Asifa Matrood Al-maeahi et al /J. Pharm. Sci. & Res. Vol. 10(12), 2018, 3146-3148

ISSN:0975-1459
Journal of Pharmaceutical Sciences and Research
www.jpsr.pharmainfo.in

Parasitological survey of visceral leishmaniasis (kala-Azar) in Al-Diwaniyah Province, Iraq

Asifa Matrood Al-maeahi and Ikhlas Abbas Marhoon
Department of Biology, College of Education, University of Al-Qadisiyah

Abstract

For the period from September 2017 to July 2018, atotal of 85 blood samples were collected from children suspected of being infected with kala- azar from four townships in Diwaniyah governorate, the city center, the Saniya township, the Shafiya township and the Al-Badeer township. Blood samples were collected with medical assistance from children who visit the birth hospital and children and some health centers and laboratories, using the Kala-azar direct TM Rapid test. The current study recorded the injury of 31 children with Kala-azar with a total infection rate of 36.4%. It was also noticed that the most common age group of infection is category (2-4) years with a percentage of infection rate of 54.5% followed by the age group(least 1 year - 2) year that record infection rate of 50% , and males were more susceptible to infection than females, having recorded a rate of infection of 38.2%. The study also showed that children who were most infection by kala-azar during the month of January with a rate of 60%, as well as the incidence of infection during the month of February and January, where the percentage of 53.8% and 50%, respectively, while decreased during June to 12.5% and more areas affected by Kala-azar are Al-Badeer township, The children recorded a high infection rate of 47.8%, followed by the Shafiya area by 35% while the Saniya township recorded a less infection reached to 29.4%.

Keywords: kala-azar, *leishmania donavani* , Rapid test ,children , *Phlebotomus*

INTRODUCTION

Leishmania parasite a single-cell parasite that belongs to the (Haemo-flagellates) and belongs to the (*genus Leishmania*) of the (*Family Trypanosmatidae*). The name Leishmania is named Leishman William, who discovered one of the species of that parasite microscopy belonging to flagellate protozoa in 1900. In a spleen biopsy taken from a soldier who died of fever in India, leishmania attacks the reticula endothelial system tissues of the (vertebrate host), it moves from one host to another by means of a sand fly insect bites (1). The disease of leishmaniasis occurs when the infection is transmitted by an insect called Sand fly belonging to the genus *Phlebotomns*, locally known as Hermas (2), and the sand fly is a small insect that feeds on the blood and it the *Psychodidae* family, order *Diptera*, with a body length of about 2-3 mm (3). It is active at night and rests in the houses, canes, caves and gaps between the rocks during the day. Most sand flies are usually bitten in dusk, females Absorbs blood to produce eggs,, usually their bites are painful (4). It has been found that there are other uncommon methods of parasite transmission, the parasite may be transmitted during blood transfusions, and the parasite may also be transmitted in transient cases such as joint use of injections between people (5).

The leishmania parasite is characterized by two forms, the (*Amastigote*) non flagellate which penetrates into the vertebrate host cells, the small size (2- 4 m) circular or oval, unicellular and proliferates within the Intracellular cells of the *reticula endothelial system* in vertebrate host (6). This phase infects humans and other vertebrate animals, living and dividing into large (Macrophage) cells that proliferate in the liver, spleen, bone marrow, lymph glands, lungs and subcutaneous. These parasites are called bodies of Lashman-donovan (7). The second form is the (Promastigote), which is founded in the intestines of the vector. The flagellated phase length about (20 m) and is highly motile, living in the frontal portion of the gut (Forgut) of host insects, the sand fly where it proliferate extracellular (8). The visceral leishmaniasis is consider from locally diseases in Iraq provinces and show the infection increased during the last years. the annual report of the Ministry of Health (2000) shows that the infections increase with the progress of the years, which caused a real health problem in the country led to many researches and studies on the disease from the epidemiological and environmental aspects, and the best ways to control the disease and the impact of the presence of dogs, rodents and other animals in the spread of the disease (9). The rates of infection have recently increased as the sources indicate that the reason is due to the impact of environmental changes on the carrier host and the host of the parasite as well as the lack of means to control the disease (10).

