

## Cutaneous Leishmaniasis: A clinicoepidemiological Study in Al Muthanna Governorate/Iraq

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### ABSTRACT

**Background:** Leishmaniasis is an endemic disease in Iraq. There are three types of leishmaniasis; cutaneous, mucocutaneous, and visceral form. Cutaneous leishmaniasis (CL) is the most common type that causes skin sores. In Iraq, CL has 2 presentations, zoonotic cutaneous leishmaniasis which is caused by *L. major*, and anthroponotic cutaneous leishmaniasis caused by *L. Tropica*. Leishmaniasis, is transmitted by the bite of infected female phlebotomine sandflies.

**Objectives:** We aimed to verify the clinical and epidemiology of cutaneous leishmaniasis in the Al Muthanna governorate.

**Materials and methods:** A prospective cross-sectional descriptive study was carried out in the outpatient dermatological clinic in Al Hussein Teaching Hospital during the period from the 1<sup>st</sup> of December 2021 to the 1<sup>st</sup> of April 2022 in Al Muthanna governorate, Iraq. Patients with CL of any age and both sexes were enrolled in the current investigation. Detailed information regarding the age, gender, residence, duration, site, number, and type (wet or dry) of the lesion was recorded for every participant.

**Results:** Two hundred fifty patients were diagnosed clinically as having CL. Males represented 132 (52.8%) patients. The majority of the cases were found in the age group 0–10 (n = 174, 69.6%) patients. Eighty percent (n = 200) of the participants were from rural areas. Most of the cases were presented in less than two months (n = 164, 65.6%). Most of the lesions affected the face (n = 89, 35.6%), and the least was seen in the upper and lower limbs (n = 9, 3.6%). The majority of the cases had a single lesion (n = 164, 65.6%) and of the dry type (n = 178, 71.2%).

**Conclusion:** CL is an endemic dermatological disease in the Al Muthanna governorate. Males were outnumbering females. The highest age group affected was 0–10 years. The majority of patients were from rural areas. The majority of the cases presented within two months, involved the face, had a single lesion, and were of a dry type.

**Keywords:** Leishmaniasis; Cutaneous leishmaniasis; Al-Muthanna governorate.

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### INTRODUCTION

Leishmaniasis is a parasitic disease caused by the blood flagellation of the genus *Leishmania* [1]. There are three different types of leishmaniasis; cutaneous, mucocutaneous, and visceral leishmaniasis [2]. The most common type is cutaneous leishmaniasis (CL), which causes skin sores [3]. In Iraq, *L. major* causes the first type of

CL (zoonotic cutaneous leishmaniasis [ZCL]). While *L. Tropica* causes the second form (anthroponotic cutaneous leishmaniasis [ACL])[4]. According to geographical distribution, the disease is separated into Old World leishmaniasis occurs in Asia, Africa, the Middle East, the Mediterranean, and India, and New World leishmaniasis which occurs in Central and South America [5]. CL is more common in rural than urban areas [6, 7]. Leishmaniasis, also known as Baghdad boil, is an endemic disease in Iraq. It is also endemic in other countries like Iran, Kuwait, and Afghanistan[3].

This disease is transmitted by the bite of a female phlebotomine sandfly (*Phlebotomus papatasi* and *P. sergenti*

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species) [8]. The incubation period is 2–8 weeks. The symptoms vary according to the parasite species and the patient immune response. CL starts as an erythematous papule that expands in size to produce a nodule, then ulceration and crusting occur over time. Its border is distinct and raised. Usually, the ulcer is without pain, however, a painful ulcer indicates a superadded infection with bacteria or fungi. The size of the ulcers might change over time and may eventually heal after a while, leaving a scar [6, 7].

In all areas of Iraq, there had been registered cases of CL. In the year 2001, there were 625 cases of CL, in 2000 there were 955 cases, and as many as 8779 cases in 1992 (45 cases for every 100000 citizens) [1]. CL as a result of *L. Tropica* is seen commonly in the periphery of large governorates (Mosul and Baghdad) owing to the substandard sanitary conditions of these populations. While the *L. major* is more prevalent in the rural areas, particularly in the southern and northern governorates of our country [3, 9].

There is a paucity of data regarding the registration of CL cases in our governorate (Al Muthanna). Hence we conducted the current study to find out the clinical and epidemiological conditions of CL in the Al Muthanna governorate.

