



Epidemiological study of *Cutaneous leishmaniasis* in Al – diwaniyah province, Iraq

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Abstract

The study included examining 4276 people who visited Al-Diwaniyah Teaching Hospital in Al-Diwaniyah Governorate Center and its county areas. The disease was diagnosed clinically by a dermatologist in the hospital and excluded all cases similar to *Cutaneous leishmaniasis*. The study showed that the mean prevalence of *Cutaneous leishmaniasis* was 34.82%, the rural areas were more prevalent for this disease (40.57%) compared to the areas within the city (18%). The months, December, January, and February, recorded the highest infection rate of 48.98%, 57.62%, and 51.16%, respectively. The incidence of *Cutaneous leishmaniasis* was 43.33% at the age of 1-14 years and 21.45% at the age of 55 years. Males were more susceptible to infection (48.05%) than females (26.39%). The arms and legs were more susceptible to infection (58.70%) than head ulcers (58.70%). Multiple ulcers showed more prevalence in the body (60.44%) compared to a single ulcer. Wet ulcers were more prevalent (82.94%) compared to dry ulcers (17.06%).

Keywords: baghdad boil, flagellata, blood and tissue, sandfly, tropica, major

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INTRODUCTION

Forced migration of Iraqi people from their province has encouraged an increase in the infected rate with *Cutaneous leishmaniasis* in areas previously uninfected, especially when the clinical form of the *Leishmania tropica* parasite of anthroponotic appears and on the other hand, immunity has the greater role In determining the type or number of ulcers a person has, which depends mainly on the immune response of the infected person and the virulence of the parasitic strain of the type of cutaneous leishmania (Al-Qadhi *et al.* 2013).

The spread of *Cutaneous leishmaniasis* is linked to multiple economic and environmental factors such as population growth, population migration, population expansion, and agricultural activity. Population movement and rapid urbanization projects and the invasion of disease-endemic areas are the most important factors in the emergence and survival of the disease (WHO 2010).

As for the ages in which *Cutaneous leishmaniasis* is common, most of the prevalence recorded in children under the age of twelve who are most susceptible to developing the disease (Pringle 1957, Al-Janabi 2001) mentioned that the infection rate was 63.3% in the age of 15. With regard to sex, most studies indicated that both male and female sexes are equally vulnerable to infection (Al-Mayali 2008).

As for the timing of the appearance of the infection, the research varied slightly, some of which indicate that the cases of the infection peaked in the month of January and February and decreased significantly in July (Rahim and Tatar 1966, Al-Yaziachi 1974).

It is well known that the predominant method of transmission of the parasite to humans is the bite of a female sandfly that is a small insect vector that is 2-3 mm long and acts as a vital vector of leishmaniasis around the world with its known species (WHO 2010).

The study aimed to identify some epidemiological factors accompanying the spread of *Cutaneous leishmaniasis* in Diwaniya governorate, which includes (the incidence of leishmaniasis, the incidence of male and female infections, age group, the number of skin lesions, the distribution of skin lesions, the type of skin lesion being wet or dry, the size of ulcers).

MATERIAL & METHODS

Study Area

Al-Diwaniyah is the center of Al-Diwaniyah Governorate in the central region of Iraq, or what is called the “Middle Euphrates” region. Its number is 350,000 people. Its area is 52 square kilometers, it is

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Fig. 1. Map of center and district Al-Diwaniyah (<https://www.google.com/maps/place/>)

Table 1. Prevalence of *Cutaneous leishmaniasis* in Al-Diwaniyah city

Region	No. tested	No. infected	%
Al-diwanayah	1089	196	18
Al - Hamza	1193	761	63.79
Al- Shamiya	867	34	3.92
Afk	1127	498	44.19
Total	4276	1489	34.82

P=0.000

bordered by the governorates of Wasit and Dhi Qar from the east, the governorates of Babel and Wasit from the north, the province of Muthanna from the south and the province of Najaf from the west within the geographical coordinate lines 31.17 and 32.24 north and longitudes 44.24 and 45.49 east (**Fig. 1**).

Sample Collection

Samples were collected from people who reviewed to Al-Diwaniyah Teaching Hospital, where 4276 samples were collected from people suspected of having dermal infected after being diagnosed externally by a specialist during the year 2018.

