

THE PREVALENCE OF CUTANEOUS LEISHMANIASIS IN ERBIL CITY

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ABSTRACT

Background and objective: Cutaneous Leishmaniasis is worldwide endemic disease and one of the major health problems, considered as the second most important protozoan disease. The objective of this study was to assess the prevalence of Cutaneous Leishmaniasis among the individuals within Erbil city, compare the causes of the infection and its associated risk factors.

Methods: A survey study was conducted during the period from November 2017 till March 2018 to investigate the prevalence of Cutaneous Leishmaniasis among the people who admitted to Erbil city hospital complaining of cutaneous lesions. Most cases were diagnosed subclinically depending on the clinical feature of the disease. Microscopic examination is done by using direct wet mount preparation and Giemsa stain.

Results: A total of 1059 (male: 648 / female: 411) patients were examined from different ages and different pathological skin lesion locations. The overall percentage incidence of Cutaneous Leishmaniasis in this study was (16.05 %). they were big differences in the infection by the parasite according to gender (males: 11.8% and females: 4.25 %). The rate of the infection was high among Peshmarga forces (41.76%). according to the site of the lesion, most individuals were bitten by the vector in their upper limbs (60%) of the infected patients. The age group target of the parasite was patient of 20 to 29 years old.

Conclusion: The overall percentage of Cutaneous Leishmaniasis in Erbil city was low. We observed differences in the infection according to gender, age, location and the patient's job. Since there isn't a previous research available on the disease in Erbil city, this study was performed to follow the prevalence of the disease for future investigations and precaution measurements

Keywords: *Leishmania major*, Leishmaniasis, Erbil city, Prevalence

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INTRODUCTION

Cutaneous leishmaniasis (CL) is an uncontrolled worldwide endemic disease and one of the major health problems and the burden increases, considered as the second most important protozoan disease, one of the omitted diseases that have become a special focus of World Health Organization (WHO) [1]. Caused by parasites from Trypanosomatidae family, about 20 to 30 species of *Leishmania* have been identified to cause disease in humans, which are morphologically indistinguishable [2].

There are at least five species causing cutaneous leishmaniasis and the parasites are divided to old world (developing countries) species: *L. donovani*, *L. major*, *L. infantum*, *L. aethiopica* and *L. tropica*) endemic in Middle east, the horns of Africa and India [3]. Whereas new world species are (*L. maxicana*, *L. braziliensis*, *L. chagasi*, *L. peruviana*.) endemic in Middle and South America. These parasites cause cutaneous leishmaniasis which is a localized single to multiple lesions at the site of the inoculation, or nodular lymphangitis, satellite lesions may be found [4]. Leishmaniasis is a vector-borne disease transmitted by bites from female sandfly insect. The disease affects some of the poorest people on earth [5]. With two million cases each year and 350 million people at risk, in 88

countries, *Leishmania* is an eukaryotic obligate intra macrophage parasite, characterized by its diversity and complexity, and the possession of Kinoplast and a unique form of mitochondrial DNA [6].

The parasite has a complicated life cycle, completing it in two hosts (human as a vertebrate host and female sandfly of the genus *Phlebotomus* as the invertebrate host) [3]. Infection to human occurs when the infected sandfly bites, pierces the skin with its proboscis and injects the infective stage (promastigote) from their proboscis to the skin of the victim along with its saliva during blood meals [2]. The vector feeds on the blood of infected individual at night [6].

The lesion starts as a small red papule in an acute phase (1 - 3 weeks), an early ulceration with a surrounding zone of inflammation that is moist and exudative, in some cases dry [3]. Forms a loose crust above a granulomatous base that eventually produces a scar, the lesions may contain few or no parasite, and the number of the lesions depends on the number of bites, the patient develops either a hypersensitivity response or allergic response [4]. The lesion caused by parasites can be treated by several drugs, albendazole is an antiparasitic agent used to treat irritable diseases caused by the parasite [7].