The disease is called Kala-azar, black fever or (Dum Dum) caused by (*Lishmania donouani*) parasites. It is found in many parts of Africa, Asia, South America and the Middle East, including Iraq (11). Clinical apearances of the disease in Iraq are similar in the Mediterranean region (12). The disease infects children and infants at high rates and may be due to the incomplete growth and development of the immune system, in addition to the absence of immunoglobulin Euglobulin in children's serums, which has the ability to destroy the parasite (13) and children are characterized by frequent exposure to the carrier because of the increased movement and activity at this stage of life. The infection may remain for several weeks or months. At the same time, some of the infected cells reach the bloodstream that carries them to the organs (liver, spleen and bone marrow) where the parasite stay and proliferates causing destroy of the organs cells and causing the visceral leishmania (14). and Kal-azar is characterized by a long irregular fever with Hepatosplenomegaly due to the accumulate of infected cells with parasite inside these organs (15). Weight loss and anemia due to the accumulation of parasite-infected cells in the bone marrow tissues-containing blood. in addition to iron deficiency, increased fragility of red blood cells, and ease of rupture with the disease development (16). If leaving the disease untreated can lead to mortality level reach to 100% through two years (17).

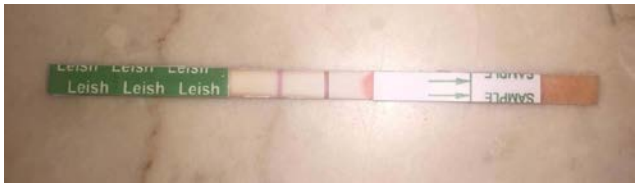
The WHO consider this parasite is important because it dangerous and spread prevalence, come the aim this study for known the prevalence of infection between children in some areas of Al-Diwaniyah Province and effect of age group and sex on infection rate by use Rapid test which consider new method using in Iraqi laboratories, also known on the some factors which help to spread this disease such as dogs.

MATERIALS AND METHODS

During the period from September 2017 to July 2018, a total of 85 blood samples were collected from children suspected of being infected with kala-azar by symptoms and are ranged in age from less from one to 6 years and more to four areas in Al-Diwaniyah province which included City center, Sanya township, Shafi'a district and Al-Badeer who visited birth hospital and children and Some health centers and civil laboratories. Blood samples were took by medical aid and put in clean test tubes and we recorded some information like patient's name, sex , age and housing and then separating the serum by using centrifuge at 3000/15 minutes

and then using Kala-azar direct test Tm Rapid test American origin USA, which was manufactured by In Bios company.
Test strip was taken after removing it from the protective casing and put inside test tube and then 2-3 drops (20 ml) of serum was added on the test strip in the area which called sampled ped area. Then a 3-2 drop of Buffer solution was added to the sample ped and read the result within 10 minutes and indicate the result , it consider a positive result when the emergence of two red lines, representing the top line is the control line and the bottom line is the positive result line in the picture(1). but if the negative result shows the line the top is just as in the picture (2).

Statistical analysis
The chi-square test was used to determine the effect of some variables on the number and incidence of childhood Kala-azar disease at P≤ 0.05 (18).



Picture (1) positive result of kala-azar test

Picture (2) negative result of kala-azar test

RESULTS :

Results showed the incidence of children with Kala-azar fever with a total infection rate of 36.4%, ranging in age from less than 1 year to 6 years and more. The age group(2-4years) recorded the highest infection percentage among children (54.5%). While the lowest rate of infection at 6 years and more which was 8% as in table (1) The statistical analysis showed a significant differences at P≤ 0.05.

Table (1): Percentage of infection of Kala-azar according to age groups of children

Age group of children	Positive No.	%
Less than a year - 2 years	9	50
2-4 years	12	54.5
4-6 years	8	40
6 years -more	2	8
Total	31	36.4

As for table (2), males were more prone to Kala-azar by 38.2%, while females recorded 34.2%. The total infection in children in Al-Diwaniyah was 36.4%. The statistical analysis showed no significant differences at P ≤ 0.05.

