

Original Research Article

Epidemiological aspects of cutaneous leishmaniasis in North West of Libya

ABSTRACT

Aims: this study was conducted to evaluate the epidemiological aspects of Cutaneous Leishmaniasis (CL) in the patients who were presented to dermatology clinic of main referral hospital in Zliten and its distribution in relation to age, sex, season, residency.

Study design: In this case series study. The data of patients presented to dermatology outpatient clinic of Zliten Teaching Hospital over many years were analyzed to discover the incidence of CL, as well as the distribution of CL according to age, sex, residency, season, and affected body sites.

Place and Duration of Study: All patients with CL, who were referred or presented to dermatology outpatient clinic of Zliten Teaching Hospital, were enrolled. The majority of patients came from Zliten and its Suburban and the minority from neighboring cities. The study was conducted over more than a six-year period from November 2010 till December 2016.

Methodology: The referred or presented patients with suspected CL, were diagnosed clinically, and when diagnosis were suspicious slit skin smear and or Skin biopsy for microscopic confirmation were performed. The information about age, gender, address of patient, date of presentation, and site of lesions on the body were collected and analyzed with use of statistical Microsoft SPSS 20 .

Results: Out of all referred patients, 420 patients were found to be infected with CL. Males were 311(represented 74 %) and females were 109 (represented 26%). The ages of patients ranged from 2 years to 80 years, and most of the infections were in age group 20-29 years, which were 118 patient (28.1%), and decreased steadily after 40 years of age. Annual distribution of disease (Presentation of new cases of CL) increased markedly in 2016, and more wide geographical areas in Zliten were to be involved, and the disease most frequently observed in the winter.

Conclusion: CL in Zliten showed marked increase of infected cases in 2016, and changing pattern of distribution to become more in east area of Zliten in this year compared to previous years. This meant that new geographical areas to become endemic areas for CL. Therefore, further studies are required to recognize the vector, causative species of parasite and the animal reservoir, which would enable national and local health authorities to put effective control programs.

Key words: Zoonotic cutaneous Leishmaniasis, Epidemiology, Zliten, Libya.

1. INTRODUCTION

CL is a parasitic vector-borne disease caused by *leishmania*, which is flagellated protozoa transmitted by bite of infected female sandfly. There are variety of *leishmania species*, and each one of them has specific reservoir host [1]. The clinical presentation of CL vary depending on infecting *leishmania species* and its lesions persist for months before healing take place with atrophic scars, which could cause severe social and psychological

impact due to scarring and disfigurement [2]. CL is the most frequently occurred type of Leishmaniasis worldwide [3-7].

CL usually manifests with one or multiple lesions on exposed parts of skin. There are similarities between lesions caused by different *leishmanial species*, however; the immunological response is variable from one infected person to another, but all lesions share sequential appearance of papules, plaques, nodules, ulceration, crusting and healing with scarring. The incubation period for rural or zoonotic CL, which caused with *Leishmania major* (*L. major*) is less than 4 months and the spontaneous healing thereafter needs 2-8 months [8,9].

Leishmaniasis in general could be classified into anthroponotic or zoonotic according whether the natural reservoir of the parasite is human or animal. zoonotic CL is caused by *L. major* and *L. infantum* in rural areas, and anthroponotic CL is caused by *L. tropica* in urban areas [10].

In North Africa, *L. major* and *L. tropica* were the most frequent causative agents for CL, while *L. infantum* was the least frequent cause [4-7].

According to weekly epidemiological record of World Health Organization (2016) , there were 12 countries considered to be high burden countries for CL , and the number of recorded cases in high burden countries were tripled over few years from > 50000 in 1998 to >150000 in 2005. These high burden countries were Afghanistan, Pakistan, Iran, Saudi Arabia, Syria, Turkey, Morocco, Algeria, Tunisia, Brazil, Colombia, and Peru, with highest total number of CL cases (55204 infected patients) were in Syria according to data reported 2014 and in the same year in Tunisia were 3368 cases, but underreporting were debated [3] .

CL ranked among the tropical diseases least known and most neglected in middle east and north Africa region. Morocco and Tunisia were ranked as countries with highest prevalence of zoonotic cutaneous leishmaniasis (*L. major*), and Morocco was one of the countries with highest prevalence for anthroponotic cutaneous leishmaniasis (*L. tropica*) [11]. Cases were reported in north-west of Libya over dozens of years [6, 12-15]. Spread of CL into northern central part of Libya were recently documented [16,17]. The risk factors of this infectious disease were suspected to increase because of conflicts since 2011 as well as interruption of the leishmania national control program aimed to prevent the spread of CL to non-endemic areas. Moreover , Zliten as a coastal region has a higher risk of CL with expected increase of newly infected people each year according recent studies about CL in Libya[17, 18].

