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Evaluation of the Surveillance and Epidemiological Aspects of Cutaneous Leishmaniasis in Babylon Province, Iraq

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Abstract

Leishmaniasis diseases constitute an important public health problem in both tropical and subtropical areas. The aim of this study is to evaluate the epidemiological situation of cutaneous leishmaniasis (CL) in Babylon province, Iraq. The current work included the recording of 142 new cases of CL infection in Babylon province for the period from November 2019 to February 2020. Male infection was represented by 87 cases (61.27%), while females composed 55 samples (38.73%), with a significant difference ($p < 0.05$) between the two groups. The age group of 5-14 years was found to have the highest recorded CL cases (56; 39.44%), while the age group of less than one year had the lowest cases (1; 0.70%), with the differences being significant at $p < 0.05$. Al-Gazali location was found to include the highest recorded CL cases (29; 20.42%), whereas Kish location had the lowest cases (1; 0.70%). The dry type of CL lesions was represented in 112 cases (78.9%), while the wet type was represented 30 cases (21.1%). The ulcero-crusted form of CL sores was more frequent (105; 73.7%), followed by the papulonodular form (30; 21.1%). According to the location of lesions, the upper limb lesions were more frequent (90; 63.16%), followed by the lower limb lesions (37; 26.32%). About 82 (57.9%) of the recorded CL cases were appearing as new cases, whereas 60 cases (42.1%) were recorded as a relapse after treatment. The study concludes that CL is highly distributed in Babylon province.

Keywords: Cutaneous leishmaniasis, Epidemiology, Babylon province

تقييم الجوانب المسحية والوبائية للشمانيا الجلدية في محافظة بابل، العراق

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الخلاصة

أمراض اللمشمانيات هي مشكلة صحة عامة مهمة في المناطق الاستوائية وشبه الاستوائية. هدف الدراسة هو تقييم الوضع الوبائي لمرض اللمشمانيا الجلدية في محافظة بابل، العراق. تضمن العمل الحالي تسجيل 142 حالة إصابة جديدة باللمشمانيا الجلدية في محافظة بابل للمدة من تشرين الثاني 2019 إلى شباط 2020. تم تشخيص الإصابات سريريا من قبل الأطباء العاملين في مستشفى الهاشمية. وجد أن نسبة الإصابة باللمشمانيا

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الجلدية في محافظة بابل كانت 49 لكل 100000 شخص. كانت نسبة إصابة الذكور 87 (61.27%) بينما كانت نسبة إصابة الإناث 55 (38.73%) بفروقات معنوية $p < 0.05$. أعلى حالات إصابة باللشمانيا الجلدية كانت قد سجلت في الفئة العمرية 5-14 سنة 56 (39.44%)، بينما أوطأ حالات كانت قد سجلت في الفئة العمرية أقل من سنة واحدة 1 (0.70%) بفروقات معنوية $p < 0.05$. وأعلى حالات إصابة باللشمانيا الجلدية كانت قد سجلت في موقع الغزالي 29 (20.42%)، وأوطأ حالات كانت قد سجلت في موقع كيش 1 (0.70%). كان المظهر الجاف لنوع اللشمانيا يمثل 112 (78.9%) بينما كان المظهر الرطب يمثل 30 (21.1%). كما تبين ان شكل البثرة القشري المتفرح هو الأكثر ترددا 105 (73.7%) تلاه شكل البثرة الحطاطي 30 (21.1%). كما تبين ان موقع البثور في الاطراف العليا هو الأكثر ترددا 90 (63.16%) تلاه موقع البثور في الاطراف السفلى 37 (26.32%). تم تسجيل حوالي 82 (57.9%) من الاصابات كحالات جديدة، لكن 60 (42.1%) من الحالات كانت قد سجلت كأنتكاسة بعد العلاج. أستنتجت الدراسة ان اللشمانيا الجلدية عالية الانتشار في محافظة بابل.

Introduction

Leishmaniasis diseases comprise important public health problems in both tropical and subtropical areas, mostly at all times [1]. Iraq is one of the areas that are endemic with cutaneous and visceral leishmaniasis [2, 3]. Leishmaniasis is a common group of infections caused by common parasites called *Leishmania* spp.. which are protozoans transferred to humans through the bite of a common vector called sandfly which belongs to the Phlebotominae family of insects [4].

In general, the literature refers to the recording of three known forms of leishmaniasis based on clinical features, which are the visceral (VL), cutaneous (CL), and mucocutaneous (MCL). CL is recorded as the most common and widespread form [5].

Cutaneous leishmaniasis is the most common syndrome feature. It normally creates skin lesions on different locations of human body that are always exposed to sand fly biting, such as the face, neck, arms, legs, and perhaps abdomen. The number of lesions might reach two hundred on one body. Healing of ulcers often leaves permanent scars which, when present on the face, cause serious social problems [6].

