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Clinico-epidemiological features of cutaneous leishmaniasis in Mazandaran Province, northern Iran

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ABSTRACT

Introduction: Iran is considered as one of the most important endemic foci of cutaneous leishmaniasis (CL) worldwide. Recently, sporadic cases of CL have been reported in some parts of Mazandaran Province, northern Iran. This study aims to determine the clinical and epidemiological aspects of CL, for the first time, in this area.
Methods: All CL cases registered during 2009–2016 were entered into this descriptive study. Required data was collected from the portal of surveillance system in excel format and entered into SPSS Version 16 software and described as percent frequency, mean, standard deviation, minimum and maximum. The analysis was performed using Chi square and independent T tests.
Results: During 2009–2016, 343 subjects were entered into the study. Among investigated patients, 72.6% were male and 87.8% had history of travelling. Mean age of patients was 30.7 years and 21.6% of whom were reported in November while 18.4% were identified in October. The lesions were found in upper limb (39.7%), lower limb (25.7%) and face (6.4%). Of them, 37.3% had one lesion and 22.4% had two lesions. There were no significant difference in the mean age of men and women ($p = 0.648$) as well as number of lesions in both genders ($p = 0.190$).
Conclusion: Our results showed that the most CL cases in the studied area were aged 15–44 most of which had history of recent travelling to endemic areas. According to this study, Mazandaran is not considered as a CL endemic focus and most identified cases were affected following travel to the known endemic Iranian foci of CL.

1. Introduction

Leishmaniasis is an infectious disease and one of the six major diseases in the tropical zones. The disease is caused by a flagellated protozoa parasite from leishmania species belonging to the family Trypanosomatidae transmitted by the bite of sandflies from human or animal reservoirs to the healthy sensitive subjects. Leishmaniasis is classified as cutaneous, mucocotaneous and visceral. Cutaneous leishmaniasis is specified as chronic lesions occur in limbs and face. Clinical manifestations vary from self limited superficial lesions to severe fatal lesions. Cutaneous leishmaniasis (CL) is classified to rural and urban types.[1–5]

Leishmania major and *Leishmania tropica* are responsible for most of CL cases. Urban type of CL caused by Leishmania Tropica has been reported from Tehran, Shiraz, Mashhad, Neishabour, Kerman, Bam, Rafsanjan and Khomeini-shahr while, Leishmania major is responsible for rural (wet lesion) CL reporting from Isfahan, Serakhs, Lotf-Aabad, Khoozestan, Kashmar, Damghan and Dehloran.[6]

The global annual incidence of leishmaniasis is 0.5–1.5 million new cases and is endemic in 88 countries.[6] The disease is a main public health concern in the Eastern Mediterranean countries so that cutaneous and visceral leishmaniasis are reported from 14 to 22 countries of this region respectively. Each 10 years, some outbreaks are reported from these countries.[7,8]

About 90% of CL cases are reported from seven countries including Iran, Afghanistan, Algeria, Brazil, Peru, Syria and Saudi Arabia.

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Approximately 20,000 new cases are annually reported from different parts of Iran. However, the real incidence has been estimated five folds higher than these notified cases. The prevalence rate of leishmaniasis in different Iranian provinces has been reported from 1.8% to 37.9%.[6] Therefore, Iran is one of the most important centers of the disease in the world and leishmaniasis is one of the major parasitic diseases in this country causing a lot of economic costs.[9]

The incidence rate of CL is higher among Iranian men than Iranian women.[1,2] Of 300 patients with CL investigated in Lorestan, Iran, 57.7% were male most of whom aged 10–40 years.[10] In Khorasan-Razavi, Iran, the lowest incidence of disease was observed among those aged over 60. Moreover, the disease was most common among housewife women and students.[11] In a study carried out in Morocco, of 58710 cases identified from 1922 to 2010, 56194 (95.7%) had CL. This study showed that the endemicity of CL has been changed during the time due to improvement in surveillance system as well as increasing the real cases.[12]

Spreading the leishmaniasis due to globalization and travelling to the endemic regions is an increasing concern. One of the great problems is barriers against treatment and diagnosis as well as access to anti-leishmania drugs.[13] In addition, it has been reported that emerging of a disease in a new region leads to the stability of that disease reducing the efficacy of national and international investments toward its eradication.[6]

According to the knowledge of the authors, Mazandaran –a northern province of Iran-is not an endemic area for leishmaniasis but its population is at risk of infection because of travelling to the endemic areas. The evidences show new incident cases annually leading to physical, mental and economic problems for the residents. Ignoring the surveillance of vectors and hosts can be a factor for spreading of infection in this province. No investigations regarding different aspects of leishmaniasis have been carried out so far in this province. Therefore, this study aims to determine the epidemiological and clinical pattern of patients with CL in north of Iran to improve the surveillance system of this disease.

