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The prevalence of cutaneous leishmaniasis among patients in the Diyala governorate in 2022

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Abstract

Background: Cutaneous leishmaniasis is a parasite disease spread by vectors that affect a large number of people in Iraq and other Middle Eastern and Mediterranean countries.

Objectives: The study aimed to detect the prevalence of cutaneous leishmaniasis among patients in the Diyala governorate in 2022, and study the relationship between the infection and parameters such as age, gender, and site of the lesion.

Patients and methods: The cross-sectional study was performed at the dermatology clinic at Baquba teaching hospital. All the patients who presented during the period from the 1st of January 2022 to the 31st of December 2022. The provisional diagnosis was dependent on clinical examination. The surveillance database of the Diyala Health Directorate was used in the study to pinpoint the illness. There were 130750 patients in total, representing various age and sex groupings. Patients were collected which represents the actual number of all the people who the consultatory clinic in Baquba teaching hospital.

Results: About 337 (0.25%) of them were diagnosed with a cutaneous leishmaniasis, their age range from (1-65) with a mean of 20.2 ± 15.3 , about 54.3% of infected patients were males and 45.7% were females. There was a significant association between age groups and the sites of lesions ($P < 0,001$).

Conclusion: The study concluded the prevalence of cutaneous leishmaniasis among patients in Diyala governorate was higher than in other governorates of Iraq in 2022 about 25 cases per 10,000.

Key Words: Prevalence, Cutaneous Leishmaniasis, Baquba, Diyala.

Introduction

Human cutaneous leishmaniasis (CL) is caused by the *Leishmania* sp. parasite and is endemic in Iraq. Leishmaniasis is a tropical and subtropical disease caused by an intracellular parasite transmitted to humans by the bite of a sand fly, mainly *Phlebotomus* and *Lutzomyia* (Europe, Northern Africa, the Middle East, Asia, and part of South America); exceptionally, transmission has also been reported as a laboratory accident. According to the World Health Organization (WHO), leishmaniasis is one of the seven most important tropical diseases and it represents a serious world health problem that presents a broad spectrum of clinical manifestations with a potentially fatal outcome ^(1, 2).

Clinically, there are three different types of leishmaniasis: cutaneous, mucocutaneous, and visceral. Geographically, the illness is classified into two types: Old World leishmaniasis, which can cause cutaneous or visceral symptoms and is present in Africa, Asia, the Middle East, the Mediterranean, and India, and New World leishmaniasis ⁽³⁾.

In general, there were more Cutaneous Leishmaniosis cases in Iraq between 1989 and 2011 than in Jordan, but fewer than in Syria and Saudi Arabia. Malnutrition, inadequate sanitation, age, gender, geography, and seasonal distribution are all risk factors for this illness ⁽⁴⁾.

Cutaneous Leishmaniosis in Iraq decreased during the anti-malaria control program and anti-malaria house spraying with DDT, but when this was discontinued in the mid-1960s, the incidence returned. During the Gulf War (1991), cases the number of CL peaked with an incidence of 45/10,000 population in 2008 ⁽⁵⁾.

In Iraq, two species are present: *L. tropica*, the agent of anthroponotic cutaneous leishmaniasis (ACL), and *L. major*, the agent of zoonotic cutaneous leishmaniasis (ZCL). Both ACL and ZCL were reported as causative agents of leishmaniasis in Iraq, but ACL is found mainly in suburban areas ⁽⁶⁾.

The disease is distributed in 98 countries worldwide, and around 1.3 million new cases, with an estimated 20,000 to 40,000 deaths, are reported annually ⁽⁷⁾ .

Cutaneous leishmaniasis is prevalent across the whole of Iraq except for in 3 northeastern provinces, and is transmitted by *Phlebotomus papatasi* and *P. sergenti* species of sandfly ^(8,9).

In Iraqi governorates, leishmaniasis is common; the first instances were found in the cities of Mosul and Baghdad ⁽¹⁰⁾. According to (Sukker, 1986), the majority of the 12038

instances of this disease were in youngsters, particularly in rural areas, and the middle of Iraq is plagued with the disease⁽¹¹⁾. While it was discovered that Mosul is one of the regions in northern Iraq affected by cutaneous leishmaniasis^(12,13).