CL has currently been endemic in 88 countries, covering most of the continents such as Asia, Africa, Europe, and America. About 350 million persons are considered being at risk for CL, with a worldwide prevalence of 12 million cases and annual incidence of 1.5 million cases. The causes of high prevalence of CL are exclusively related to climate change and shifts in anthropological environments [7]. Another study reported that the global incidence of CL ranges between 0.7 to 1.2 million annually [8]. The average annual incidence rate of CL was reported to have the range of 2.8 to 4.6 per 100,000 people in Jordan, Syria, KSA, Kuwait, and Turkey [8]. The records of CL prevalence revealed a range of 0.7 to 4.7% in Iran [9]. A study conducted in India recorded an incidence rate of CL of 2.5 per 1000 persons per year [10]. In Iraq, leishmaniasis is widespread. The incidence rate of CL was recorded as 5/100,000 individuals per year; it was reported that CL cases were peaked to 45.5 cases per 100,000 in 1992. Also, an outbreak was investigated as 300- 400 cases were recorded in Diwanayah province in 2008 [11]. In 2020, more than 200 cases were recorded in this study, which was conducted in Al- Madhathiya sub-district (Al-Hashimiyah district), Babylon province, through a survey study in schools, health centers, and rural areas. In general, fourteen species of *Leishmania* are known to cause Leishmaniasis diseases to humans; these types may have similar or different clinical syndromes [12]. The causative agents of CL are confirmed in many countries, including those neighboring Iraq. In Iran, *L. tropica* was found to be the causative agent of anthroponotic cutaneous leishmaniasis (ACL), while *L. major* was found to be the causative agent of zoonotic cutaneous leishmaniasis (ZCL) [13]. In Saudi Arabia, *L. major* and *L. tropica* were found to be the etiological agents of cutaneous leishmaniasis [14, 15]. In Kuwait, *L. major* is the causative agent of cutaneous leishmaniasis [5]. In Turkey, it is well-known that ACL is caused by *L. tropica* and zoonotic CL is caused by *L. infantum* and *L. major* [16]. In Jordan, CL was found to be caused by two types of parasites, namely *L. major* and *L. tropica* [17]. In Morocco, CL was found to be caused by three species, namely *L. tropica*, *L. major*, and *L. infantum* [18]. The aim of this study is to conduct an epidemiological survey of CL in Babylon province, Iraq.

traditionally cover less parts of their skin as compared to females, which leads to higher exposure to sandflies [21].

The age group of 5-14 years was found to have the highest recorded CL cases (56; 39.44%), while the age group of less than one year had the lowest cases (1; 0.70%), with significant differences between the two groups (Table-2). The results of this study are in agreement with those of previous studies conducted in Iraq. For example, an earlier study showed that the age range of 1-14 years recorded the highest incidence of CL. The authors attributed this result to the weakness of children's immune system as compared to that of the adults, or the exposure to low doses of the parasite transmitted by sandflies. Furthermore, the results of the present study agree with those of another study [22], which found that the overall incidence of CL is greater among people who are 5–14 years old. This age is the school and work age in Iraq for both genders, who are more likely to participate in outdoor activities and be exposed to sandfly-associated environmental conditions. Also, *L. tropica* infections were reported to result in the development of life-time immunity [23], which may contribute to lower incidence in the oldest age groups [24].

Table 1- CL recorded cases in Babylon province according to gender during 2019-2020.

Gender	No of CL cases	Percent of CL cases (%)	Mean \pm SD	P-value
Male	87	61.27	71 \pm 0.4	<0.001
Female	55	38.73		
Total	142	100		

Table 2- CL recorded cases in Babylon province according to age group during 2019-2020.

Age group	No of CL cases	Percent of CL cases (%)	Mean \pm SD	P-value
<1year	1	0.70	10.5 \pm 11	<0.001
1-4years	34	23.94		
5-14years	56	39.44		
>14 years	51	35.92		
Total	142	100		

Al-Gazali location was found to have the highest recorded CL cases (29; 20.42%), while Kish location had the lowest recorded cases (1; 0.71%) (Table-3). The dry type of CL lesions was found in 112 cases (78.9%), while the wet type was found in 30 cases (21.1%) (Table-4). These results are concordant with classical knowledge about the disease, as dry and wet lesion types are attributed to *L. tropica* lesions [16].

Table 3- CL recorded cases in Babylon province according to the location in 2019-2020.

