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# Serological detection of mucocutaneous leishmaniasis parasite district center in Majar al-kabir

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In this study, the prevalence and isolation of serotype-specific antibodies to Mucocutaneous Leishmaniasis are detected using an ELISA Enzyme-linked immunosorbent assay, which is specialized to detect the spectroscopic specific antibodies for the parasite Leishmania tropica , Leishmania brazilensis. The collection serums of 80 people from the rural and city, Various ages and for sexes, in the district center in Majar al-Kabir within Maysan Governorate, southern Iraq, Appearance Some signs of skin ulceration appeared in the areas of the face and limbs, with bloody diarrhea, vomiting, and sometimes occurring general weakness. Another group did not show any other clinical signs. An overview of infection rates based on clinical symptoms Skin ulcers: 80.9% on the limbs and face Vomiting and having bloody diarrhea: 45.4% and 70.7% have lymphadenopathy. Skin joint cracks and thickening: 33.4% Overall weakness: 45.4% 38.9% appear to be intact. An overview of the rates of infection by residential area 38.4% of the city 62.96% in rural areas Rate of infection overall: 55% The results showed that the total infection rate 55%, as the highest percentage is recorded in the group suffering from skin lesions. 80.9%, with a statistically significant difference from the rest of the totals, while the highest infection rate is detection for people in the rural compared to people living in the city, 62.96% and 38.4%, respectively, and with a clear statistically significant difference.

**Keywords:** Mucocutaneous Leishmaniasis; Majar al-Kabir; District; Serological detection.

## 1. INTRODUCTION

Leishmaniasis is a common disease between humans and animals caused by the Leishmania parasite, which is considered a parasitic protozoan that is forced to live inside cells. The parasite belongs to the Kinetoplastidia class, the Trypanosomiases family, of the Leishmania genus, type Leishmania tropica,

Leishmania major [1]. The parasite is transmitted in several ways, the most important of which is by the female sand fly of the Phlebotomous genus. The bite of the female fly is considered one of the most important methods of transmission. The infection can be transmitted sexually congenitally from the mother to the fetus and through the process of blood transfusion from an infected person to a healthy person or from an infected animal to a healthy person [2,3], The infection can also be transmitted through the use of contaminated medical syringes [4], Dogs and rodents are considered the most important reservoir hosts for the parasite [5]. The mucocutaneous form of the disease is characterized by skin lesions represented by dermatitis, cracks with thickening of the paw pad fissures, and skin blisters and ulcers in the facial area,[6]. In addition to the mucocutaneous form, it is also characterized by complete or partial amputation of the mucous membranes of the mouth, nose, and throat [7].

Diagnosing the parasite Leishmania tropica and Leishmania brazilensis is one of the most important problems facing researchers due to the large number of pathological symptoms observed in the patient [8]. Therefore, necessary to use appropriate early serological diagnostic tests upon the arrival of a patient whose diagnosis is doubtful and who carries multiple apparent and non-apparent signs. Possible use of direct and indirect tests.[9]. Detecting parasitic amastigotes in tissues and tests for detecting parasite DNA considered one of the effective methods for diagnosis [10]. But needed to quickly detect infection can be using specialized tests to detect antibodies to the parasite, and these tests include the indirect agglutination test, indirect immunofluorescence test, and the. (Enzyme-linked immunosorbent) – Indirect [11,12]. There are many studies to detect the parasite and its specific antibodies using rapid tests in humans in Iraq, but these studies lack more specific and sensitive tests[13], about Majar al-Kabir within Maysan Governorate, southern Iraq [14]. With the start of migration operations due to the drought in the marshes in southern Iraq and the migration of thousands of citizens towards the city, they are subjected to harsh living conditions in the marshes, along with the deterioration of health and service conditions therein, which created a fertile environment for the spread of diseases, including Leishmaniasis, as many cases of infection with this parasite are recorded in field hospitals at high rates. high, according to[15], and because the environment plays an essential role and is a reservoir for the parasite[16], this research had to be conducted to determine the prevalence of the parasite in Majar al-Kabir , using an indirect enzyme-linked immunosorbent test. the purpose of this research is to determine the prevalence of the Leishmania parasite in Majar al-Kabir using an indirect enzyme-linked immunosorbent assay (ELISA) to provide a more sensitive and specific diagnostic approach for detecting infections in the region.

## 2. MATERIALS AND METHOD

The study included 80 patients visiting Al Majar Alkabir hospital (from the city center and rural) of various ages and both sexes. Some of them appear to suffer from the appearance of skin ulcers in the face and extremities, along with bloody diarrhea, vomiting, enlarged lymph nodes, cracks, and general weakness, while others show no clinical symptoms. The blood samples are collected from patients from an intravenous drawing of 4 ml for the period from February 2022 until October 2023. The blood is then placed in sterile tubes and the blood is left until it coagulated. The tubes are then transferred to a centrifuge at 1500 rpm for 10 minutes, and then the serum is separated and placed in tubes until Conduct serological tests Eppendorf and stored at -30 ºC [11].