Diagnosis of Samples

Clinical diagnosis: Clinical diagnosis was made by a dermatologist.

Laboratory diagnosis: Used direct smear method prepared from the edge of the ulcer and stained using Giemsa then checked for amastigotes by high –power microscope with oil immersion(John and Petri, 2006).

Statistical Analysis

The results of the study were analyzed using the Chi-square using the statistical program known as the Statistical Package for Social Sciences (SPSS) version 19 (Al-Baldawi 2009).

RESULTS

The prevalence of *Cutaneous leishmaniasis* recorded in this study in Al-Diwaniyah governorate about

Table 2. Prevalence of *Cutaneous leishmaniasis* during months

Months	No. tested	No. infected	%
January	647	331	51.16
February	423	221	52.25
March	728	227	31.18
April	274	15	5.47
May	367	25	6.81
June	176	6	3.41
July	74	2	2.70
August	97	2	2.06
September	63	28	44.44
October	375	47	12.53
November	245	120	48.98
December	807	465	57.62
Total	4276	1489	34.82

P=0.000

Table 3. Prevalence of *Cutaneous leishmaniasis* during age groups

Age group	No. tested	No. infected	%
1 – 14	1387	601	43.33
15 – 24	598	154	25.75
25 – 44	595	150	25.21
45 – 54	1048	445	42.46
> 55	648	139	21.45
Total	4276	1489	34.82

P=0.009

Table 4. Prevalence of *Cutaneous leishmaniasis* during to gender

Gender	No. tested	No. infected	%
Male	1665	800	48.05
Female	2611	689	26.39

P=0.011

34.82% this prevalence distributed in 18% in the city center, 63.79% in Al-Hamza district, 44.19 in Afak District and less prevalence 3.92% in Al-Shamiya District. The statistical analysis by chi-square found a significant difference in the prevalence of cutaneous leishmania between the city center and district of the province on level $p \geq 0.05$ (**Table 1**).

Table 2 Showed that the monthly distribution of *Cutaneous leishmaniasis* during the study months indicated that the rate of infection was in a noticeable increase during both the winter season (December, January, and February) and the autumn season (September, October, and November) and then decreased during the spring season (March, April, and May) and the summer season (June, July, and August) and this different more significant in level $p \geq 0.05$ (**Table 2**).

Table 3 showed in the study the ages group (1-14) years recorded the highest prevalence of *Cutaneous leishmaniasis*, at 43.33%, followed by age (45-54) years, at 42.46%, while the rest of the age groups represented a clear decrease in prevalence and different more significant in level $p \geq 0.05$ (**Table 3**).

Table 4 shows that males are 48.05% more exposure to infected with *Cutaneous leishmaniasis* than women that record 26.39%. The statistic analysis by chi-square found a significant difference in the prevalence of

Table 5. Prevalence of *Cutaneous leishmaniasis* during the resides

Resides	No. tested	No. infected	%
Urban	1089	196	18
Rural	3187	1293	40.57

P=0.003

Table 6. Prevalence of *Cutaneous leishmaniasis* according to the location of the ulcer

Site	No. tested	No. infected	%
Hand & leg	1580	874	58.70
Head	2696	615	41.30

P=0.072

Table 7. Prevalence of *Cutaneous leishmaniasis* during the number of ulcers

No. ulcer	No. tested	No. infected	%
multiple	2350	900	60.44
single	1926	589	39.56

P=0.046

Table 8. Prevalence of *Cutaneous leishmaniasis* during the number of ulcers

Type	No. tested	No. infected	%
Zoonotic	2182	1235	82.94
Anthroponotic	2094	254	17.06

P=0.000

cutaneous leishmania between the city center and district of the province on level $p \geq 0.05$.

Table 5 shows the rate of infection with the *Cutaneous leishmaniasis* parasite, according to the location of housing during the current study period, and the results obtained show that the infection rates increased in rural agricultural areas (40.57%), while the remaining infection rate (18%) You may be present in the city center.

Table 6 shows that no significant difference between a part of the body exposure to infected. The hands and legs are more the part affected by parasitic ulcers (58.70%) compared to the head (41.30%).

The statistical analysis by chi-square ($p \geq 0.05$) noticed the infection of people with more than one ulcer was the highest (60.44%) compared to those with one ulcer (39.56%) more significant (**Table 7**).