The disease is epidemiologically unstable, with large and unpredictable fluctuations in the number cases. The total incidence rate of cutaneous leishmaniasis in Iraq varies from 2.3 / 100000 to 45.5 / 100000⁽¹⁴⁾

On the other hand, cutaneous and visceral leishmaniasis are endemic in many regions of Iraq. Iraq records 1800 visceral cases annually, with estimates of 400–5000 cases in previous years⁽¹⁵⁾.

The two leishmania species that cause skin infections are *Leishmania tropica* and *Leishmania major*. The disease frequently only affects the skin and can be identified by the development of one or more pustules, depending on the leishmania species. When the lesions involved nasopharyngeal mucosa including the nasal septum, lips, and palate the disease called Mucocutaneous Leishmaniasis. There is species caused Visceral leishmaniasis also known as black fever or kala-azar characterized by erratic fever, splenomegaly, hepatomegaly, thrombocytopenia, hyper-gamma globulinemia, weight loss, and pancytopenia are some of the symptoms it produces⁽¹⁶⁾.

Pure Cutaneous Leishmaniasis was first described in the Old World by Lewis and Cunningham in 1876. It is caused by *L. tropica*. In the Mexican Southwest and at its border with Guatemala, the causal agent is *L. mexicana*. It occurs in areas of the body exposed to insect bites; in decreasing order of frequency, the most involved regions are the ears (areas usually involved are the helix and anti-helix), nose, upper lip, cheeks, legs, hands and forearms, and ankles. It is striking that in Guatemala the most affected sites are the upper limbs (up to 43% of cases). The incubation period is from 1 to 4 weeks but can last for up to several years. Patients may refer to previous travel to endemic zones^(17,18).

The diagnosis of CL is based on clinical features (supported by epidemiologic data) and laboratory testing. Numerous diagnostic methods have been described with a huge variation in diagnostic accuracy, including direct parasitologic examination (microscopy, histopathology, and parasite culture) and/or indirect testing with serology and molecular diagnostics⁽¹⁹⁾.

Local treatment combining intralesional antimony and cryotherapy proved more effective than antimony or cryotherapy alone, although as monotherapies, both also show high cure rates. Heat therapy has also proven to be effective but requires special equipment.

Systemic treatment can be considered for multiple lesions, disfiguring facial lesions, or lesions at sites that make topical treatment less desirable. Systemic (oral) miltefosine treatment is a promising option for patients with multiple or complicated Old World CL (*L. major*) lesions^(20,21).

In the control and prevention of cutaneous leishmaniasis there are set of intervention strategies that include the human or animal host, the parasite, as well as the vector, necessitating a range of intervention measures to stop infection transmission such as by lowering the population of sand flies, vector management aids in minimizing or stopping disease transmission, monitoring the disease may help to conduct good management, and managing reservoir hosts can be a very effective strategy, especially when the zoonotic transmission is an issue^(22,23).

Aim of study

The current study aimed to evaluate the prevalence of Cutaneous Leishmaniasis in the Diyala governorate in 2022, and the relation between some parameters such as age, gender, and site of lesion.

Patients and methods

This cross-sectional study included an analysis of the reported cases of Cutaneous Leishmaniasis. The study used the available surveillance database for the disease from the health records of both the consultatory of dermatology clinic and the general health department both of them are following the Diyala health directorate. Data from the current study were collected for the period from the 1st of January until the 31st of December 2022. The diagnosis of cases is achieved by physicians' work in these health associations. The privacy of the patients was preserved by coding their data into numbers to prevent bias. We collected information about age, gender, site of the lesion, size of the lesion, and the number of lesions.

Out of a total of 130750 patients, 337 were infected with cutaneous leishmaniasis and were included in this study. Although the parasite infects all age groups, the patients were divided into four groups according to age. The first group included patients (1-15 years, the second group aged (16-30 years), the third group aged (31-50) years, and the fourth group more than (51 years)

The research protocol was approved by the ethical committee of Diyala University College of Medicine.

The data analysis was done by Statistical Package for Social Sciences (SPSS) version 26. We expressed the qualitative data by frequencies and the quantitative data such as weight and length by arithmetic mean. We used Chi-square to analyze the association between variables when $P < 0.05$ was considered significant.

Results:

A sample of 130750 patients was collected which represents the actual number of all the people who the consultatory clinic in Baquba teaching hospital. 337 of them were diagnosed with cutaneous leishmaniasis (0.25%) as shown in (figure1).