Cutaneous leishmaniasis is diagnosed using several methods including [2,7], Clinical diagnosis is based on clinical features of the disease, and laboratory diagnosis like "Direct smear staining with Giemsa or Wright stain. Culturing the parasite in Novy-MacNeal-Nicolle (NNN) medium, Histopathological techniques, Immunological diagnosis,

Polymerase chain reaction and Leishmania skin test

Aims of the study

1. To investigate the prevalence of cutaneous leishmaniasis in Erbil city.
2. To detect cutaneous leishmaniasis infections in male and female.
3. To investigate the prevalence of the infection according to location and jobs.

MATERIALS AND METHODS

The study was conducted on the total of 1059 individuals who referred to Erbil Dermatology center in Erbil province of Iraq – Kurdistan region. From the period November 2017 till February 2018. Various information about each individual was collected by interview using a special questionnaire sheet. Obtained data were arranged according to the age, gender, job, and site of infection, number of lesions and date of infection.

The macroscopic diagnosis of cutaneous leishmaniasis lesions was performed clinically for the patients who admitted to the hospital by the physicians working in the hospital. While microscopic examination was done by using skin scraping method, to detect and demonstrate amastigote stages of *Leishmania*, stained with Giemsa stain [8].

Statistical analysis

The Statistical Package for the Social Sciences (SPSS v.20) program was used to study the effect of different factors and parameters. Chi-square test was used to compare among percentages of variables in this study.

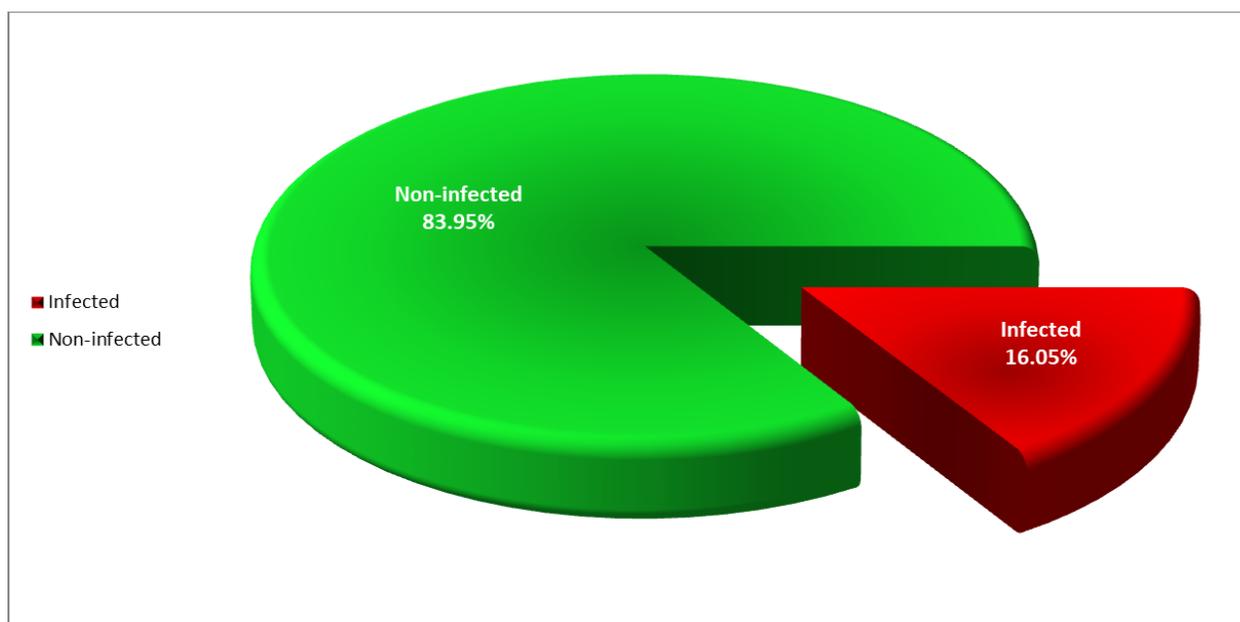
RESULTS

Overall percentage of cutaneous leishmaniasis

The result of this study showed that the overall percentage of infection by cutaneous Leishmaniasis was 170 (16.05%) after the

examination of 1059 persons who visited the dermatology center in Erbil City, as shown in (Figure 1).

Figure (1): Total percentage of cutaneous leishmaniasis



Prevalence of cutaneous leishmaniasis according to gender

In our study we found a highly significant difference ($P < 0.001$) between male and female in the infection of cutaneous leishmaniasis as shown in the (Table 1 and Figure 2), which show a high rate of infection (19.29%) in male, while in female was (10.95%).