2. METHODS AND SUBJECTS

2.1 Area of Study

Zliten is a northern city in Libya and located on Mediterranean sea, about 160 Kilometer eastern of Tripoli (Fig. 1).



Fig. 1 Geographical location of Zliten on Mediterranean sea.

2.2 Objectives

Our study aimed to find out the epidemiological pattern of CL over several years in defined wide rural geographical area in northwest of Libya, in Zliten city, which had, according civil registration in 2015 more than 263000 inhabitant [19].

2.3 Methods

All patients presented to dermatology outpatient clinic of Zliten Teaching Hospital (ZTH) during the period from 1st November 2010 to 31st December 2016, and diagnosed with CL were included in the study. The dermatology outpatient clinic of ZTH is the only referral center for diagnosis and treatment of all suspected cases of CL in Zliten city. The only clinic in the region supplied with Pentostam (Sodium Stibogluconate) for treatment of CL. This clinic receives referral from primary and secondary health centers as well as from private clinics in Zliten.

In present study, a special form was filled for all patient, containing information about age, gender, address of patient, date of presentation, site of lesions on the body, number of them and type of applied treatment. Zliten were divided into 3 regions, central area, eastern area and western area, according to the geographical distribution of place of residency of patients. The diagnosis were based on clinical findings, in addition, laboratory tests, e.g slit smear and skin biopsy were done when necessary or the diagnosis were suspicious.

2.4 Statistical analysis

The obtained data were statistically analyzed using statistical Microsoft SPSS system, version 20. Frequency distribution, percentage, descriptive statistics, chi-square was performed whenever needed.

3. RESULTS

3.1 Study population

The total number of cases, which were identified to have CL, was 420 patients, majority of them were males (Fig. 2).

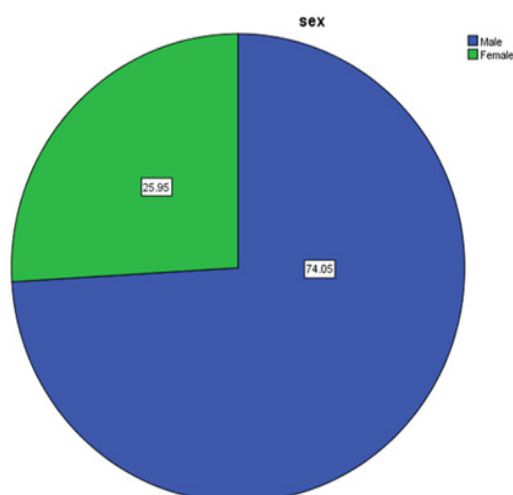


Fig. 2. Gender distribution of patients with CL.

3.2 Age

The mean age of patients was 30.6 years. The youngest were 5 patients, aged 2 years old. The oldest patient was male and aged 80 years old. The most affected age group were from 20 years up to 29 years, and more than 60% were patients aged between 10 up to 40 years old. As well as, it's clearly to be seen that after 39 years old the number of cases decreased steadily (Fig. 3).

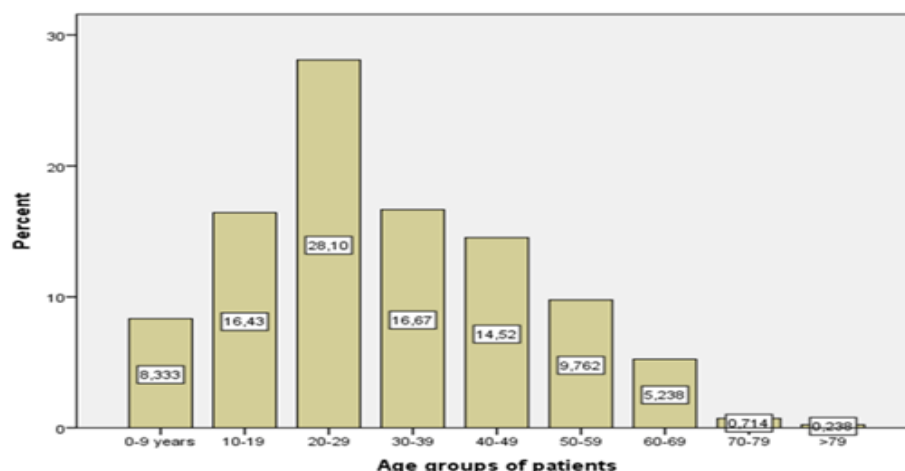


Fig. 3 Age distribution of patients with CL.

