

The Sociodemographic, Living and Environmental Characteristics of Patients with Cutaneous Leishmaniasis

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Abstract

Background: Cutaneous leishmaniasis is a parasitic skin disease caused by various leishmaniasis species.

Material and Methods: In this study, the clinical, sociodemographic, living and environmental characteristics of 4048 cutaneous leishmaniasis patients are presented. A retrospective evaluation was made of 4048 cutaneous leishmaniasis patients in terms of gender, lesion diameter (mm), number of lesions, duration of lesions (weeks) and living conditions, then statistical analysis was applied.

Results: The cutaneous leishmaniasis patients comprised 52.47% female and 47.53% males with a mean age of 16.48±0.23 years. The mean duration of the disease was 9.62±0.33 weeks, lesion diameter was 12.197±0.10 mm and mean number of lesions was 1.75±0.02. The number of people in the patient's family was generally 5-10 and the number of rooms in the house was 2-3 for 70.63% of patients. The vast majority of the cutaneous leishmaniasis patients, 96.96%, lived in a lowland plains area and no patient lived in wetlands. The types of houses were of concrete construction in 94.94% and stone in 1.61% and 1.41% lived in an apartment block. Animals were reported to be kept in the living area of 17.02% of patients and of those, 2.30% had a WC.

Conclusion: The determination of an excessive number of Phlebotomus in areas of low socio-economic living conditions and the high incidence of cases in these areas has revealed a direct, positive relationship between cutaneous leishmaniasis disease and the socio-economic conditions of the patients.

Introduction

Cutaneous leishmaniasis (CL) is a zoonotic disease caused by *Leishmania* species, spread by vector sandflies (*Phlebotomus* spp) with an obligatory intracellular protozoon and which leaves a scar on the skin [1]. The occurrence of CL disease and the healing process are determined by the host immune

system, the virulence of the parasite and the characteristics of the vector [2,3]. In addition, the continuity of anthroponotic focus especially in unplanned urbanisation with no infrastructure has been found to contribute to causing a positive effect as a global risk factor for CL disease [4]. Recently, an increase in the number of cases of CL disease in Turkey

Table 1. General Features of Patients with Cutaneous Leishmaniasis Patients

General features	Frequency
Age (years)(n=4048)	16.48±0.23
Female	2124(52.47%)
Male	1924(47.53%)
Duration (months) (n=3996)	9.62±0.33
Size (mm) (n=4048)	12.197±0.10
Number (n=4000)	1.75±0.02

has been determined [5,6]. According to the Ministry of Health, approximately 45% of the cases of CL in Turkey in the last 20 years, in the province of Şanlıurfa in particular, have been seen to originate in areas of highly unplanned residences without sufficient infrastructure [7].

Two types of sandfly species (*Phlebotomus* spp) are responsible for the spread of CL disease; the vector sandfly *Lutzomyia* for New World CL seen on the American continent and the vector sandfly *Phlebotomus* (*Phlebotomus papatasi* and *Phlebotomus sergenti*) for Old World CL seen in the Mediterranean region [8]. While *Phlebotomus sergenti* is accepted as the vector for *Leishmania tropica*, *Phlebotomus papatasi* is accepted as the vector for *Leishmania major* [9,10,11]. The agent often causing CL disease seen in the province of Şanlıurfa has been shown to be *Leishmania tropica* [8,10,12,13,14,15]. The aim of this study was to make a retrospective examination of the clinical and socio-demographic characteristics and living environments of 4048 CL patients recorded in Turkey at Şanlıurfa Public Health Centre and Harran University Medical Faculty Dermatology Clinic.

Material and Methods

A retrospective evaluation was made of the records of 4048 CL patients registered at Şanlıurfa Public Health Centre and Harran University Medical Faculty Dermatology Clinic between 1998 and 2004. Approval for the study was granted by the Local Ethics Committee. An examination was made of the age

(years) of the CL patients, gender, lesion diameter (mm), number of lesions, duration of lesions (months) and living conditions. The data were statistically evaluated.

Diagnosis of CL disease was made from clinical appearance of the patient, and positive demonstration of *Leishmania* with laboratory tests (parasites-amastigotes-in skin smears). When there were difficulties in diagnosis, laboratory tests such as polymerase chain reaction and immune fluorescent antibody techniques were of benefit in the evaluation of the histopathological results.