Table (1): Prevalence of cutaneous leishmaniasis according to gender.

Gender	Positive No. (%)	Negative No. (%)	Total No. of samples
Male	125 (19.29)	523 (80.71)	648
Female	45 (10.95)	366 (89.05)	411
Total	170 (16.05)	889 (83.95)	1059

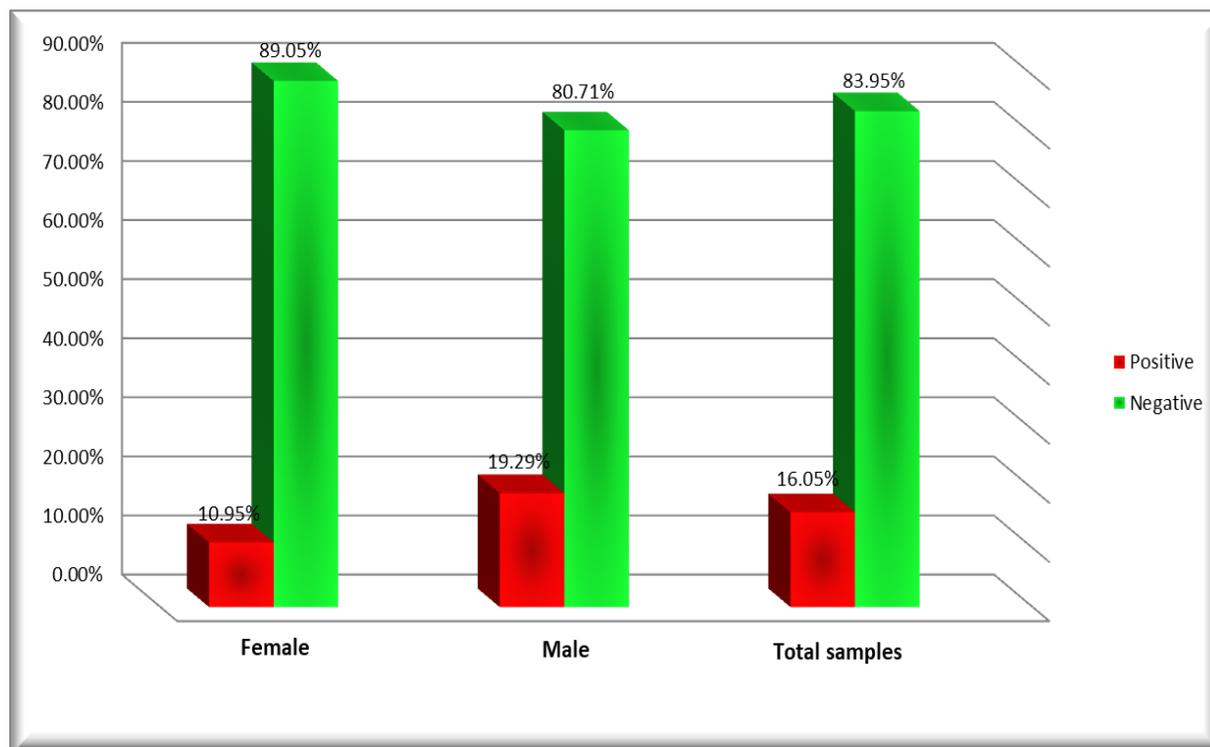


Figure 2: Prevalence of cutaneous leishmaniasis according to gender.

3.3. Distribution of cutaneous leishmaniasis according to jobs

In current study we found that most of the infected individuals were working as Peshmerga (41.76%), and decreased in other jobs, as shown in (Figure 3, Figure 4 and Figure 5).