3.3 Seasonal variations:

Most patients were presented to Dermatology OPD of Zliten Teaching Hospital in December (Over many years), and followed by patients, who were presented in November. In June over studied years, no any new cases of CL were presented. In July, the least presented cases were registered (Fig. 4).

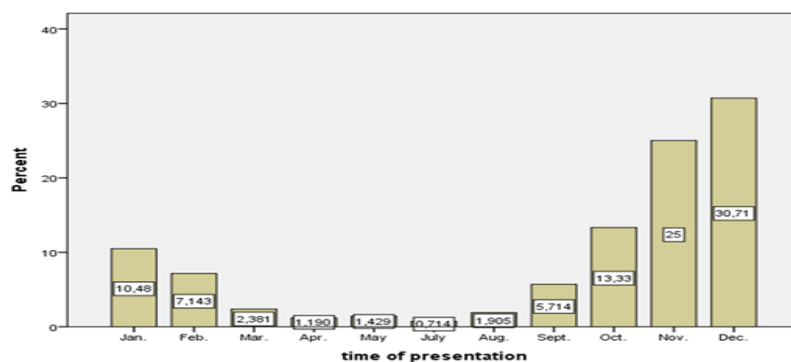


Fig. 4 Seasonal variation of patients with CL.

3.4 Incidence

The number of new cases of CL is markedly increased in 2016 to reach 264 new cases with incidence rate of 0.1 % or (1: 1000), which is relatively high compared to only 48 new patients in 2015 with incidence rate 0.01% (1:10000) , while, in the previous years, before 2015, the number of registered new cases was always

less than 33 cases in each year (Fig. 5).

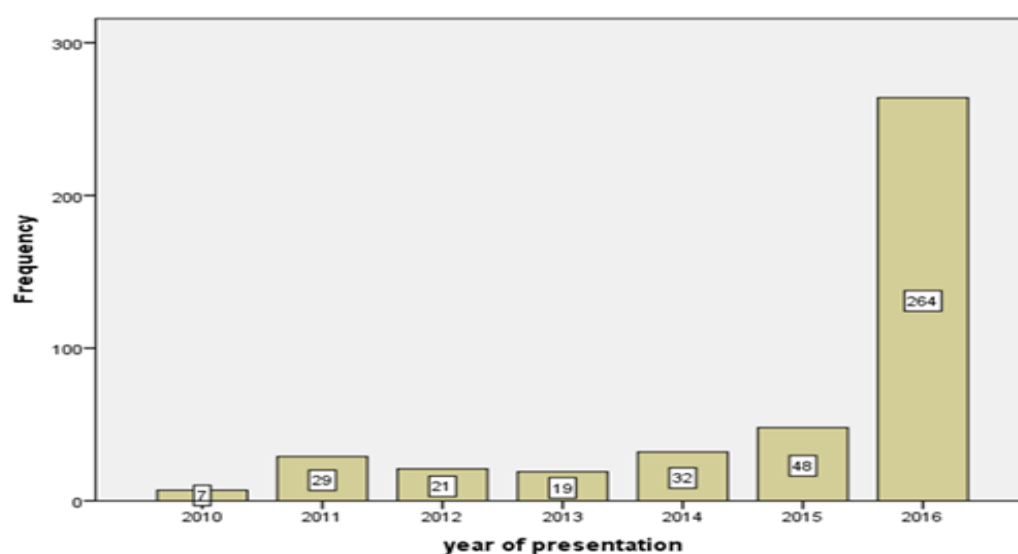


Fig. 5 The number of new cases with CL in several consequent years

3.5 distribution of cases according their place of residency

Viewing the geographical distribution according to residency, the largest number of patients, 172 (represented 41% of total), came from eastern area of Zliten. While 146 patients (35%) came from western area of Zliten (Fig. 6).