2. Materials and methods

This descriptive study was carried out using the information registered into the Leishmaniasis surveillance system of the Iranian Ministry of Health and Medical Education attributed to the Mazandaran province. All registered data collected for the study including date of registry (year-month), district, residence area (urban/rural), patients' name, gender, job, residence address, history of travel during the last year and the destination, date of disease onset, date of diagnosis, referral unit, type of common parasite in the infected area, size, location, form and number of lesions and smear results. The samples were collected from the inflammated border of the suspected lesions and spread onto a glass microscope slide. After staining, the sample was being investigated by optic microscope. Diagnosis was based on observing leishmania parasites.

The required data were extracted in excel format and entered into SPSS Version 16 software after refinement. Moreover, any deficiencies in the information were completed by the program coordinator. These data were described as percent frequency, mean, standard deviation, minimum and maximum and also were analyzed using Chi square and independent T tests.

3. Results

During the study period 343 patients with CL attended in health and treatment centers of Mazandaran University of Medical Sciences most of them (72.6%) were male. Mean (standard deviation) of their age was 30.7 (16.3) years. Minimum and maximum age of patients were one and 82 years respectively. Mean (SD) age of men and women was 30.5 (14.7) and 31.5 (19.8) years respectively (p = 0.648).

Table 1
Demographical characteristics of cutaneous leishmaniasis patients in Mazandaran Province, Iran.

Variables		Number	Percent
gender	Male	249	72.6
	Female	94	27.4
Age group	14–0	38	11.1
	24–15	104	30.3
	44–25	131	38.2
	64–45	54	15.7
	> = 65	16	4.7
Nationality	Iranian	332	96.8
	Afghan	11	3.2
Residence area	Urban	191	55.7
	Rural	152	44.3
History of travelling in recent year	Yes	301	87.8
	No	42	12.2
Job	Military	41	12
	Housewife	57	16.6
	Driver	25	7.3
	Child/student	46	13.4
	Worker	62	18.1
	Employee	19	5.5
	Other	93	27.1
Year of notification	2009	20	5.8
	2010	66	19.2
	2011	46	13.4
	2012	52	15.2
	2013	43	12.5
	2014	34	9.9
	2015	35	10.2
	2016	47	13.7
Total		343	100

The majority of patients (96.8%) were Iranian and 87.8% had history of travel during the recent year. Of them, 55.7% were urban residents, 12% were military members, 7.3% were driver and 18.1% were worker. The epidemiological characteristics of patients are described in Table 1.

The size of lesions was in average 3.6 cm varied between 0.5 and 30 cm. It was undetectable in 43 patients. The most common sites of the lesions was in upper limb (39.7%) and lower limb (25.7%) respectively. These lesions were in different form such as wet (44.6%), dry (44.6%) and lupoid (0.9%). The form of lesions in 9.9% of cases was unknown. Out of patients, 22.4% had at least four lesions (Table 2). No statistically significant difference was observed between the number of lesions (one, two, three, four and more lesions) and gender (p = 0.190). Most of cases had been reported in November (21.6%) and October (18.4%) (Fig. 1).

4. Discussion

This survey carried out among patients with CL in a northern province of Iran, showed that 72.6% of patients were male, 55.7% were urban residence, 18.1% were worker, 12% were military members and 87.8% had previous history of travelling. In addition, they were in average 30.7 years old and their problem had been diagnosed mostly in November (21.6%) and October (18.4%). From the viewpoint of the clinical characteristics, the lesions were in upper limbs (39.7%), lower limbs (25.7%) and face (6.4%). In addition, all patients had one (37.3%) or two lesions (22.4%). These lesions were either wet (44.6%) or dry (44.6%).

Karami et al. investigated 1315 patients with CL in Isfahan, Iran and reported that most of cases were detected in autumn (54%) and in the northern part of the study region (60.9%). The disease was occurred in men (61.8%) more than women and most of patients (31.2%) were 21–30 years old. The majority of lesions were nodular form (36.5%) and located in the upper limb (48.3%). More than 80% were Iranian and the others were from Afghanistan or other nations. The patients

Table 2
Clinical characteristics of cutaneous leishmaniasis patients in Mazandaran Province, Iran.

Variables		Number	Percent
Location of the lesion	upper limb	136	39.7
	lower limb	88	25.7
	Upper and lower limbs	32	9.3
	face	22	6.4
	trunk	6	1.7
	upper limb and trunk	9	2.6
	face and upper limb	8	2.3
	other[a]	39	11.4
	unknown	3	0.9
Number of lesions	One lesion	128	37.3
	two lesions	77	22.4
	three lesions	44	12.8
	Four or more lesions	77	22.4
	unknown	17	5
Type of lesions	dry	153	44.6
	wet	153	44.6
	lupoid	3	0.9
	unknown	34	9.9
Total		343	100

[a] "Other" means lower limb & trunk, lower&upper limbs & trunk, upper limb & head & neck, upper limb & face, head & neck, head & neck & lower limb, head & neck & upper limb, face & trunk, face & trunk & lower limb, face & upper & lower limbs, face & upper limb & trunk, face & head & neck, face & head & neck & upper limb.