Table (2): Percentage of infection to Kala-azar in children according to the sex

Sex	Positive No.	%
Males	18	38.2
females	13	34.2
Total	31	36.4

The current study showed that the month of January recorded the highest rate of infection amounted to 60% followed by the months of February and December, the percentage of infection were 53.8% and 50%, respectively. While the lowest rate was observed in June amounted to 12.5% (Table 3). While in September, April and July there were no cases of infection by Kala-azar. Statistical analysis showed a significant effects at P ≤ 0.05 .
Results in table (4) showed numbers and percentages of infection in Kala-azar according to study areas. Al-Badeer township recorded the highest percentage of infection (47.8%) while Al-Sanya township recorded the lowest rate (29.4%) Statistical analysis showed a significant differences at P ≤ 0.05.

Table (3): Percentage of infection of Kala-azar according to the months of the study

Months of study	Positive No.	%
September	-	-
October	4	44.4
November	2	33.3
December	8	50
January	6	60
February	7	53.8
March	2	33.3
April	-	-
May	1	16.6
June	1	12.5
July	-	-
Total	31	36.4

Table (4): Percentage of infection of Kala- azar according to the study areas

The study area	Positive No.	%
AL-Sanya	5	29.4
AL-Shafya	7	35
City Center	8	32
AL-Badeer	11	47.8
Total	31	36.4

DISCUSSION

Through the results of the current study noted in table No. (1) that the age group (2-4) a year were vulnerable at 54.5%, followed by the age group (less than 2 years) and 50%, while the age group (6 years and above) The lowest rate of infection was 8%. This difference in the incidence of infection may be due to the fact that the disease affects all age groups of children without exception, especially the small age groups. This may be due to the incomplete development of the immune system in children under five years and their inability to protect themselves of sand fly bites during sleep, especially in the outdoors (19). It was also observed that the incidence is lower in the age groups greater than 6 years and this is consistent with the findings of (20) that the incidence decreases by increased age group and may be due to the development of their immune system.
As for table (2), males are more susceptible to sand fly bites and may be due to sleep in the outdoors and not wearing protective clothing in addition to some parts of their bodies exposed and this is not for the female as well as most infected males have dogs for the purpose of protection and play with them and these dogs consider reservoir host for parasite also these children living in houses from mud. In addition, the accumulation of waste contributes to the spread of the insect and its spread, thus increasing the incidence of infection (21). It may also be due to the incidence of males to the infection more widely than females due to the presence of long periods outside the home than girls as well as their presence in the agricultural areas for agriculture and irrigation helped the exposure to infection.

It was noted that the infection increased during the month of January and February by 60% and 53.8%, respectively, followed by the month of December and October by 50% and 44.4% respectively .This corresponds to the findings of (22) the infection increases during the cold and warm seasons and decreased infection During the month of June to reach 12.5% as in Table (3). This corresponds with (22) that the infection decreases with the beginning of the summer months and may be due to the high spread of sand fly in Iraq during the month of September (23). The incidence and spread of infections is due to temperature as insect bites start during the summer and hot months in conjunction with the activity of the insect carrier and density (2). The highest prevalence was recorded in Al -Badeer (47.8%) followed by Shafya district (35%) as in Table (4). It was noted that more infection found in children living in rural areas and working in animal-breeding and agriculture and most of their homes of mud and the presence of dogs the reservoir for the parasite and most children are malnourished, so all these conditions may be the cause of the large number of injuries as these conditions helped spread the sand fly insect (24). The center of Diwaniyah recorded infection rate a 32% injury due to the environmental neglect of the residential areas, the low level of health and the lack of attention to hygiene and non-integrated treatment helped spread the insect and thus increase the infection (21).