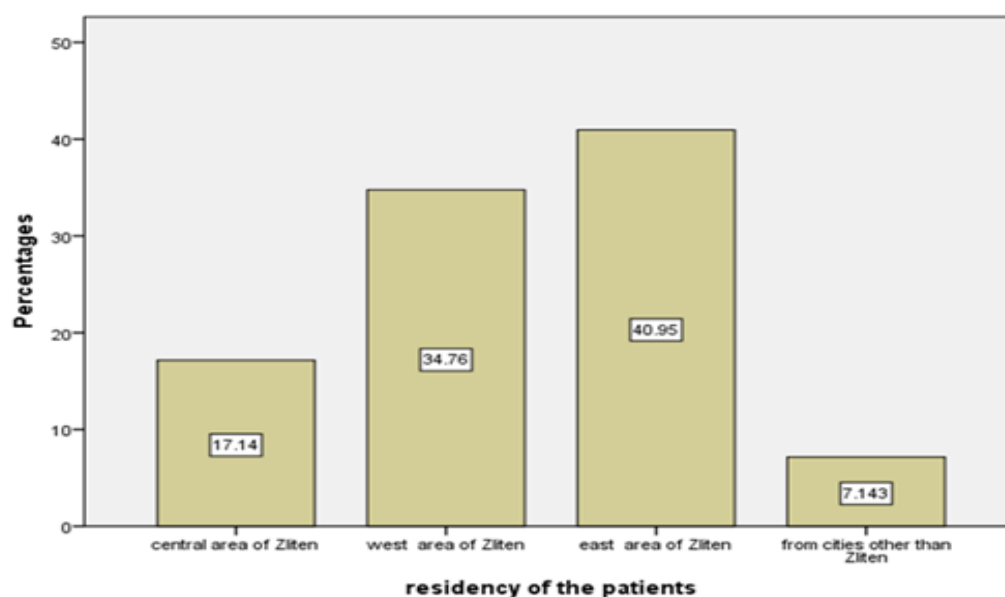


Figure 6 Distribution of CL cases according residency.

The most of the patient with CL in 2016 came from eastern area of Zliten. On the other hand, in all previous years from 2010 until end of 2015 the majority of patients were residents of western area of Zliten (Fig. 7).

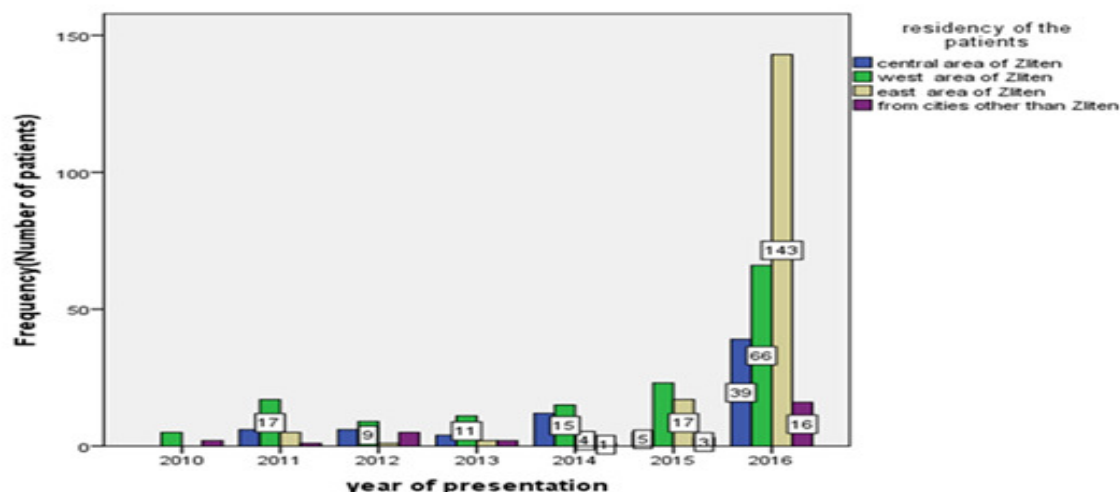


Fig. 7. The relationship between the distribution of CL cases according their residency and the year of presentation. (P value <0.05).

3.6 distribution of patients according affected body sites

Patients with sole facial lesions (with no other sites to be affected) were 16 patient (3.8%), while, the majority of patient were, either affected with lesions on one of extremities and were 194 patients (46.2%), or patients affected with lesions at different body sites (including, face, trunk and extremities) were 198 (47.1%). Metastatic lymphatic spread were reported in 10 patients (2.4%) (Fig. 8).