## MATERIALS AND METHODS

This prospective cross-sectional clinicoepidemiological descriptive study was carried out in the outpatient dermatological clinic in Al Hussein Teaching Hospital during the period from the 1<sup>st</sup> of December 2021 to the 1<sup>st</sup> of April 2022 in Al Muthanna governorate, Iraq.

Patients with CL of both sexes, any age, who wished to participate in the study were enrolled in this study. Verbal consent was obtained from all the participating patients, or their parents or relatives if the participant was < 15 years of age. Patients with other dermatological lesions and those who declined to participate were excluded from this investigation. The study was approved by the Research Ethics Committee and Scientific Committee of the College of Medicine, Muthanna University.

All the cases were diagnosed clinically independently by two dermatologists (painless violaceous or erythematous crusted or ulcerated indurated nodule mainly on the exposed part of the body for at least one month or more in duration). Data regarding the age, gender, address, duration of the lesion, site, number, and type (dry or wet) of the lesions of all enrolled patients were recorded. Also, the list were a positive family history of the same disease, a previous personal history or scar of CL, and if any treatment had been taken.

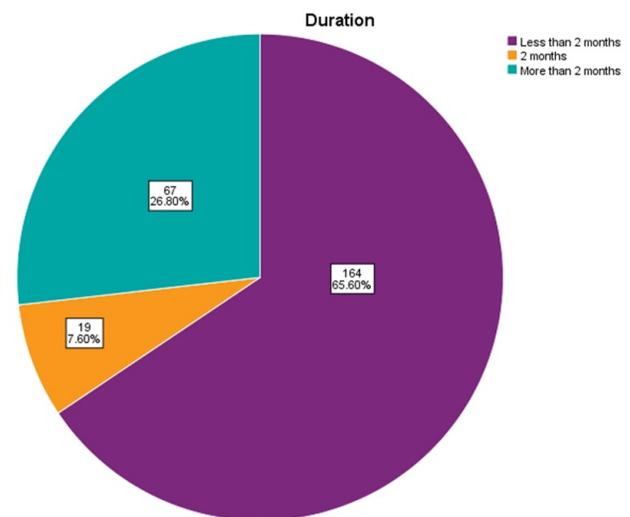
The data were entered and analyzed using SPSS version 22. The categorical variables were presented in frequencies and percentages and compared within the same variable by the Chi-squared test. A P-value of less than 0.05 was considered to be a statistically significant difference.

## RESULTS

There were 250 patients with CL enrolled in the present study. The age of the patients ranged from 2 to 69 years (mean  $12.08 \pm 10.682$  years), while the median and mode were 9 and 7 years respectively. The highest age group affected was 0–10 years ( $n = 174$ , 69.6%). The males ( $n = 132$ , 52.2%) slightly predominated the females. The majority of the cases were from rural areas ( $n = 200$ , 80%). There were significant differences in patient age groups and residences

**Table 1.** Demographic distribution of the 250 patients with cutaneous leishmaniasis.

Variables	Number	Percentages	P-value
<b>Age in years</b>			
0–10	174	69.6	0.001
11–20	41	16.4	
21–30	20	8	
31–40	7	2.8	
41–50	3	1.2	
51–60	2	0.8	
61–70	3	1.2	
<b>Gender</b>			
Males	132	52.8	0.376
Females	118	47.2	
<b>Residence</b>			
Rural	200	80	0.001
Urban	50	20	



**Figure 1.** The distribution of the 250 patients according to the duration of the lesions. P-value = 0.001.

(P-value=0.001). While there was no significant difference regarding gender (P-value > 0.05) as shown in Table 1.

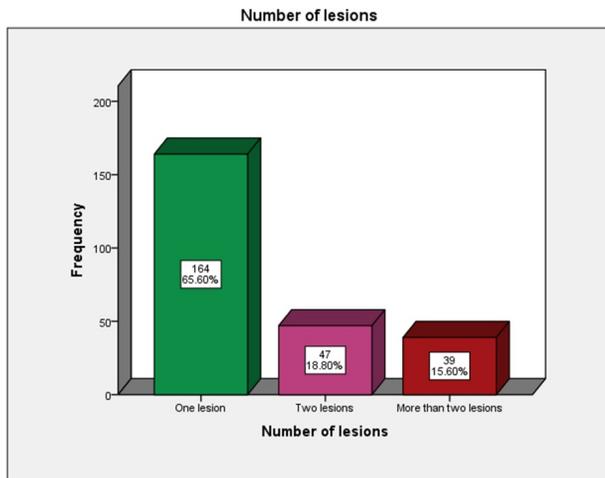
The majority of the patients ( $n = 164$ , 65.6%) were presented within two months (Figure 1). Most of the lesions were affecting the face ( $n = 89$ , 35.6%), and the least lesions involved the upper and lower limbs ( $n = 9$ , 3.6%). There was a statistically significant difference among the locations of the lesions (P-value < 0.05) as shown in Table 2. Most of the patients presented with one lesion ( $n = 164$ , 65.6%). While few patients had more than 3 skin lesions ( $n = 39$ , 15.6%) (Figure 2). The majority of the lesions were dry ( $n = 178$ , 71.2%) as shown in Figure 3. Figures 4–6 are examples of our patients.