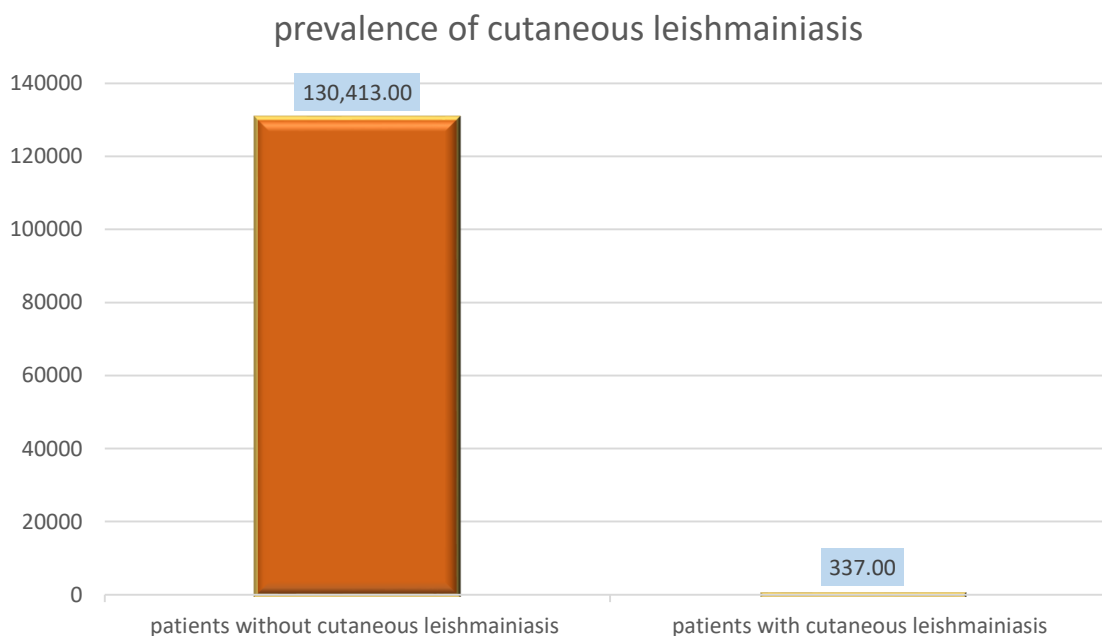


Figure 1: The Prevalence of Cutaneous Leishmaniasis

Regarding gender about (183) 54.3% of infected patients were males and (154) 45.7% were females as shown in table 1.

Table 1. The Distribution of Patients According to Gender

Gender	Frequency	Percent
Male	183	54.3
Female	154	45.7
Total	337	100.0

According to age, the age range from (1-65) with a mean of 20.2 ± 15.3 the patients were divided into four groups. The infection was high in the age group of less than 15-year-old 170 (50.4%), then in the group (16-30 years) 101 (30%), and less in a group of more than 51 years old 14 (4.2%) with statistical differences ($P=0.01$). as shown in figure 2.

Distribution Of Patients According To Age Groups

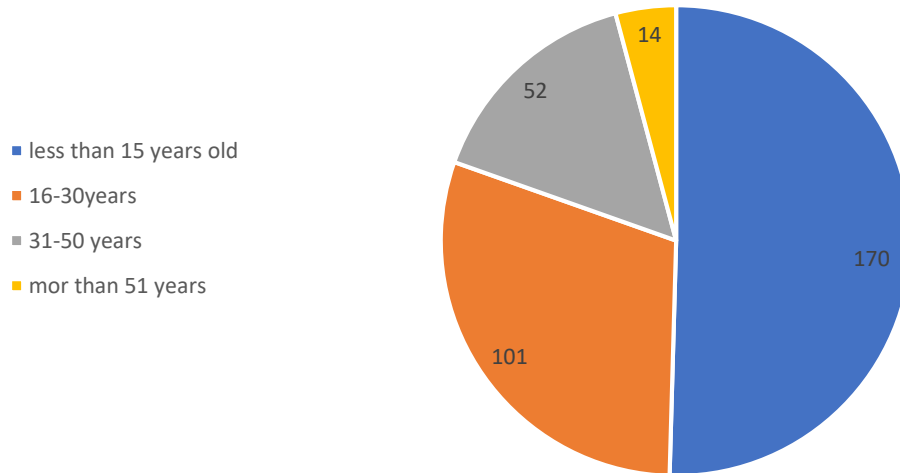


Figure 2: Distribution of Infected Patients According to Age Groups

Regarding the number of lesions, it was found that 46.9% (158 cases) had a single lesion, while 53.1% (179 cases) had multiple lesions most patients were about 156 (46.3%) were with less than five lesions, and about 23 (6.8%) were with more than five lesions. As in table 3.