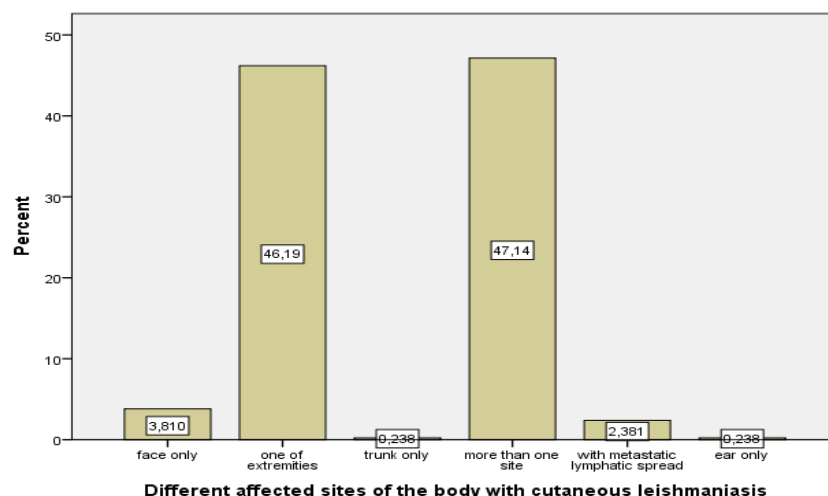


Fig. 8 Distribution of CL cases according different affected body sites.

4. DISCUSSION

In our study, males were more at risk to develop CL, this might be because of men, mainly young adults stay outdoors at night because of leisure or work activities, this make them more exposed to get stung with infected sandfly, furthermore, men sleep outdoors in hot weather in summer time, which make them more exposed than women.

CL were more to affect younger age groups, which could indicate that Zliten is an old endemic area for CL and this is similar to results of studies were done in AL-Rabta (Libya) as well as results of study carried out in Tripoli central Hospital, which studied the data of patients came from 24 localities in north west of Libya [15,20].

In present study the majority of patients sought medical advice in November and December months each year which was similar to pattern of increase of recording of CL in 1998 in AL-Rabta (Libya), as well as similar to seasonal distribution of CL in study preformed about the data of patients with CL from different localities in north west of Libya during the period of time from 1995 to 2008 and recently in 2011 and 2012 [17, 18, 20].

A survey was done in 1993 in Al-Haraba and 1997 in Ejhawat in North West of Libya, found out that, *phlebotomus papatasi*, the vector of *L. major*, was active and widely spread in the above named areas between August and October, which seems to be similar to the activity of the vector in Zliten, which is up to date still unknown, and need to be recognized [21, 22].

With considering that, incubation period for *L. major* lies between 2 weeks and less than 4 months, and clear seasonality for the CL incidence in Zliten, therefore, it is reasonable to think that CL in Zliten was caused mainly by *L. major*, therefore, it is mandatory to use sensitive and specific laboratory methods to recognize *leishmania species* causing skin disease [17,20].

The sharp increase in the number of infected patients in 2016 compared to the registered number in 2015 might be caused by increase in the number of vector and reservoir, that, the most of CL cases in 2016 came from eastern area of Zliten, which seemed to be newly developed focus for CL.

5. CONCLUSION

CL in Zliten, as a part of endemic area in north west of Libya, had characteristic features of ZCL, and recently had increasing rate of infected people, and more wide geographical areas to become endemic areas for CL, therefore, further studies are required for identification of vector, reservoir and infecting leishmania species, and continued research disease monitoring will allow the effective control of this infectious skin disease in Zliten.

ETHICAL APPROVAL

The study design and protocols were reviewed and approved by Ethical Committee of Zliten teaching hospital.

REFERENCES

1. Reithinger R, Dujardin JC, Louzir H, Pirmez C, Alexander B, Brooker S. Cutaneous leishmaniasis. lancet infectious diseases. 2007; 7(9):581-596. <https://www.ncbi.nlm.nih.gov>
2. Pearson RD, Sousa AQ. Clinical spectrum of leishmaniasis. Clinical infectious diseases. 1996; 22 (1): 1-13. <https://www.ncbi.nlm.nih.gov>
3. World Health Organization. weekly epidemiological record.(2016, 3 june); No. 22,91, 285-296. <http://www.who.int/wer>
4. Achour Barchiche N, Madiou M. Outbreak of cutaneous leishmaniasis: about 213 cases in the province of Tizi-Ouzou. Pathol Biol (Paris). 2009 ; 57(1) :65–70.
5. Rhajaoui M. Human leishmaniasis in Morocco: a nosogeographical diversity. Pathol Biol (Paris). 2011; 59: 226–229.