Table 8 shows that the prevalence of wet ulcer of Zoonotic accounted for 82.94% and a high rate compared to dry ulcer of Anthroponotic that accounted for 17.06% of the total parasitic infections of *Cutaneous leishmaniasis*. The statistical analysis by chi-square found significant difference in prevalence of cutaneous leishmania between origin of ulcer on level $p \geq 0.05$ (**Table 8**).

DISCUSSION

Recorded in this study the prevalence of *Cutaneous leishmaniasis* in Al-Diwaniyah governorate about 34.82% this result agreement with other studies, in the same area (Seaad et al. 2017) which recorded the high prevalence of *C. leishmaniasis* in the city center, Al-Hamza district and Afak district. The main reason for the

increasing number of this percentage is due to the migration movement that occurred during the past years, which increased the chance of developing *Cutaneous leishmaniasis* (Korzeniewski, 2006).

Notice increased the prevalence of infection during both winter and autumn season and less in both Spring and summer season these results agree with the study (Al-Difaie and Jassim 2014, Al-Maialy 2004, Seaad et al. 2017, WHO 2002) in the same area. Increased prevalence during summer months perhaps due to using an insecticide to vector (sandfly) in the first April and incubation period of cutaneous leishmania which needed many weeks (Amin et al. 2013, Bulent et al. 2016).

The current study showed that ages (1-14) years recorded the highest incidence for children may be attributed to their weak immunity compared to the development immunity of adults with growing old and as a result of exposure to low doses of the parasite transmitted by sandflies (Al-Difaie and Jassim 2014, El-Safi et al. 1991, Musa 2011).

Also shows that males are 48.05% more exposure to infected than women. The higher number of male casualties compared to women is attributed to the fact that they use the home yard to sleep in the summer while children and women sleep in the rooms, especially in rural areas (Uzun et al. 1999). The exposed bodies of organs such as hands and legs in men help increase the chance for parasite infection compared to women's clothing (Dhia El-Deen et al. 2006).

As for the prevalence of *Cutaneous leishmaniasis* by regions during the study, the results of the study also indicate that lesions of *Cutaneous leishmaniasis* were concentrated in rural areas, which included Afak, Shamiya, and Hamza, where the focus of infection appeared in the last region and the number of injuries in it reached 761, with a rate of 63.79%. The number of injuries in the governorate center is 196 injuries, with a rate of 18%, and this corresponds to Al-Difaie and Jassim (2014) but disagreement with Mayali (2004) in the same area, was confirmed that most of the cases came from the city center.

The study showed that the hands and legs are the most part of the body infected with parasitic ulcers (58.70%) compared to the face (41.30%). This result compares to Dawood and Al-Jeboori (2016), while other studies have shown the opposite (Al-jawabreh et al. 2003).

Results in the current research showed the percentage of people with more than one ulcer was the highest (60.44%) compared to those with one ulcer (39.56%), the results in the case study are similar to what he found (Daham and Al-Alousy 2011, Dawood and Al-Jeboori 2016) that multiple lesions indicate a persistence Successively and repeated bites of sand flies as indicated (Qadhi et al., 2013) that the immune response in infected with more than one ulcer was

higher than person which infected with one ulcer, but the logical explanation is due to the optimal conditions that allow infection occur, such as the nature of the exposed area provided Sandfly and even weak immune response.

Table 8 shows that the percentage of wet sores of animal origin accounted for 82.94% and a high rate compared to dry sores of human origin that accounted for 17.06% of the total parasitic infections of *Cutaneous leishmaniasis*, which clearly indicates that the main cause of this ulcer is *L. major*, who attacks the skin after a short incubation period of one to two months compared to *L. tropica*, which needs a longer incubation period (Alam et al., 2011). These results also indicate the presence of large numbers of reservoir animals in the study area (dogs, Rodents) especially the nature of the

area is agricultural, which encourages the availability of large numbers of insect vectors of disease: sand fly (Shujan 2017).

CONCLUSION

1. That *Cutaneous leishmaniasis* is experiencing a noticeable increase in proliferation in different regions of Iraq, and the results of the current study indicate this reality.
2. Children are the most susceptible to infection with the parasite due to their low immune side.
3. The number of ulcers was more present in people with *Cutaneous leishmaniasis* and more numbers in the same patient, which indicates a low innate immunity in the Iraqi citizen.

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