## DISCUSSION

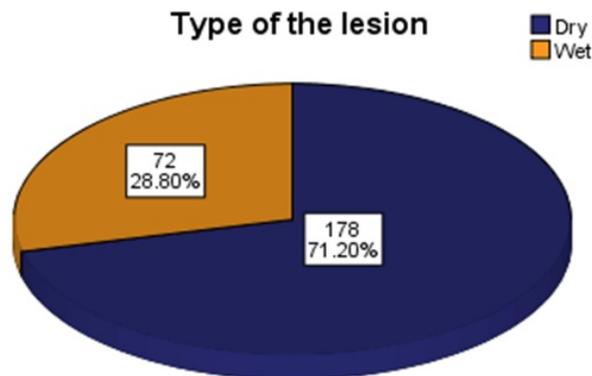
In Iraq, both *L. Tropica* and *L. major* are the causative agents of CL. In Iraq, leishmaniasis is an endemic disease with an annual outbreak [10]. Baghdad boil is a familiar name for this condition, which means that the disease has a long historical background in Iraq [11]. As a consequence,

**Table 2.** Distribution of lesions according to the site of the 250 subjects with cutaneous leishmaniasis. P-value = 0.001.

Site of lesion	Number	Percentages
Face	89	35.6
Upper limbs	52	20.8
Lower limbs	47	18.8
Face and upper limbs	19	7.6
Upper and lower limbs	9	3.6
Other sites	34	13.6
Total	250	10



**Figure 2.** The distribution of the lesion number in 250 patients with cutaneous leishmaniasis. P-value = 0.001.



**Figure 3.** The type of lesions in 250 patients with cutaneous leishmaniasis. P-value = 0.001.

there are huge cases that have been registered. Owing to the close cooperation between the Iraqi Ministry of Health and the World Health Organisation (WHO), there has been a reduction in the number of registered cases of CL, from 2978 cases in 2011 to 1648 cases in 2013 [12].

In this study, CL happened more in males (52.8%) than in females (47.2%). This result is in concurrence with a study done in Iraq [13]. However, female preponderance was reported from previous studies in Turkey (53.84%) [14] and



**Figure 4.** A 2-years-old boy with two lesions of cutaneous leishmaniasis on the face of two months duration.



**Figure 5.** A 2-year-old girl with multiple lesions of cutaneous leishmaniasis on the right hand of one-month duration.



**Figure 6.** A 24-year-old gentleman with a single lesion of cutaneous leishmaniasis in the lower abdomen of 3 months duration.

Iraq/Bahgdad (56%) [15]. This could be attributed to the

differences in the study's design, sample size, studied sample of the population, and weather conditions. Furthermore, in our society, fewer outdoor activities and enclosed clothing for females are factors contributing to the relatively low number of cases in females [16]. As a result, males are more likely to have occupational contact with outside sand fly vectors [12, 16]. Despite that, the sex hormones may affect the establishment and course of parasitic diseases, behavioral factors, make male subjects more vulnerable to the vectors in the environment, and other ways of transmission are probably equally or more significant [17].

Regarding the age of patients, our study showed more cases in the age group (0–10) years which represents 69.6% of cases. This result was similar to a prior study from Iran (31.6% in the age group 1–10 years) [4]. In contrast, a study in Baghdad/Iraq reported that the age groups 5–14 and 15–45 years old were more affected by CL. The differences in these studies may be correlated to the school and occupation age groups of males and females in Iraq, respectively, for both sexes and they are more likely to share in outdoor activities and be exposed to sandfly-related environmental circumstances than subjects from other ages [18]. This high rate may also be attributed to the fact that younger children are more susceptible to infection than adults or older children, particularly in rural areas such as our city, where the rural population outnumbers the urban population [13]. Furthermore, the immune system is less developed in younger children than in other age groups, making them at a higher risk of acquiring the infection [14].

