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Research Article

A Cross-Sectional Study on the Prevalence and Risk Factors of Cutaneous Leishmaniasis

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A B S T R A C T

Background: Cutaneous leishmaniasis (CL) is a parasitic skin disease caused by *Leishmania tropica* that infects humans and other mammals, which are the final hosts of the parasite. The disease is transmitted by the vector host (female sandfly) *Phlebotomus* spp. when it feeds on the blood of the final host.

Objective: Due to the importance of the disease, as it is endemic in Diyala Governorate, and to address its spread, this study aims to clarify the epidemiology of the disease and some demographic, economic, and social factors affecting its spread in some areas of the Governorate

Methods: The study was conducted in Baquba Teaching Hospital and the health centres in Muqdadiyah, Khanaqin, Jalawla, Saadiyah, and Balad Ruz during 2024 and included 1,501 patients suspected of having the disease, of both sexes and different age groups.

Results: The study recorded 912 (60.759%) infected patients, including 550 males and 362 females, with percentages of 60.307% and 39.692%, respectively. Higher infection rates were among the age group of 1–10 years and the lowest among those more than 50 years of age (33.114% and 1.754%, respectively). The highest infection rate according to the body sites was in the face and head, and the lowest was in the trunk (47.149% and 10.964%, respectively). January and February showed the highest infection rates, and August had the lowest rate (31.140%, 19.078%, and 1.644%, respectively). Within the areas under study, the infection rate was the highest in Baquba and the lowest in Saadiyah district (41.337% and 8.881%, respectively).

Conclusion: Baghdad boil, as it is commonly known in Iraq, is an endemic disease in Diyala and is considered a health and social problem due to the physical and psychological damage it causes. Despite efforts to limit the disease, it still poses a health risk in the region, requiring concerted efforts to limit and control it.

Keywords: Cutaneous Leishmaniasis, Skin Ulcer, Sandfly, Amastigote, Endemic Disease

Introduction

Leishmaniasis is a globally widespread parasitic disease caused by an intracellular protozoan parasite of the genus *Leishmania*, which belongs to the family *Trypanosomidae* (Leta et al., 2014; Ahmed et al.,2025). The World Health Organisation considers it to be a neglected disease (WHO, 2003). Leishmaniasis is transmitted between humans and animals, which confirms that it is a zoonotic disease (Alemue et al., 2023). It is widespread in tropical and subtropical regions; population displacement, poverty, malnutrition, disease vectors, and a weak immune system are among the most important factors in its spread (Debash et al., 2022; Piyasiri and Dewasurenra, 2023). The disease affects more than 1.2 million people annually and spreads in more than 90 countries around the world (Naz et al.,2023; WHO, 2023). The disease is caused by the bite of infected female sandflies after feeding on the host's blood (vector host), causing several forms of the disease: visceral (VL), cutaneous (CL), and mucosal (MCL) leishmaniasis (Zang, et al.,2025). CL is endemic in Iraq and is known locally as Baghdad boil. It is also endemic in many neighbouring countries such as Iran, Saudi Arabia, Syria, and Kuwait (WHO, 2003; Al-Waaly and Shubber, 2020). The incidence of the disease increases during the sandfly breeding months, which extend in Iraq from April to November (Rahi, 2013). The *Leishmania* parasite life cycle consists of the amastigote stage within the phagocytic cells of mammalian hosts and the promastigote stage in the intestine of female sandflies (Rahi, 2013). CL appears as one or more skin lesions on the parts of the body that are exposed to the bite of the vector host (Kuna et al., 2019). After an incubation period of 2–8 weeks, the lesion appears as an erythematous papule that expands to form a nodule, with elevation and peeling of the surrounding skin. It forms an ulcer with distinct borders. It is usually painless. Painful cases indicate that the ulcer has been exposed to a secondary bacterial or fungal infection. The ulcer may increase in size significantly or it may not heal completely, leaving a clear and undesirable scar on the skin (Abdulla et al., 2018). Annually, Iraq records more than 20,000 cases of CL in different regions (Alwan, 2025). The urban areas of Diyala, Baghdad, and Mosul recorded the most cases of CL, while *L. major* is widespread in rural areas of southern Iraq (Al-Ani et al., 2012). Despite efforts to control CL infection, it remains the most common arthropod-transmitted parasitic disease in Iraq (Amane et al., 2022). Research is necessary to address the health and social issues of CL. This study aims to analyse the epidemiology of the disease and the demographic, economic, and social factors affecting its spread in a few areas of the Diyala Governorate.