The indirect cELISA (indirect competitive ELISA) uses the kit, manufactured by Euroimmun, with a sensitivity of 96% and a specificity of 99% to detect specialized antibodies to the Leishmania parasite complex, using the recombinant antigen in patients' sera at a dilution of 1:101. The test is performed according to the instructions of the manufacturer of the diagnostic kit. The results are then statistically analyzed using the Chi-square test within the computer program (19 Spss program. V) [17].

## 3. RESULTS AND DISCUSSION

The results of the clinical examination of the patients under study showed a total infection rate of 55%. However, using the indirect cELISA, the infection rate varied in patients according to their clinical presentation, Patients who showed skin ulcers in the face and limbs area had the highest infection rate of 80.9%. While patients suffering from cracks and thickening of the footplate recorded the lowest infection rate, 33.4%, the infection rates for the rest of the patients varied between these two percentages, When the percentages of each infection are treated statistically, also that there are no statistical differences between them, except for the people who suffered from skin ulcers in the area face and limbs shown as in table 1 with Figure 1.

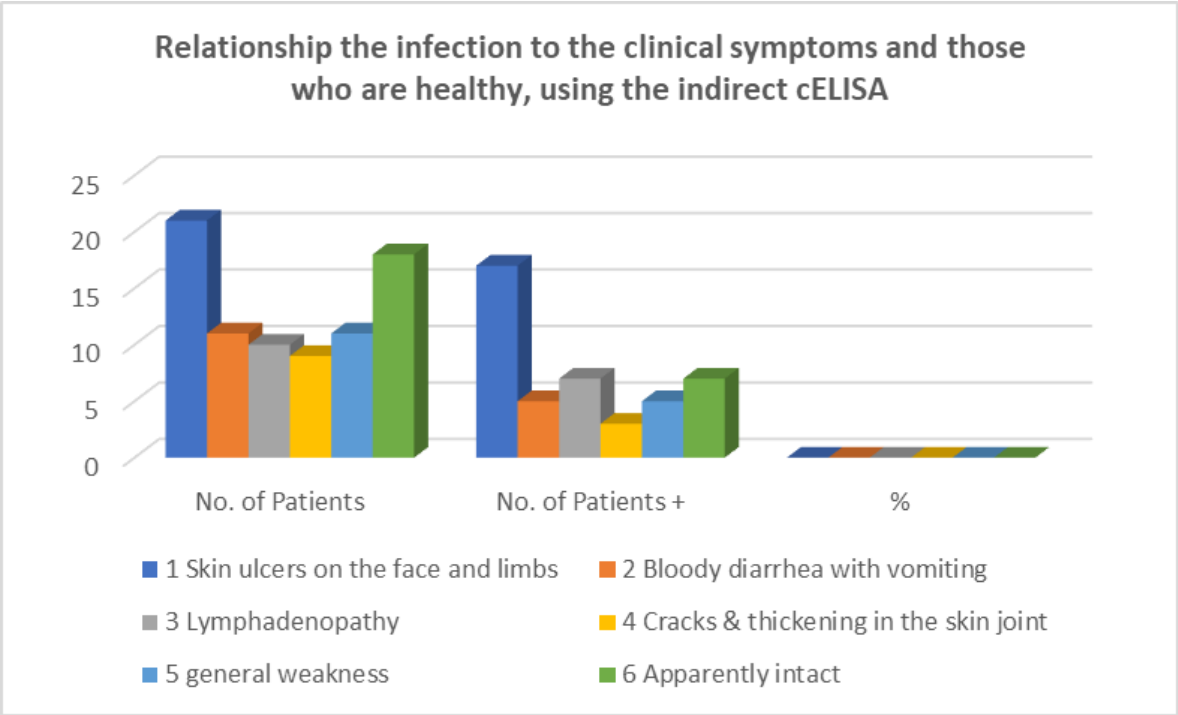


**Figure 1** Relationship the infection to the clinical symptoms and those who are healthy, using the indirect c ELISA.

**Table 1** Shows the relationship of the incidence of infection to the clinical symptoms appearing in patients and those who are healthy, using the indirect c ELISA.

| Type for clinical signs | No. of Patients | No .of Patients + | % | |
|---|---|---|---|---|
| Skin ulcers on the face and limbs | 21 | 17 | (80.9) | A |
| Bloody diarrhea with vomiting | 11 | 5 | (45.4) | B |
| Lymphadenopathy | 10 | 7 | (70.7) | B |
| Cracks & thickening in the skin joint | 9 | 3 | (33.4) | B |
| general weakness | 11 | 5 | (45.4) | B |
| Apparently intact | 18 | 7 | (38.9) | B |
| TOTAL | 80 | 44 | 55 | |

*The difference in letters: means that the values differ significantly under the probability level $P < 0.05$

The results of the study also showed that the highest infection rate is among people living in rural, where the infection rate reached 62.96%, while the infection rate among people living in the city is 38.4%. There are significant differences between the two groups shown as in table 2 with Figure 2.