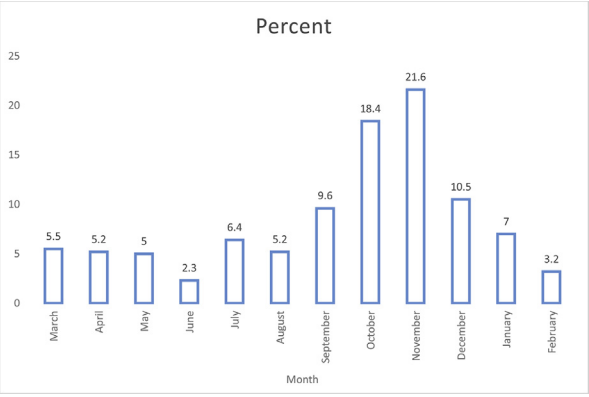

Fig. 1. Frequency of cutaneous leishmaniasis cases according to the month in Mazandaran Province, Iran.

had mainly multiple lesions and previous history of these lesions had been reported by 10.7%. The highest rate of the disease was observed among students (18.1%).[6] These observations were similar to our results. Davami et al. reported that of 40 patients with CL in Jahrom-Iran, 35% were under 10 years. Most of lesions were located in the upper limbs. The majority of patients had just one lesion. However, two patients had more than 25 lesions.[14] The age pattern of patients in Davami study was different than that reported for the current study. It may be due to difference in the objectives of these two studies so that Davami study aimed to detect the type of parasite in the samples provided from the patients' lesions. Moreover, small sample sizes can increase the random error of the study. It should be noted that Dvami et al. was carried out in an endemic area.

During a survey conducted in Lorestan, Iran, among suspected cases, 300 patients with CL were detected 173 of whom were male. The most cases (143) had upper limb lesions. The patients were mostly from rural areas and aged 10–40 which can be due to more activity as well as more exposure to sandflies.[10] The age-sex characteristic of patients as well as the location of the lesions was similar to those observed in the current study. According to the results of another study carried out among 140 Libyan cases suffered from leishmaniasis, most lesions were developed in bare body areas such as face, hand and foot. Most of patients were working in open areas such as farms or during the nights. For example, polices were more at risk than the other patients.[15] These results are in keeping with the findings of this research.

Of 47 cases investigated by Khan in Saudi Arabia,[16] 27 subjects had CL 81% of whom had just one lesion located in face (21 cases), upper limbs (16 cases) and lower limbs (10 cases). Another study performed in rural areas of Basra, Iraq, of 35 patients with CL identified during 2013–2014, 65.7% were male. The number of lesions varied between one and five in different parts of the body. It was predicted that the leishmaniasis in this area was different from the other parts of Iraq because of different life styles of the residents, strains of leishmania, behaviors and differences in vectors and carriers.[17]

Dalooei et al. showed that the most CL cases in Khorasan-Razavi province were detected in October and November[18] which was similar to our results. Conversely, Bitsalos et al. did not found any seasonal pattern among 500 cases investigated in Greece,[19] while, Karami et al. detected the most cases (54%) in autumn.[6]

Although that study area was not an endemic region, because of the appropriate background, it seems to be a potential area for endemicity. For example in an outbreak occurred in Sabzvar, Iran, of 541 students investigated, 9.4% had scar and 5.9% had lesions. Out of 807 rural residents investigated during that outbreak, prevalence of scar and lesion was 10.4% and 3% respectively.[20] Another study carried out among 82 specimens collected from different parts of Iran, 42 samples were infected with Leishmania Tropica, 36 samples were positive for Leihmania Major and two cases were affected with Leishmania Infantum.[21]

The current study was performed based on the information collected from the surveillance system. Since such information is based on just the routine health services and not based on research objectives, the results can be prone to some deficiencies and biases. For example, variables such as location, form and number of the lesions, were unknown in some cases. In addition, 12.2% of patients did not report any history of recent travelling which is not in consistence with the epidemiological characteristics of a non-endemic region. This defect might be occurred because of the multiple system users and the interventions might be incomplete.

In conclusion, our study showed that the most CL cases in the study region (northern Iran) were aged 15–44 most of which had history of recent travelling. Therefore, it seems that this area is not an endemic foci for CL and most of cases have been affected following travel to the endemic regions of CL in Iran such as Golestan Province.[22]That was in accordance with the results of some researches that surveyed in non-endemic area of CL in Iran such as Pakdasht district, Central Iran [23]. Another epidemiologic point of the study is identifying most of cases during October–November months indicating that the biting might be occurred between May and June. In these seasons, people used to sleep without cloths in open environments. The site of lesions was also in open body points. Considering these epidemiological characteristics and using personal protective measures, the burden of CL can be reduced. As a whole, we suggest to identify the Leishmania species among CL patients using molecular tests in the area [24].

Conflicts of interest

The authors declare that have no conflict of interest.

Acknowledgment

This study was based on a registered proposal and approved by the ethical review board of Mazandaran University of Medical Sciences. The authors thank to all university members for their cooperation.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.cegh.2018.08.001.

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