Materials and Methods

The current study included 1,501 patients suffering from skin lesions who visited the Dermatology Unit/ Consultative Clinic/ Baquba Teaching Hospital and health centres in Jalawla, Saadiyah, Khanaqin, Muqdadiyah, and Balad Ruz. Among them, 912 were confirmed to be infected with CL (550 males and 362 females aged between 1 and 70 years) after being diagnosed by specialised dermatologists through clinical examination of the patients and confirmation of the infection during the period from January to December 2024. Patient information was recorded according to a special questionnaire form that included sex, age, residence, location and ulcer site on the body, and the first appearance of infection.

Results and Discussion

Cutaneous leishmaniasis is an ancient and neglected disease. The current study included 1,501 suspected cases. After a clinical examination of ulcers by specialised dermatologists, 912 cases were confirmed with the disease, with an overall infection rate of 60.759%. These 912 cases included 550 males and 362 females, with infection rates of 60.307% and 39.692%, respectively (Table 1).

This study is consistent with the study by Kareem et al. (2016), which confirmed a higher incidence of CL among males as compared to females. This is attributed to occupational factors and the involvement of males in agricultural and construction work, which exposes them to the bites of female sandflies, as well as greater attention to hygiene and personal care among females than males (Al-Daoody et al., 2019; Hassan et al.,2024). As shown in Table 1, the highest infection rate was found to be in the age group of 1–10 years, while the lowest was among those over 50 years, at 33.114% and 1.754%, respectively. The higher incidence in the age group of 1–10 years is attributed to the underdeveloped immune system and the inability of children to protect themselves from the bites of the insect that transmits the disease (Durrani et al., 2011; Mohammed, 2024). The lowest infection rate was among the > 50 age group due to the likelihood of them contracting the disease earlier and gaining immunity towards subsequent infections. Furthermore, the elderly are less likely to visit the hospital for treatment, and the presence of disfiguring skin ulcers is not as important to them as it is to younger people. Furthermore, not going out to work at retirement age reduces their exposure to bites from the vector insect (Ghezzai et al., 2020). The current study addressed the areas of spread of skin ulcers in the human body (Table 2). Although the disease may be present in all parts of the body,Figure(1). s it depends on the location of the bite of the vector host, the results showed a high rate of infection in the head and face (430 patients, at a rate of 47.149%), and the lowest rate in the trunk (100 patients, at a rate of 10.964%). The incidence of infection in the upper extremities was higher than that in the lower extremities (212 and 170 patients, at rates of 23.245% and 18.640%, respectively)

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These results are not compatible with those of Muhammad (2024), who indicated a high incidence infection in theupper extremities, followed by the face and abdomen. The current study was compatible with the studies carried out by Alwan (2025) and Rahi (2013). The spread of infection in the face, and upper and lower extremities is attributed to the fact that the vector insect targets parts of the uncovered body (Yaghoobi-Ershadi, 2016). Also, the location of the spread of ulcers depends on many factors, including the species of sandfly, the social and cultural behaviour of patients, and the nature of the climate in those areas (Rahi, 2019; Al-Dhafiri et al., 2023). Table 3 indicates the number of cases of CL and their percentages during the study months. It showed an increase in the number of cases in January and February, followed by September, as the numbers of infected people were 284, 174, and 139, with the percentages being 31.140%, 19.078%, and 15.241%, respectively. The lowest numbers of cases were in July and August, with the numbers of infected being 15 and 17, and percentages being 1.864% and 1.644%, respectively.