Table 2. Distribution of the Number of Lesions

NO. of lesion	Frequency	Percent
One lesion	158	46.8
less than five	156	46.3
more than 5	23	6.9
Total	337	100.0

Concerning to the sites of lesions, most lesions were present on an exposed area of the body. The distribution of the sites of the lesions was 38.3% (129 cases) in upper limbs and hand then 37.4 % (126 cases) in lower limbs and feet, 23.7% (80 cases) in the face, and 6% (2 cases) in other parts of the body. As shown in Table 3 and Figure 3

Table 3. Distribution of patients according to sites of lesions

Site	Frequency	Percent
Face	80	23.7
Upper limbs or hands	129	38.3
Lower limbs and feet	126	37.4
Other sites	2	6
Total	340	100.0



Figure 3: The Distribution of Lesions Regarding Site, Size, and Number

Only 20 cases of them were diagnosed by laboratory investigation (by using gimsa stain) and the rest of them were diagnosed clinically. All of the patients were treated locally with intralesional sodium stibogluconate (Pentostam).

The recent study showed significant differences between the age groups and the site of lesion ($P = < 0.001$). As in Table 4

Table 4. Association between age groups and sites of lesions

Age Groups	Site of lesions				Total	Sig.
	Face	Upper limbs or hands	Lower limbs and feet	Other sites		
less than 15 Years	61	55	53	1	170	P < 0.001
16-30 years	10	52	39	0	101	
31-50 years	6	18	27	1	52	
more than 51 years	3	4	7	0	14	
Total	80	129	126	2	337	

Discussion

In Diyala, some cities are thought of as rural areas. The distribution and presence of CL in this area are influenced by a variety of variables, including the presence of animal reservoirs and a large variety of insects, thus its residents spend a lot of time working on farms where they are more likely to get bitten.

The World Health Organization predicts that there would be 1711 cases of visceral leishmaniasis in Iraq annually, compared to a range of 3400 to 6800 illnesses between 2004 and 2008⁽²⁴⁾.

Also, according to our data, the number of new CL cases tended to rise around October and peak in January and February. The distribution of lesions depends on which body parts are exposed and the susceptibility of the patient. The incidence rate of infection then starts to fall in March and reaches its lowest point in April.

This may be due to the development of female insects and their need for blood throughout their life cycles for the maturity and generation of eggs, especially in the spring season, and may also be related to the changes in the monthly distribution of CL patients. The lengthy leishmaniasis incubation period may be responsible for the delay between the patient being bitten and developing skin lesions (two to four months).

In this study, the incidence rate was 25 cases per 10,000. This rate was higher than what was indicated for other Iraqi regions such as Tikrit the incidence was 2.5 cases / 10,000 in 2000 ⁽²⁵⁾, and Kirkuk city 15 cases / 10,000 in 2000, Anbar governorate 32 cases ⁽²⁶⁾, and In Al-Diwaniyah 60 patients with cutaneous leishmaniasis⁽²⁷⁾.

The result of the current study showed lower incidence of infection than other studies in Iraqi cities such as in Kirkuk where there were 571 cases of cutaneous leishmaniasis⁽²⁸⁾, and In Al-Diwaniyah were 1489 cases of cutaneous leishmaniasis⁽²⁹⁾.

These variations could be explained by variances in study designs, population sizes, climatic fluctuations, and cultural differences, among other variables.

The incidence of CL cases in Iraq is due to the highly distributed distribution of sand flies, which is dependent on local environmental factors, physical factors, and biotic factors. Climatic factors such as rainfall, winds, and temperature are the most important

factors, while altitude and bioclimatic structure have an important impact on the distribution of sand fly species ⁽³⁰⁾.