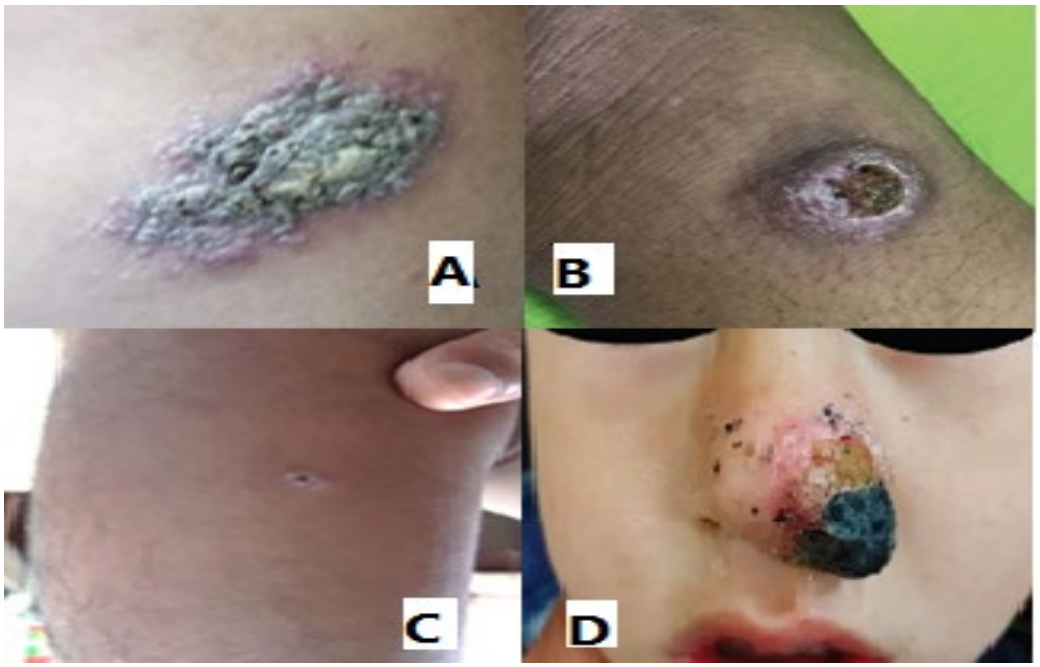


**Figure 2** Appears infection Leishmaniasis (a- single lesion in the lower abdomen. b- lower leg c-. Typical appearance of papule. d- the infection on nose left sidelesions: (A).

**Table 2** Shows the infection rate in the patients' residential area.

| Area | No. of Patients | No. of Patients + | % |
|---|---|---|---|
| City | 26 | 10 | (38.40) A |
| Rural | 54 | 34 | (62.96) B |
| TOTAL | 80 | 44 | 55.00 |

*The difference in letters: means that the values differ significantly under the probability level $P < 0.05$.