The results of the current study did not agree with those of the study conducted by Muslim and Ali (2022) in Babylon Governorate, Iraq, as they indicated a high incidence of the disease in December and a low incidence in June. However, the current study agreed with a previous study conducted by Al-Yasiri et al. (2022), which indicated a high incidence in January and February and a reduced infection rate in June, July, and August. Studies conducted by Al-Awadi (2019) and Falih (2021) also agreed with the results of the current study. The discrepancy between studies in the month-wise prevalence of the infection is attributed to the nature of the climate in the countries, as well as between the governorates in Iraq, and climatic conditions such as humidity and temperature directly affecting the transmitting host (Alghezi, 2022). The peak of the spread of the vector insect is from May to September, and the appearance of skin ulcers comes after it feeds on human blood and completes the parasite's life cycle in its final hosts, so the ulcers appear densely during the months of January and February (Mohammed, 2024). Table 4 shows the incidence of CL in Baqubah city and in some areas east of Diyala. An increase in the numbers and rates of infection was witnessed in Baqubah (377 with a rate of 41.337%), followed by Muqdadiyah (164 infections with a rate of 17.982%), Khanaqin district in the far east of Diyala Governorate (110 infections with a rate of 12.061%), and Jalawla and Balad Ruz districts (94 and 86 infections with rates of 10.307% and 9.429%, respectively), while Al-Saadiyah district witnessed the lowest number of infections with 81 infected cases and a rate of 8.881%.

Table 1.Total Cases Examined and Confirmed Infected with Cutaneous Leishmaniasis, Along With the Classification on the Basis of Age Groups among Infected Genders

Total Examinees	Confirmed Infection	Percentage	Infected Males	Percentage	Infected Female	Percentage
1,501	912	60.759	550	60.307	362	39.692
Age in years 1–10	302	33.114	200	66.225	102	33.774
11–20	180	19.736	84	46.666	96	53.333
21–30	199	21.820	122	61.306	77	38.693
31–40	120	13.157	85	70.833	35	29.166
41–50	95	10.416	67	70.526	28	29.473
> 50	16	1.754	6	37.500	10	62.500

Table 2.Distribution of Lesions According to the Site of Cutaneous Leishmaniasis

Lesion Site	Number of Lesions	Percentage
Face and head	430	47.149
Upper limbs	212	23.245
Lower limbs	170	18.640
Trunk	100	10.964

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Figure 1.Signal Lesions of Cutaneous Leishmaniasis

Table 3.Monthly Incidence of Cutaneous Leishmaniasis in 2024

Month	Infected Patients	Percentage
January	284	31.140
February	174	19.078
March	36	3.947
April	30	3.289
May	31	3.399
June	20	2.192
July	17	1.864
August	15	1.644
September	139	15.241
October	86	9.429
November	38	4.166
December	42	4.605

Table 4.Distribution of Cutaneous Leishmaniasis According to Area of Residence

Region	Number of Patients	Percentage
Baquba	377	41.337
Khanaqin	110	12.061
Jalawla	94	10.307
Saadia	81	8.881
Muqdadiya	164	17.982
Balad Ruz	86	9.429

The current study was consistent with the study of Al-Yasiri (2022) carried out in Dhi Qar Governorate, which indicated that infection rates were high in urban and low in rural areas. The study did not agree with that of Al-Awadi (2019), conducted in Dhi Qar Governorate, which indicated that infections were high in the countryside, villages, and districts and low in cities. Urbanisation, population growth, and migration from villages to cities contributed to the spread of the disease, and the removal of orchards and agricultural areas, their conversion into buildings, and poor sanitation made it a suitable environment for the growth and spread of the vector host and the transmission of the parasite, largely in crowded cities. Diyala Governorate and Baqubah are endemic areas for the disease (Hassan et al, 2024).

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Conclusion

In this study, it was found that the incidence of CL is higher among males than females, and in the age group of under 10 years, with facial infection being the most recorded. The highest infection rate was recorded in January and February, and the prevalence of the disease in Baqubah city was the highest among the cities, districts, and sub-districts of eastern Diyala. The disease is neglected, and it is necessary to develop scientific health policies to control the reservoir hosts and combat the vector host, since the disease is endemic in the province.

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