6. El Buni A A, Jabeal I, Ben-Darif AT. Cutaneous leishmaniasis in the Libyan Arab Jamahiriya: a study of the Yafra area. *Eastern Mediterranean Health Journal*. 2000; 6 (5–6): 884–887.
7. Bousslimi N, Aoun K, Ben-Abda I, Ben-Alaya-Bouafif N, Raouane M, et al. Epidemiologic and clinical features of cutaneous leishmaniasis in southeastern Tunisia. *Am J Trop Med Hyg*. 2010; 83(5):1034–1039.
8. Organization WHO. Manual for case management of cutaneous leishmaniasis in the WHO Eastern Mediterranean Region. 2014; 14.
9. Vega-Lopez F. & Hay R.J. Parasitic Worms and Protozoa, 37.35. In: Burns T, Breathnach S, Cox N., Griffiths Ch. *Rook's Textbook of Dermatology*. 8th ed. Wiley-Blackwell. 2010; 37.34–37.35.
10. Postigo JA. Leishmaniasis in the World Health Organization Eastern Mediterranean Region. *Int J Antimicrob Agents*. 2010; 36 (1): 62–65.
11. Hotez PJ, Savioli L, Fenwick A (2012) Neglected Tropical Diseases of the Middle East and North Africa: Review of Their Prevalence, Distribution, and Opportunities for Control. *PLoS Negl Trop Dis* 6(2): e1475. doi:10.1371/journal.pntd.0001475.
12. Onorato R. The current state of our Knowledge of the nasography of Tripoli. *Arch. It. Scie. Med. Colon*. 1931 ; 12:137-186.
13. Ashford RW, Chance ML, Ebert F, Schnur LF, Bushwereb AK, Drebi SM. Cutaneous Leishmaniasis in the Libyan Arab Republic: distribution of the disease and identity of the parasite. *Ann. Trop. Med. Parasit*. 1976; 70: 401-409.
14. EL-Buni A A, Ben-Darif A. Cutaneous Leishmaniasis in Libya: epidemiological survey in AL-Badarna. *Parassitologia* 38.1996; 579-580.
15. El Buni A A, Edwebi H, Ben Darif AL. Prospective study among cutaneous leishmaniasis cases in Tripoli Central Hospital, Tripoli, Libya. *Archives de l'Institut Pasteur de Tunis*. 1997; 74 (1– 2): 3–4.
16. Fathy FM, El-Kasah F, El-Ahwal AM. Emerging cutaneous leishmaniasis in Sirte-Libya: epidemiology, recognition and management. *Journal of the Egyptian Society of Parasitology*. 2009;39 (3): 881–905.
17. Amro A, Gashout A, Al-Dwibe H, Zahangir Alam M, Annajar B, Hamarsheh O, Shubar H, Schoenian G. First molecular epidemiological study of cutaneous leishmaniasis in Libya. *PLoS Neglected Tropical Diseases*. 2012; 6(6), e1700.
18. Amro A, Al-Dwibe H, Gashout A, Moskalenko O, Galafin M, Hamarsheh O, et al. (2017) Spatiotemporal and molecular epidemiology of cutaneous leishmaniasis in Libya. *PLoS Negl Trop Dis* 11(9): e0005873. <https://doi.org/10.1371/journal.pntd.0005873>
19. Monthly report on population number and statistics of Zliten office for civil registration. 2015 ; 4: 1-3.
20. EL-Buni A A, Ben-Darif AL-Lo. T, Refai A. Prospective study of cutaneous leishmaniasis in AL-Rabta, Libya. *Rivista Di Parassitologia*. 1999 ; Vol.XVI(LX)-N.3.
21. El-buni A A , AL-Edodi K, Refai A, Ben-Darif AL-Lo. T. Phlebotomine Sandflies (Diptera, Psychodidae) Fauna Survey in Ejhawat, Libya. *Rivista Di Parassitologia*. 1997; Vol.XIV(LVIII)-N.3
22. Elbuni A A , Annajar BB, Zaatour A , Ben-Darif AL-lo T, Refai A, Ftaiti A , Ben-Ismail R. Isolation and Biochemical characterization of leishmania major from phlebotomus papatasi in Libya. *Rivista Di Parassitologia*. 2000; Vol. XVII (LXI)-N.2.