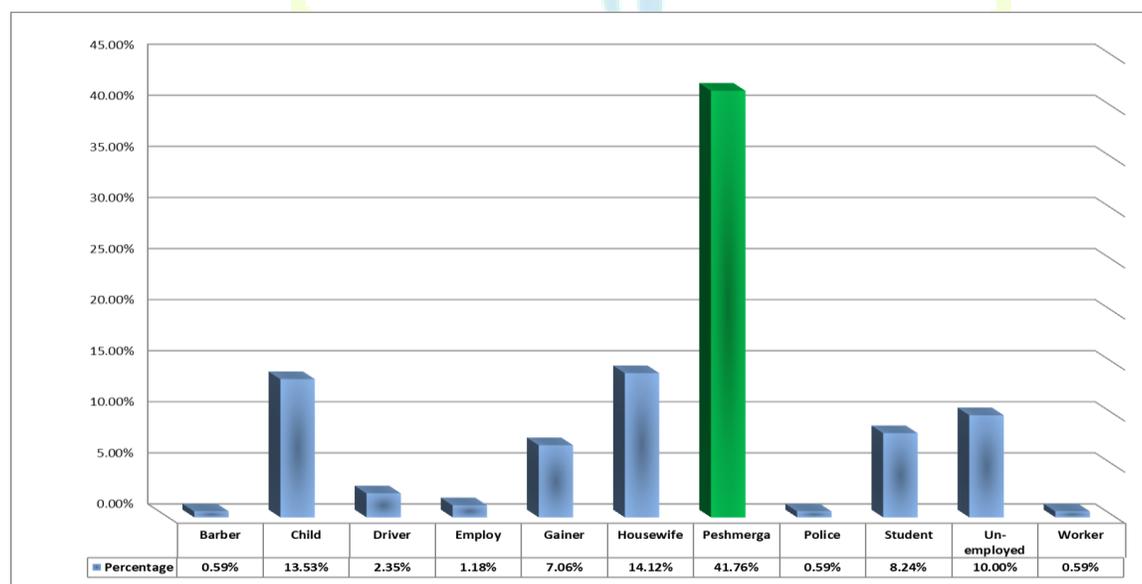


Figure :- 3 Prevalence of cutaneous leishmaniasis infected individuals depending on their jobs.

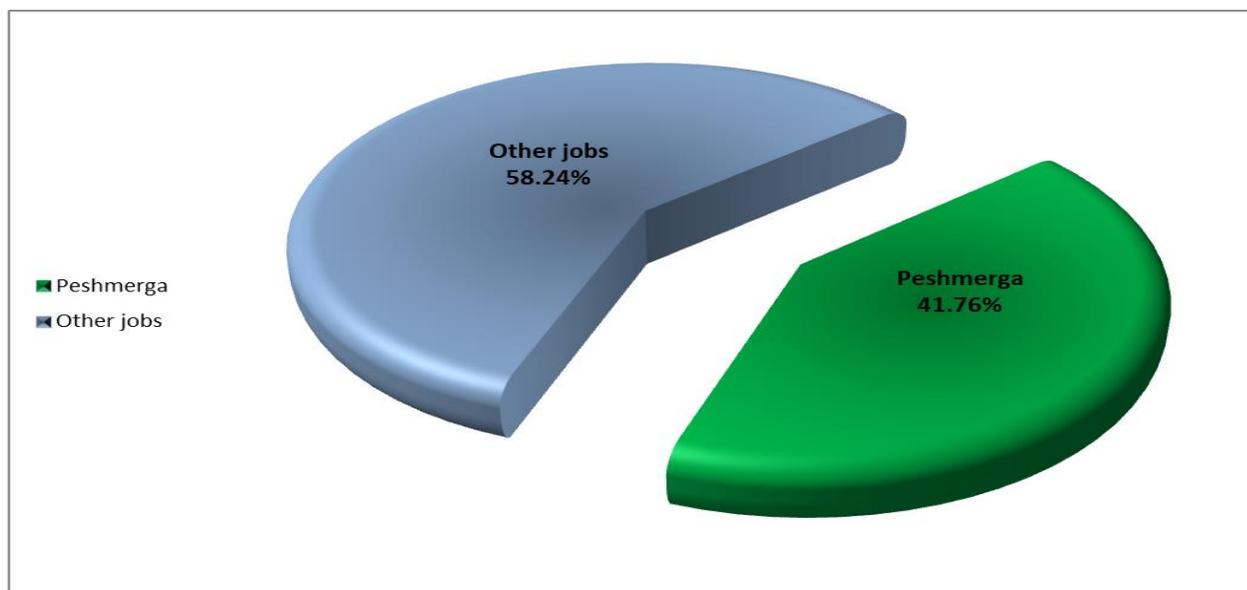


Figure : 4 Prevalence of cutaneous leishmaniasis among the infected individuals who work as peshmerga

Distribution of cutaneous leishmaniasis according to site of infection

In this study we observed that most of the infected individuals have lesions in exposed areas (example: face, arms and legs), so we divided the lesion areas into 3 main sites (head and neck, lower limbs and upper limbs), as shown in (Table 2, Figure 7 and Figure 8). Most of the infected people have lesions in the upper limbs (60.0%).

