical and healthcare centers and some patients have been treated outside the province. Second, some patients may have been treated without medication and have not been registered in the medical centers. They may have been outnumbered in this study. According to studies, the number of these patients is limited. In terms of gender, male patients constituted the majority of patients with 58.6%. The finding is compatible with the findings in Marvdasht of Fars province, Shiraz, Kerman, Sabzevar and Pakistan. In studying the Marvdasht, Fars, the percentage of male patients stood at 3.60%.[20] In another study in 2008 in Shiraz the male percentage stood at 59.36% against 40.64%.[21] In Kerman, male patients percentage stood at 56%,[22] and in Pakistan 65.6% of the patients were men.[23] In another study in the rural schools of Jowayn and Sabzevar, the disease outbreak in boys was over two-fold girls.[24] One of the reasons for the conformity of the data is because of the Hijab worn by women in Muslim countries. Another reason is this that usually men are active outside the house and they are more in contact with the parasitic disease. Another important factor in catching the infectious diseases like cutaneous Leishmaniasis is the age of the patient. In this study, the mean age of the individuals was 22/80 ± 18/08 and maximum outbreak of the disease was observed in age group of 16-30. In Marvdasht study, the average age of the patients was 16/9±30/7 and the maximum outbreak was in the age group of 15-30 years (40%).[20] This is indeed the same active age group of the statistical society who are exposed to the disease for activity beside the parasite colony, rodents, insects, etc. As a rule, the adults living in non-endemic regions close to the centers of infection are more exposed to catching the disease.[23] In a study, 51.1% of the patients are in the age group of 6-15 years and in another study the majority of patients are in age group of 16-50, and finally 85% of the patients were the youth and adults.[7,25,26] In this study, the majority of the ulcers were on hands (38.7%), while in Marvdasht study the majority of the ulcers appeared in upper part of the body (52.1%).[20] It is clear that the uncovered body parts are more exposed to sandflies bite. In some other studies, the majority of the ulcers appeared in the upper part of the body. In Bam and Kerman the ulcers appeared on neck and face (6.63%), head and face (56%) and hand (65.8%). The findings of this study conform to the previous studies.[22,27] This shows abundance of bites and frequency of sandflies in these regions. In a study carried out in Kashan, the majority of ulcers were reported to be on hands, feet and then on face respectively.[15] The majority of the patients had two or more ulcers that are compatible with the other studies.[20,23,28] In terms of the season, the maximum occurrence has been reported in fall and then summer that is conforming to Marvdasht study.[20] This is justifiable with respect to the biology of the sandflies in the region, a subfamily Phlebotominae as one of the major vectors or transmitters. In the meantime, the majority of the occurrence of the disease was in August and similar result has been in Marvdasht.[20] Whereas in the study in Pakistan,[23] the majority of the outbreak has been in winter. Although the majority of the occasions in summer and fall are compatible with the rural cutaneous Leishmaniasis characteristics, the occurrence of the disease in March is not conforming to this pattern that can be because of the delay in diagnosis of the disease. And that the type of the disease is not rural, so that urban Leishmaniasis may be also at work in the province. Despite the fact that in the

previous study Jajarm had the highest degree of infection with rural cutaneous Leishmaniasis, according to the results of this study, Esfarayen has the highest rate. This is because of separation of Garmeh from Jajarm that has reduced the population of the city and accordingly the number of the patients in comparison with the previous study.[28] when we calculate the Leishmanasis Prevalence in the districs, jajarm has the highest prevelence in the North Khorasan province.

CONCLUSION

The statistics and figures in this study show that North Khorasan Province is one of the major centers of cutaneous Leishmaniasis in Iran. Since the disease is more outspread among men, aged 16-30, rural residents, and laborers, more than other groups, this factor are necessarily considered in designing and implementation of prevention and controlling of the disease.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

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REFERENCES

1. Hanafi AA.Evaluation of cutaneous Leishmaniasis in Ardestan. MSc dissertation. Tehran: Tehran University; 1998.
2. Davies CR, Reithinger R, Campbell-Lendrum D, Feliciangeli D, Borges R, Rodriguez N. The epidemiology and control of Leishmaniasis in Andean countries. Cad Saude Publica. 2000; 16(4): 925-50.
3. Shojaei Tehrani H. Textbook of preventive and social medicine, common non-communicable chronic diseases and communicable diseases. Tehran: SAMAT Publications. 2001: 315.
4. Gramiccia M, Gradoni L. The current status of zoonotic leishmaniases and approaches to disease control. Int J Parasitol. 2005; 35(11-12): 1169-80.
5. Blum JA, Hatz CF. Treatment of cutaneous Leishmaniasis in travelers 2009. J Travel Med. 2009; 16(2): 123-31.
6. Bailey MS, Lockwood DNJ. Cutaneous Leishmaniasis. Clin Dermatol. 2007; 25: 203-211.
7. Klaus SN, Frankenburg S, Ingber A. Epidemiology of cutaneous Leishmaniasis. Clin Dermatol. 1999; 17(3): 257-60.
8.http://www.icd10data.com/ICD10CM/Codes/A00-B99/B50-B64/B55-/B55.9.
9. Klaus SN, Frankenburg S. Leishmaniasis and other protozoan infection. In: Freedber IM, EisenAz, Wolff K, eds. Dermatology in general medicine. New York: McGraw Hill, 1999: 1206-15.
10. Razmjou S, Hejazy H, Motazedian MH, Baghaei M, Emamy M, Kalantary M. A new focus of zoonotic cutaneous Leishmaniasis in Shiraz, Iran. Trans R Soc Trop Med Hyg. 2009; 103(7): 727-30.
11. World Health Organization. Control of Leishmaniasis, Report by the secretariat March 2007. Available from: apps.who.int/gb/ebwha/pdf_files/WHA60/A60_10-en.pdf.
12. Motamedi N, Hejazi SH, Hazavehei SMM, Saberi S, Rahimi E. Effect of education based on Health Belief Model on promoting preventive behavior of coetaneous Leishmaniasis. J Mil Med. 2010; 11(4): 231-6.