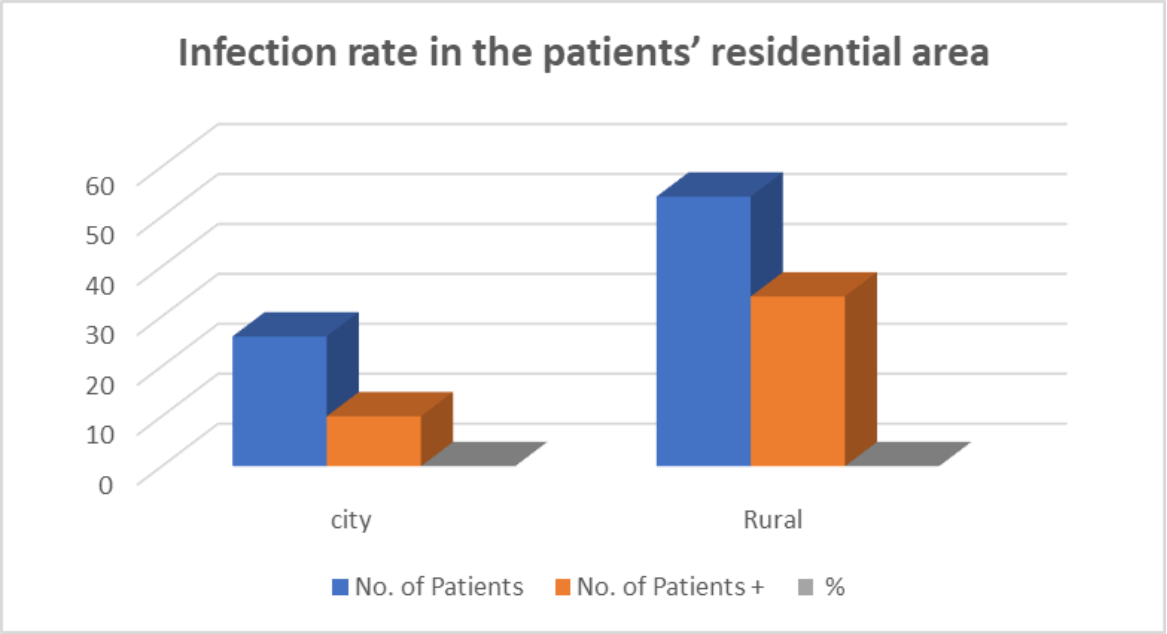


**Figure 3** Shows the infection rate in the patients' residential area.

Leishmaniasis is a threat to the health of both animals and humans, infection causes a humoral and cellular immune response. The humoral immune response is represented by the formation of specialized specific antibodies. Therefore, this type of immune response is used to diagnose infection with this disease to detect specialized immune globulins using many different types of serological tests. With its sensitivity and specificity to parasite-specific antibodies [18]. In this study, specific antibodies to a parasitic complex are investigated Leishmania tropica, Leishmania braziliensis (Leishmania chagasi and Leishmania. donovani) to detection Mucocutaneous Leishmaniasis Parasite, Using the appropriate antigen for eight types and different ages and genders, as well as the location of the patient and its effect on the extent of the infection and the effect of clinical symptoms on the patient on healthy patients. The results of the study showed that the total infection rate is 55% when comparing the results of our study with previous studies in Nineveh governorate [19], appeared that the infection rate is high compared to the researcher [1], as the infection rate reached 14%. The reason for this discrepancy is due to many reasons, including the difference in the type of serological tests used, as he used in his study the rapid test technique using the specific membrane-based immunoassay that is specialized only for Leishmania. While the indirect enzyme-linked immunosorbent test is considered more specific and sensitive in addition to the detection of antibodies to the parasite's complex antigen, [20] is stated that the indirect enzyme-linked immunosorbent test has high sensitivity and specificity compared to other serological tests. While another study compared the accuracy and sensitivity of two types of indirect enzyme-linked immunosorbent, the indirect immunofluorescence test and the rapid test technique using specific membrane-based immunoassay, also that the two most highly accurate tests are the indirect enzyme-linked immunosorbent [21] showed that the more complex and multiple proteins the specific antigen used in the technique are, the greater the accuracy and specificity of the test [22,23]. The high infection rate can also be attributed to the selection of infected patients in our study, as is considered a targeted study to detect antibodies to the parasite, in addition to the difference in time, [24], the environment in which samples are collected due to different circumstances. When comparing the infection rate to the clinical symptoms appearing in patients, [25] the results showed that the infection rate in patients who showed skin ulcers in the face and extremities area is the highest, 80.9%. The rates varied in other groups [16] the reason for this discrepancy in

infection rates is due to many reasons, including the stage of parasite infection, the individual immune response for each person, age of the patient, the form of the disease, and parasite type according [26]. Also, when comparing the infection rate in the city and the countryside, may be that the highest infection rate is in rural patients compared to city patients [19,27-29]. The reason for this discrepancy may be due to the health care of individuals in terms of health periodic treatment with anti-parasitic drugs, and combating external parasites, as well as the increasing interest in general hygiene due to their treatment. Lifestyle with that reduces the chance of infection with the parasite. identify and reduce infections in Mucocutaneous Leishmaniasis Parasite, there are important factors that must be focused on, including reducing and treating the causative vector and increasing health awareness, in addition to providing early diagnosis so that can be treated and reduced risks.

## 4. CONCLUSIONS

Numerous restrictions and presumptions are addressed in this study. The Greater Hungary region's sample size of 80 patients is geographically restricted, meaning that the results are exclusive to this region. The fact that the data was gathered throughout a particular time frame could have an impact on the seasonal outcomes. The accuracy of early diagnosis can be improved by future technological advancements, but the use of the indirect ELISA test improves the accuracy of antibodies to the parasite. The clinical evaluation of the symptoms, which is erratic but captures the practical medical diagnosis in the area, was used. The research made the assumptions that environmental and socioeconomic factors are uniform throughout the study community and that the ELISA indirect test is accurate. That *mucocutaneous leishmaniasis* was the cause of the clinical symptoms used to classify patients, which aids in the diagnosis' accuracy, and that all samples were obtained and processed under the same guidelines to guarantee the validity of the findings.

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