Location of CL cases records	No of CL cases	Percent of CL cases (%)
Al-Kamisiyah	22	15.49
Al-Gazali	29	20.42
Al-Hamza	8	5.63
Al-Hashimiyah	27	19.01
Al-Qasim	5	3.53
Al-Shomali	17	11.97
Al-Shuraifat	17	11.97
Kish	1	0.71
Al-Dabbla	2	1.41
Al-Saaed	6	4.23
Al-Shumua school	3	2.11
Al-Mashaael health center	2	1.41
Al-Elaf school	3	2.11
Total	142	100

Table 4- CL cases according to type of lesion, recorded in Babylon province in 2019-2020.

Type of lesion	No of cases	Percent of CL cases (%)
Dry CL lesion	112	78.9
Wet CL lesion	30	21.1
Total	142	100

The ulcero-crusted form of CL was found to be more frequent (105; 73.7%), followed by the papulonodular form (30; 21.1%), and lastly the impetigenous form (7; 5.2%) (Table-5). These results are in agreement with those reported by previous studies [25, 26]. The latter study found that the ulcerated form has the most common presentation. It should be noted that CL may also be present in other unusual forms, such as the papulonodular, psoriasiform, and impetiginous.

Most of CL lesions were 10mm² in size (67; 47.37%), followed by >30mm² size (52; 36.83%), and lastly the 20mm² size (22; 15.80%) (Table-6). The results of this study are in agreement with those of a previous study, which reported that the size of CL lesion in early stages was 52.1 mm², whereas that in the late CL was 346.8mm² [27]. Also, these results are consistent with the findings of the Health Organization (WHO) [28], which reported that the size of most of the lesions was lower than 40mm².

Table 5- CL cases frequency according to lesion shape in Babylon province in 2019-2020.

Form of sore	No of CL cases	Percent of CL cases (%)
Ulcero-crusted	105	73.7
Papulonodular	30	21.1
Impetigenous	7	5.2
Total	142	100

Table 6- CL frequency according to lesions size in Babylon province during 2019-2020.

Size of lesion mm ²	No of CL cases	Percent of CL cases (%)
10	67	47.37
20	22	15.80
>30	52	36.83
Total	142	100

The location of lesions was more frequent in the upper limbs (90; 63.16%), followed by the lower limbs (37; 26.32%), while the face and neck had equal frequencies (7; 5.26) (Table-7; Figures -2A, 2B, and 2C). These results provide support to those previously reported [29], which found that the lesions were more frequent in upper limbs than the lower limbs. The authors stated that people who prefer to sleep outdoors are more exposed to bites at their upper and lower limbs as well as faces at night when the insects become more active. In addition, the distribution of the lesion depends on the parts of the body that are more exposed to sand fly bite. In addition, the results of the current study are consistent with those of another work which attributed the high frequency of lesions in the upper parts of the body to the probability that these sites are more exposed to flies. If the lesion location is on the extremities of the body, the location can be protected against bites by the dress, but if it is on the face, it is difficult to cover and easily exposed for biting during the active periods of sandflies in the night, which is important for spreading the parasite [16].

Table 7- CL cases according to the location in the body, recorded in Babylon province during 2019-2020.

Location of lesion	No of CL cases	Percent of CL cases (%)
Upper limbs	90	63.16
Lower limbs	37	26.32
Face	7	5.26
Neck	7	5.26
Total	142	100



Figure 2- Cutaneous lesions of *Leishmania* appearing on different locations of the body. The samples were collected from Al-Shureifat village, Babylon, Iraq in 2020; A. Face, B. Hand, C. Leg.

About 82 (57.9%) of the recorded CL cases appeared as new cases, but 60 cases (42.1%) of were recorded as a relapse after treatment (Table-8). These results are similar to those reported by an earlier study [30], which found relapsing lesions after ten months, which required further treatment. The highest number of sores recorded was two sores in 45 cases (31.6%), while the lowest number of sores was four sores recorded in 7 cases (5.2%) (Table-9). The results agree with those of other studies which discussed the long periods of exposure to repeated and consecutive bites of sandflies as well as the high population density of sandflies in this area [29, 31]. In general, the presence and distribution of lesions depend on which parts of the body are exposed and the susceptibility of the host [11].

Table 8- CL cases according to appearance, recorded in Babylon province during 2019-2020.

Appearance of CL cases	No of CL cases	Percent of CL cases (%)
New cases	82	57.9
Relapse cases	60	42.1
Total	142	100

Table 9- Number of sores in CL cases recorded in Babylon province during 2019-2020.

No. of CL lesion	No. of CL cases	Percent of CL cases (%)
One lesion	37	26.3
Two lesion	45	31.6
Three lesion	30	21.1
Four lesion	7	5.2
>five lesion	23	15.8
Total	142	100

Conclusions

The study concludes that the distribution of CL in Babylon province is high compared with other records. This result is due to the abundance of the vector and the formation of a reservoir of the disease with suitable environmental conditions.

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Conflict of interest

The authors declare that they have no conflict of interest.

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