REFERENCES

1- Bates, P. A. (2008). Leshmania sandfly interaction: progress and challenges. Curr. Opin. Microbiol., 11:340-344.
2- Abu Hub, Jalil (1982). Vector - borne diseases. Kuwait, World Knowledge Series.
3- Young, D. and Duncan, M. (1994). Guide to the identification and geographic distribution of Lutzomyia sand flies in Mexico, the west Indies, central and south America (Diptera: psychodidae). Memoirs of the American Entomological Institute, 54, Associated publishers-American Entomological Institute, Gainesville, FL, USA,.
4- Desjeux, P.(1992). Human Leishmaniasis: Epidemiology and public health aspects. World Health Stat. Quarterly, 45: 267-275 .
5- Vidyashankar, C. (2002). Leishmaniasis. Medicine. Com. Inc. USA .
6- Herwaldt, B.L.(1999). Leishmaniasis. Lancet., 354(9185): 1191-1199.
7- Zeibig, E. A.(1997). Clinical parasitology: Apractical approach. W.B. Saunders, Philadelphia:320pp.
8- Chance, M.L. (1985). The Six diseases of WHO: Leishmaniasis . Brit. Med. J.,283:1245-1247.
9- Chin,j. (2000).Control of communicable diseases Manual.,17th.Ed. The American Puplic Health Association, New York: 420- 422.
10- Neouimine, N. I. (1996). Leishmaniasis in the eastern mediterranean region La Revenua De Sante de la Mediterraec Oriental 2(1) :1 – 6.
11- World Health Organization WHO (2000). Leishmaniasis: Magnitude of the problem.
12- Ponte–Sucre, A. (2003). Physiological consequences of drug resistancein Lieshmania and their relevance for chemotherapy kinetoplastid. Biol. Dis., 14:1 – 12 .
13- Taub, T. (1956) . Leishmania in Advances in parasitology. New York, Academic Press, : 2nd by Dawes, B. 1964 P. 70
14- Shaaban, Ibrahim and Bandar, Muhammad (1986). Parasitology. Ministry of Higher Education and Scientific Research, pp. 124-142.
15- World Health Organization WHO (1990). Control of The Leishmaniasis. Report of a WHO Expert Committee. World Health Organization, Geneva, Technical Report Series, No.793.
16- Hadi, Noha Jabbouri (2006). A serological epidemiological study of Lishmania disease in Dhi Qar Governorate. Master Thesis. Faculty of Education, University of Dhi Qar: p.91
17- Al-Hadithi, Ismail Abdel Wahab and Awad, Abd al-Hussein Habash (2000. Parasitology, second edition, Dahr Books, Printing and Publishing, University of Mosul: 48 p.
18- Al-Rawi, Khasha Mahmoud and Khalafullah, Abdul Aziz (1980). Design and analysis of agricultural experiments. Dar of Books for Printing and Publishing, University of Mosul, 488 pages.
19- Al-Mayaly, Hadi Medalloul Hamza (2004). Evaluation and use of some immunological tests in the epidemiological study of leishmaniasis in Qadisiyah Governorate. PhD thesis. Faculty of Education, University of Qadisiyah.
20- Rahi, A. A. ; Nsaif, S. ; Hassoni, J. J. ; Ali ,M. A. & Hamza, H. A.(2013). Comparison of Diagnostic Methods in CutaneousLeishmaniasis in Iraq. American J. Bio. Sci., 1: 1-5.
21- World Health Organization WHO (2002). Gulf syndrome (bug) is found parasite in Leishmaniasis tropica. Report of a WHO Export Committee. Tech. Rep. Series.
22- World Health Organization WHO (1998). Leishmania & HIV in Grid lock. WHO and Joint UN program.
23- Al-Grawi, E.D.C., and G.R.L. Al-Awsi. 2018. “Expression of CDKN2A (P16/Ink4a) among Colorectal Cancer Patients: A Cohort Study.” *Journal of Pharmaceutical Sciences and Research* 10 (5).
23- Abu Habib, Jalil (1978). Medical and veterinary insects. Baghdad University Press, pp. 104-108.
24- Peter, C. (2000). Leishmaniasis. In: Nelson Textbook of Pediatrics. 16th ed. Behrman, R.E.; Kliegman, R.M. & Jenson, H.B. (Eds.) W. B. Saunders, Philadelphia, USA