Table (2): Distribution of cutaneous leishmaniasis according to site of infection

Patients	Upper limbs		Lower limbs		Head and neck	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Positive	102	60.0	77	45.3	47	27.6
Negative	68	40.0	93	54.7	123	72.4
Total	170	100.0	170	100.0	170	100.0

Distribution of cutaneous leishmaniasis according to age groups

As shown in (Figure 6), highly rate of infection 27.06% and 22.94% were observed in the age group 20-29 and 30-39 years old respectively (Figure 5), this probably because these groups of age were more socially active, working and may be as Peshmerga force that can represented them to more possibility to be bitten by a sand fly and thus getting an infection.

Our results disagree with the previously mentioned study of Ullah *et al.*,^[12] in which they found that patients within infancy (especially within the first 2 months) were highly infected with a percentage of 58.10%. This could be due to poverty and lack of care towards children in that area because of the hard circumstances the people faced every day.

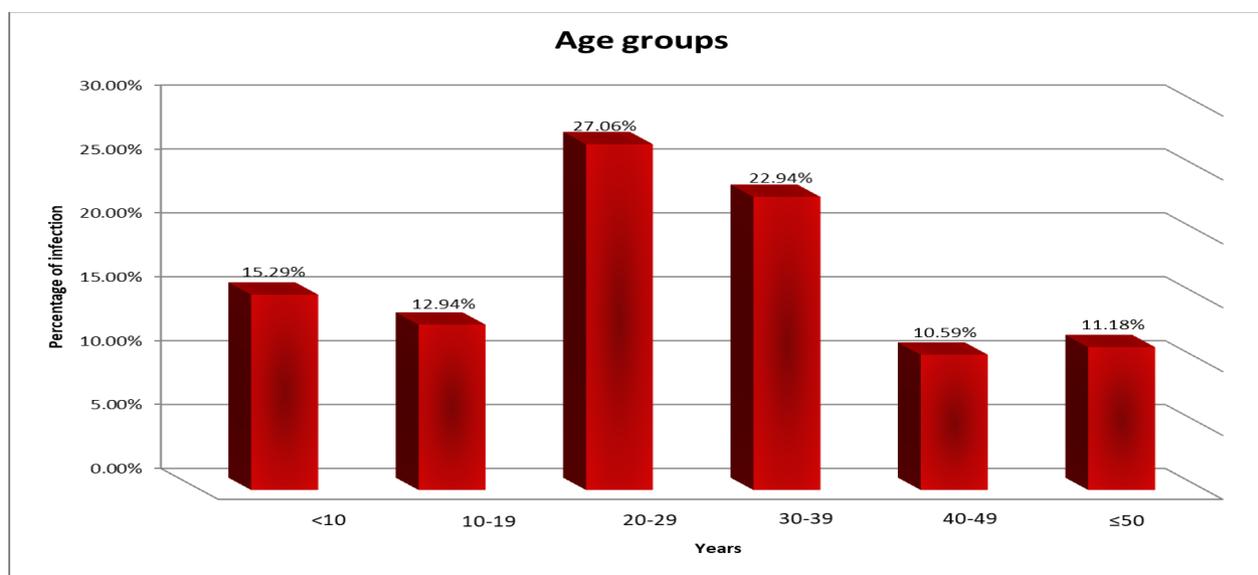


Figure :- 5 Distribution of cutaneous leishmaniasis according to age groups.

Number of lesions in each individual

The numbers of lesions in each patient were varied in current study and was reported most of individuals were infected by one lesion (44.1%) of cutaneous leishmaniasis. While the other patients were infected by 2 or more than 10 lesions ranged between (1.2% - 11.2%) as shown in (Table 3, Figure 6 and Figure 7).