According to age, in the current study, the incidence rate of infection was 50.4% in patients less than 15 years more than in other groups. These results are lower than that reported in Alhaweja District (57%) ⁽³¹⁾, and in agreement with a study in Anbar governorate, that found 75% of cases are in children under two years ⁽¹⁸⁾, for Colombia (86%) ⁽³²⁾, while the result was higher than the result reported for Iran (38%) ⁽³³⁾ and Turkey (45%) ⁽³⁴⁾

In the two most recent investigations, the researchers hypothesized that earlier infections had given rise to immunity, which explained why incidence decreased with age. Older adults may have a low incidence of cutaneous leishmaniasis because they were infected when they were young and developed lifelong immunity during childhood ⁽³⁵⁾

The current study showed that CL cases occurred more in males (54.3%) than in females (45.7%). This result was similar to those reported by AL-Obaidi for Tikrit ⁽³⁶⁾, Sarhan for Baghdad ⁽³⁷⁾, in Al-diwanayah province ⁽³⁸⁾, in Baghdad Al-Khaliq's study recorded the highest rates of infection in males with a rate of (65%) compared to (35%) of females ⁽³⁹⁾ and Sharifi *et al.* for Iran ⁽⁴⁰⁾.

In contrast, greater rates were recorded for females by AL-Zaidawi ⁽⁴¹⁾ in Tikrit and Akcali ⁽³⁴⁾ in Turkey.

The discrepancy between these two patient groups (male and female) may be explained by the fact that men are more likely to get bug bites than women because most farm laborers are men, and may be related to variations in methodological approaches, population sizes, environmental fluctuations, and cultural differences, among other variables or due to the fact that men spend more time outdoors as in work or swimming in rivers and lakes while unclothed.

Regarding the distribution of CL lesions in this study, we found that a higher proportion of the lesions was located on the upper limbs (38.3%), lower limbs (37.4%) face (23.7%), and less frequently on the other sites (2%). In Comparative, the study was similar to the study of Al-Abadi ⁽³⁶⁾ discovered that CL lesions primarily affected the upper and lower limbs, occurring less commonly on the face and considerably less frequently on the trunk, and the results were similar to the study done in Alhaweja District which found that the higher proportion of the lesions was located on the upper limbs ⁽³¹⁾, and in Al-

diwaniyah province the study showed the arms and legs were more susceptible to infection (58.70%) than head ulcers(58.70%)⁽³⁸⁾, also in Turkey^(34,42) and Iran⁽⁴⁰⁾.

The results were different with the study of Al-Zaidawi⁽⁴¹⁾, who reported that the face was most site affected by infection, and the study of Abdul-Reda, 2019 who reported that lesion in the face was seen in 50% of patients, 30% were upper lesions, and 20% seen in lower limb lesions⁽⁴³⁾, and in Baghdad was 31.3% in the face, and 50% in the upper and lower limbs⁽⁴⁴⁾.

The living circumstances and customs of the individuals in question may provide an explanation for the variations in the distribution of lesions found in the research described above. For instance, some individuals choose to sleep outside, putting themselves at risk for sand fly bites at night when the insects are most active. Generally, the presence and distribution of lesions depend on the body parts that are exposed and the host's susceptibility.

According to the site of lesions, the recent study showed that 35% of patients with single lesions and 65% with multiple lesions, the study similar to a study in Alhaweja District found that 58% had multiple lesions, while 42% had a single lesion⁽³¹⁾, in Al – diwaniyah province the study found Multiple ulcers showed more prevalence in the body (60.44%) compared to a single ulcer⁽³⁸⁾, in Babylon Cutaneous leishmaniasis lesions found on the limbs, face, and body (58%, 18% respectively)⁽⁴⁵⁾, in Baghdad was 62.5% of patients had single lesion while 37.5% had multiple lesions⁽⁴⁶⁾, and another study in Baghdad showed the multiple lesions were more than the single lesion⁽⁴⁴⁾

This result could be due to the high population density of sand flies in this region and prolonged exposure to Phlebotomine sand flies. The multiplicity of lesions can be due to several bites from sandflies during feeding, a large population of infected sandflies, or insemination after rubbing⁽⁴⁷⁾, or lymphatic spread⁽⁴⁸⁾

We found a high correlation between the age group and the site of the lesion since the less 15 years patients tend to have face lesions more frequently than the other age groups ($P < 0.001$) which agrees with the findings of Khazaei et al⁽⁴⁹⁾. On the other hand, the results of this study differ from the results of a study done in Spain which reported the most affected area in both sexes and all age groups was on the head and neck⁽⁵⁰⁾

Conclusion

The study concluded that the Leishmania parasite affects people of all ages and genders without exception, with young people experiencing the highest incidence. In contrast to other body sites, the hand and face were the most commonly affected, and numerous ulcers made up the majority of ulcers. Programs for controlling vector-borne diseases must be implemented.

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