Statistical evaluation

In the statistical evaluation of the data, the SAS 9.12 statistical software program was used. For examination of the variables in the study, firstly descriptive statistical calculations were made. Then, to establish differences between the characteristics of the groups such as age, gender, duration of the disease, lesion type, localization and diameter, the proportions test was used. A value of $p < 0.05$ was accepted as statistically significant.

Results

General characteristics of the CL patients

The study group comprised a total of 4048 patients; 2124 (52.47%) females and 1924 (47.53%) males. The mean age of the patients was 16.48 ± 0.23 years. The mean duration of the disease was 9.62 ± 0.33 weeks (range, 1-500 months). Mean lesion diameter was found to be 12.197 ± 0.10 mm (range, 1-80mm) and the mean

Table 2. The Number of Family Members and the Number of Rooms in the Home of Cutaneous Leishmaniasis Patients

	Frequency	Percentage (%)
Number of family members		
1-5	1086	26.84
5-10	2524	62.36
10-15	387	9.59
15-20	48	1.13
20-25	3	0.08
Number of rooms		
1	158	3.93
2	1431	35.37
3	1426	35.25
4	819	20.27
5	147	3.67
6	57	1.25
7	10	0.26

number of lesions was 1.75 ± 0.02 (range, 1-10) (**Table 1**).

The number of rooms in the houses where CL patients lived and the number of family members

The number of rooms in the house where CL patients lived and the number of people living there are shown in (**Table 2.**) The number of family members of CL patients ranged from 1 to 25 and generally (62.36%) the number of people living together in the family was 5-10. It was noticeable that 1-5 children in the families of the patients was at a low rate (26.84%) in CL patients. In respect of the number of rooms in the house, 70.63% of the patients lived in houses with 2 or 3 rooms.

Living environments of the CL patients

The vast majority of the CL patients lived in flat plains areas. A very low rate (0.82%) lived in mountainous areas and only 0.05% lived in forested areas. No patient lived in wetlands or surrounding areas (**Table 3**). The houses where the CL patients lived were concrete type houses in 94.94% of cases, stone houses in 1.61% and flats in apartment blocks in 1.41%. Only 3.06% of the houses lived in by CL patients were made of mud bricks. None of the patients lived in wooden houses or tents (**Table 3**). This section should include a concise textual description of the data presented in tables and/or figures. The Results and Discussion may be combined if by doing so, space is saved or the logical sequence of the manuscript is improved. Excessive repetition of table or figure contents should be avoided.

Discussion

Old World CL shows a wide geographic distribution, being seen in many countries, primarily Afghanistan, Algeria, Iran and Syria [16]. CL disease is generally seen during childhood and the prevalence decreases with increasing age [17]. The number of lesions in CL disease is usually limited to 1 or 2 [18], and the duration of the disease has been reported as mean 12.71 months [19].

Clinically, the disease starts with a spot a few millimetres in diameter and continues with papulonodular or ulcerative lesions growing over time. These lesions later heal leaving permanent scar tissue when not treated [18,20]. The Phlebotomus which play a role in the spread of the disease are found during the day in places such as piles of stones, cracks in walls, tree hollows and animal shelters. At dusk they emerge from these hiding places and the female Phlebotomus takes in amastigotes when sucking blood from sick humans or other mammals. In the intestines of the Phlebotomus, the ingested amastigotes become promastigotes, rapidly reproduce and mature. While sucking blood at the next feeding of the Phlebotomus, these parasites in promastigote form spread the disease by inoculating non-infected skin. The parasites entering the host macrophages return to amastigote form and reproduce within the cells, which results in the death of the host macrophage cells and new cells are infected by dissemination into the