DISCUSSION

Leishmaniasis is an ancient disease, and somehow neglected among other diseases^[8], in our discussion we'll demonstrate few point of the disease according to our results.

The overall percentage of infection in our study was 16.05%, which can be considered as a small number comparing to the left 83.95% non-infected individuals (Figure 1). Our positive infection was in disagreement with a result 9% which recorded by Hassan *et al.*,^[9] in Kirkuk. This may be due to differences in the environments, presence or absence the vector host sand fly and differences in the personal hygiene.

Table (3): Distribution of Numbers of cutaneous leishmaniasis lesions in each individual.

Number of lesions	Frequency	Percentage
1	75	44.1
2	18	10.6
3	16	9.4
4	17	10.0
5	10	5.9
6	5	2.9
7	4	2.4
8	4	2.4
9	2	1.2



Figure :- 6 Peshmerga forces infected by cutaneous leishmaniasis, the lesions appeared on the face, neck, upper limbs and lower limbs.



Figure :-7 Patients infected by cutaneous leishmaniasis, the lesions appeared on the upper limbs and lower limbs.

In the current study we recorded a highly significant difference of cutaneous leishmaniasis according to gender, in which we observed percentage of infection 11.80% in males higher than 4.25% in females (Table 1 and Figure 3). This is probably due to the social customs and traditions of the role of women in business world where we found most of them unemployed and being housewives, thus decreasing their chance to be exposed to the vectors, sand flies.

This result was similar to previous results of Al-Khayat *et al.*,^[10] in Erbil, and Ullah *et al.*,^[11] in Pakistan, which they found the infection in males higher than females. In contrast of our results, was found the infection in females higher than males in a study done by Hassan and Ahmad^[12] in Kirkuk. Whereas no significant difference was observed between male and female by Al-Obaidi *et al.*,^[13] in Baghdad. This disagreement may be due to difference in cultures among these areas or due to different resources and population distribution according to gender.

This study also showed that the job type can affect the possibility of getting an infection, in males we found that men working in military positions as Peshmerga were infected by 41.76%, whereas the rest 58.24% worked in different jobs, as shown in Figure (4 and 5). This may be due to the increase of exposure of soldiers to the sand flies which transmits the infection, especially their travelling or existence in districts that are abundant with the mentioned flies.

As for the site of infection, we found that the most cases were observed in the upper limbs 60%, followed by lower limbs 45.3%, and then

head and neck 27.6% in low rates as shown in Table (2). This result is in disagreement with other studies, like Hassan *et al.*,^[9] and Reyburn *et al.*,^[14] which they found the high percentage of lesions located on the face and head. This could be due to the clothing routine, which unveils the upper limbs and mostly covering the lower limbs so the sand flies can't reach them. The face and neck may be more easily protected and the person can notice any fly that's near these areas, then protect this part, which may explain the low rate of infected this part of the body in our study.

According to the age groups, highly rate of infection 27.06% and 22.94% were observed in the age group 20-29 and 30-39 years old respectively (Figure 6), this probably because these groups of age were more socially active, working and may be as Peshmerga force that can represented them to more possibility to be bitten by a sand fly and thus getting an infection.

Our results disagree with the previously mentioned study of Ullah^[11] in which they found that patients within infancy (especially within the first 2 months) were highly infected with a percentage of 58.10%. This could be due to poverty and lack of care towards children in that area because of the hard circumstances the people faced every day.

We found in current study that the number of lesions was with a higher percentage 44.1% for one lesion then decreases from 11.2% to 1.2% for more than two numbers of lesions, as shown in Table (3).

This result was similar to the study of Sharifi *et al.*,^[15] in which they found that the number of lesions had a high percentage

(82.3%) for one lesion and also decreases for any number rise. This maybe because each sand fly has the ability to bite and absorb blood for

Conclusions

From this study we concluded the following:

1. The total prevalence of cutaneous Leishmaniasis in Erbil city was 16.05%.
2. The frequency of Leishmaniasis was more in males than females.
3. We observed high rate of infection in the age group (20- 29 years).
4. Most infected males were from Peshmarga forces comparing to infected male with different jobs.

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