In the current investigation, the face is the commonest site of CL (35.6%). This observation was in agreement with a study done in Iraq and Turkey, which showed that the face was the site of the lesion in 43.5% and 58.52% respectively [1, 14]. In comparison with observations of other studies in Iraq found limbs more affected (48.8%) and face (35.8%) [19]. In Iran, one study found that the limb (48.2%) was the most affected site, while the face was affected by 25.9% [20]. Phlebotomus attacks exposed areas of the body (face) that are more vulnerable, especially during sleep. Furthermore, sandflies prefer to feed from specific locations with specific chemical attractions, such as carbon dioxide concentration, which is felt by the insects more from the feet and hands [14, 15, 19].

When it came to the number of lesions, 65.6% of the cases in this study only had one. This differs from a previous survey, which estimated that the results were one lesion in 42% and numerous lesions in 58% of patients [21]. Other research reported a single lesion in 36% of cases, and the remaining subjects had two or more lesions [15]. The causes of multiple lesions are the preference of sandflies for feeding from different sites, the dissemination of the infection as a result of rubbing, and high numbers of infected sandflies [20, 22, 23].

In our study, CL found higher prevalence in rural area (80%), which is consistent with other studies [1, 19, 24]. In almost all studies, the majority of CL cases are found in rural areas rather than urban areas, owing to large agricultural regions that attract and harbour many insect species, and the individuals in these areas rely primarily on farms, where they are more vulnerable to insect bites and reservoir animals like rodents and dogs, sleeping outside or on the floor, and vegetation that can be grasped near home that can increase sand fly suction [15, 23, 25]. Additionally, the houses in villages are built from clay, which preserves a certain level of moisture in the sand fly larval habitat. This facilitates the breeding of sand flies.

CL cases showed that 65.6% had a duration of the lesion

under 2 months, which was supported by another study performed in Wasit/Iraq, which found 50% of the cases with a duration of fewer than 2 months [1]. While the study from Erbil/Iraq reported that 56.57% of the cases had a duration of 2 to 4 months. Another study reported a duration range of 1–19 months [19]. This variation in lesion durations may be attributed to differences in leishmania species as well as the immune status of the subjects included in these studies [13, 15, 26]. As reported by certain studies, the cytokines which are produced by CD4 T cells have a protective effect against leishmaniasis through the activation of the macrophages which destroy the parasites. Moreover, the CD8 cells have a role in the differentiation of Th1 responses in the early stages of parasite infection, whereas they participate in lesion progression after the establishment of the infection. Their presence and their cytotoxic ability are directly linked to the size of the lesion [26–28].

The classification of CL depends on the clinical presentation and theoretical variations in *Leishmania* spp. as reported by previous studies [16, 29]. They divided CL into 2 main types (wet or "dry"), but the pathogenesis didn't take this into consideration [21]. The current study reported that a dry lesion was seen in 71.2% of the cases. This observation was inconsistent with a previous study, which showed that the wet lesion was detected in 51.5% of patients [19]. Another investigation also reported that a wet lesion was seen in 63.5% [15]. The wet lesion was not identified before in Iraq [13]. The wet lesion as suggested by the previous study, said that during the battle between Iraq and Iran during the period from 1980 to 1988, the wet form was transmitted from Iranian soldiers to Iraqi soldiers [13].

The CL diagnosis in our study depends solely on clinical judgement owing to the lack of diagnostic laboratory tools in our hospital, such as a smear or culture, which was considered a limitation of the study.

## CONCLUSION

In this study, we found that CL is more prevalent in rural areas, among children, and in the male gender. The face region is mostly affected by this disease. Furthermore, lesions lasting less than two months, single lesions, and wet lesions were more common in our cases. Although the incidence of the disease is diminishing, CL is still a public health problem, and disease control protocols need to be recognized. For that reason, additional studies are required to discover the vectors, reservoirs, and disease species as well as to develop appropriate disease control strategies.

## ETHICAL DECLARATIONS

### Acknowledgements

None.

### Ethics Approval and Consent to Participate

Written approval had been gained from the Research Ethics Committee and Scientific Committee of the College of Medicine, Muthanna University, Iraq. Study data/information was used for the research purpose only. Informed consents from every participant was taken.

**Consent for Publication**

Not applicable (no individual personal data included).

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**Availability of Data and Material**

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing Interests**

The authors declare that there is no conflict of interest.

**Authors' Contributions**

All the authors listed have made a substantial, direct, and intellectual contribution to the work, and approved it for publication.

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