13. Tafti MHD, Forghani H, Baghiani MH. A survey on effect of health education on health volunteer performance and knowledge in prevention of cutaneous Leishmaniasis in Yazd. J Pak Assoc Derma. 2011; 21: 27-32.
14. World Health Organization. Control of Leishmaniasis. Report by the secretariat may 2006. Available from: apps.who.int/gb/ ebwha/pdf_files/WHA60/A60_10-en.pdf.
15. Doroodgar A, Tashakkor Z. Effect of education on teachers knowledge about Cutaneous Leishmaniasis in Kashan in 2000-2001. Feyz. 2003; 7(3): 57-63.
16. Aminian, K, Yazdani, A, Moradi, H, Haherian Z. The survey epidemiology of Leishmaniasis in patients referred to health centers in Isfahan. Proceedings of the 3rd congress of skin diseases and cutaneous Leishmaniasis. Isfahan: Isfahan University of Medical Sciences, P: 98. [Persian]
17. Ebadi M. Status of cutaneous Leishmaniasis in primary school children in Borkhar region in Isfahan [Thesis]. Parasitology. Isfahan University of Medical Sciences, Faculty of Medicine; 1998.
18. Momeni A, Aminjavaheri M. Clinical picture of cutaneous Leishmaniasis in Isfahan, Iran. Int J Dermatol. 1994; 33(4): 260-5.
19. Yaghoobi-Ershadi M, Zahraei-Ramazani A, Akhavan A, Jalali-Zand A, Abdoli H, Nadim A. Rodent control operations against zoonotic cutaneous Leishmaniasis in rural Iran. Ann Saudi Med. 2005; 25(4): 309-12.
20. Almasi-Hashiani A, Shirdare M, Emadi J, Esfandiari M, Pourmohammadi B, Hosseini SH. Epidemiological study of cutaneous Leishmaniasis in Marvdasht, Fars province, Iran. 3. 2012; 3(4): 15-23.
21. Moaddeb A, Gettner S, Ardehali S. Studies on the causative agent of cutaneous Leishmaniasis in Shiraz Iran. Iran J Med Sci. 1993; 18(1): 28-33.
22. Shamsodini S. Leishmaniasis and its prevalence in immigrant and native students in primary schools in Kerman. Teb Tazkiyeh 1993; 9: 44-51.
23. Birjees MK. Epidemiology of cutaneous Leishmaniasis in Larkana district of Sindh province with particular reference to phlebotomine sandflies. Public Health Division National Institute of Health Islamabad, Pakistan (SGS) 2001 No 67. Available from: http://www.emro.who.int/ TDR/PDF/proj01- 67.pdf.
24. Mohajery M, Shamsian AA, Rezaeei AR, Hasanpour K, Mokhtari M, Shakeri MT, Farnoush GhR,. et al. Evaluation of molecular epidemiology of cutaneous Leishmaniasis in Sabzevar from 2007 to 2008. Iran J Parasitol. 2010; 5(1): 66-9.
25. Aflatonian M, Sharifi I. Frequency of cutaneous Leishmaniasis among Patients Referred to the Center for Disease Control in Bam District, 1999-2003. J Rafsanjan Univ Med Sci. 2006; 5(2): 123-8.
26. Aflatoonian MR, Sharifi I. Epidemiology of cutaneous Leishmaniasis and its relationship with blood groups in Bam, 2007. J Kerman Univ Med Sci. 2008; 15(4): 295-303.
27. Rassi Y, Javadian E, Jalali M, Motazedian M, Vatndoost H. Investigation on Zoonotic Cutaneous Leishm-aniasis, Southern Iran. Iran J Public Health. 2004; 33(1): 31-5.
28. Alavinia SM, Arzamani K, Reihani MH, Jafari J. Some epidemiological aspects of cutaneous Leishmaniasisin northern Khorasan province, Iran. Iran J Arthropod Borne Dis. 2009; 3(2): 50-54.

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