Table 3. Living Conditions of Cutaneous Leishmaniasis Patients

Living conditions of CL patients		Frequency	Percentage (%)
Plastered walls in the house (n=4048)	No	3924	96.94
	Yes	124	3.06
Mountainous area (n=4048)	No	4015	99.18
	Yes	33	0.82
Wetlands (n=4048)	No	123	3.04
	Yes	3925	96.96
Plain/lowlands (n=4048)	No	4048	100.00
	Yes	4046	99.95
Forest (n=4048)	No	4048	100.00
	Yes	2	0.05
Tent (n=4048)	No	4048	100.00
	Yes	4048	100.00
Wooden house (n=4048)	No	3991	98.59
	Yes	57	1.41
Flat in apartment block (n=4048)	No	205	5.06
	Yes	3843	94.94
Concrete house (n=4048)	No	3983	98.39
	Yes	65	1.61
Stone house (n=4048)	No	3359	82.98
	Yes	689	17.02
Animals in the house (n=4048)	No	93	2.30
	Yes	3955	97.70
Outside WC (n=4048)	No		
	Yes		

surroundings. In terms of infection, the time of highest risk when sandflies are most active together with warming of the air is from dusk to dawn [21, 22, 23, 24, 25]. In the summer months when the density of Phlebotomus increases, in open areas known as tents by people in villages, people sleep uncovered without mosquito nets, so it is inevitable that fly bites in uncovered areas such as the head and upper extremities will result in CL disease. In the sampling of homes on the outskirts of Şanlıurfa, reasons such as the general condition of the house, there being a garden, the house not having plastered walls, keeping animals in part of the house, there being a barn, keeping pigeons, the toilet being outside the house and poor hygiene conditions have been determined to make a positive contribution to the sandfly population [26]. Especially when the temperature of animal shelters is higher than the surroundings, the spread and population density of these species can be

affected negatively. This can be explained by the placing of light traps in outdoor open areas in July which catch a relatively higher number of adult flies [7,26].

In the current study, there was plaster on the walls of 96.4% of the houses lived in by CL patients. The toilets used by the household were outside the house for the majority (97.70%) of the CL patients and most of the houses were single-storey concrete houses (94.94%). In 17.02% of the places lived in by the CL patients, there were animal shelters. The rates of those living in apartment blocks (1.41%) or in houses with stone walls (1.61%) were very low. None of the patients were living in tents. The results of the current study are in contrast with those of Toprak et al as a high proportion of the houses lived in by the CL patients had plastered walls and the rate of animal shelters in the living accommodation was very low. However, the finding that a high proportion of the houses where the CL patients

lived had an outside toilet supports the findings of *Toprak et al.*

Phlebotomus are generally found in flat lowland areas [27]. This species has been seen to adapt well to drought and is not found at high altitude due to the drop in temperature [28]. In the current study, the vast majority of the CL patients lived in the lowland areas (96.96%). The rate of those living in mountainous (0.82%) or forested (0.05%) areas was very low and none of the CL patients lived in areas such as wetlands. This finding that generally the patients lived in lowlands and very few lived in mountainous areas supports the data in literature.

As a much greater number of Phlebotomus were collected in neighbourhoods with a low socio-economic living standard, and at the same time most CL patients comprised those who lived in these types of houses in these areas, a direct positive relationship has been shown between disease-sandfly density and socio-economic structure [7,26]. Another result of the current study was that CL disease is related to the number of family members and the number of rooms in the accommodation. The number of family members of the patients in the current study ranged from 1 to 25 but generally (59.2% of the CL patients) they were living in families of 5-8 individuals. The living areas of the CL patients generally (70.63%) had 2-3 rooms. The high number of children and low number of rooms in the home of the CL patients in this study can be accepted as an indicator of low socio-economic level.

Socio-economic, political and environmental factors have a decisive role in the epidemiology of CL disease in the province of Şanlıurfa. In CL disease it has been determined that animals were kept in houses where people were living and the lavatories used by the household were generally in outside areas. At the same time, especially in the outlying areas of Şanlıurfa where CL patients were more concentrated, residential areas had developed rapidly and in an unplanned way without infrastructure such as sewerage systems, thus creating an

unsuitable living environment but one which is suitable for Phlebotomus.

In the struggle against CL disease, besides effective medical treatment for patients, the implementation of environmental rehabilitation of the slum areas of cities where patients are concentrated to improve the socio-economic levels of the patients and the application of insecticides effective against Phlebotomus, will be able to make a significant reduction in the number of patients. In conclusion, CL disease should not be considered as a purely medical disease. Especially in countries where the disease is seen at high rates, evaluation is required by a committee comprised of dermatologists, parasitologists, biologists and environmental health specialists.

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