

Epidemiological study of Pediatric Visceral in Mid-Euphrates Area, Iraq

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Abstract— This study was carried out during the period from January 2012 to March 2013. Five hundred and eighty seven children aged 1- 60 months were admitted to paediatric ward of Pediatric and Maternal Hospitals of Al- Najaf, Babil, Karbala, and Al-Qadisiyyah provinces with confirmed or clinically suspected visceral leishmaniasis were included; most of them had clinical manifestation of fever, hepatosplenomegaly, weight loss, Leukopenia, and anemia. The diagnosis was under the supervision of paediatrician from each hospital.

According to the incidence of the infections, the higher incidence rate of VL was seen in rural regions of Al-Qadisiyyah province (51.27%), following by Babil (38.9%). The distribution of. The most common age group infected with VL was between 7-12 months, they represented 43.72%, which was higher as compared to other age groups. Finally, the monthly distribution of cases was variable from one month to the other with highest *peak* of infection during January and February in the both years (2014 and 2015).

1 INTRODUCTION

Leishmaniasis is one of the most important vector-borne diseases of humans, that caused by obligate intra-macrophage protozoa. This disease is characterized by

both diversity and complexity: it is caused by more than 20 leishmanial species and is transmitted to humans by 30 different species of phlebotomine sandflies [1] Leishmaniasis is a protozoan parasitic disease endemic to the tropical and subtropical regions of the world, with three major clinical forms, self-healing Cutaneous leishmaniasis (CL), Mucocutaneous leishmaniasis (MCL), and Visceral leishmaniasis (VL) [2].

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Leishmaniasis is still one of the world's most neglected diseases, affecting largely the poorest of the poor, mainly in developing countries. VL is considered as a fatal disease that causes death within two years if left untreated. According to the World Health Organization (WHO), 350 million people are considered at risk of Leishmania infection around the world. Currently an estimated 12 million people are infected and about 2 million new infections occur each year, half a million being VL [3] [4].

Leishmaniasis represents a major public health problem in the Eastern Mediterranean Region (EMR) of the World Health Organization (WHO). Visceral leishmaniasis is mainly seen in 14 of the 22 countries of the region. Anthroponotic visceral leishmaniasis, caused by *L. donovani*, occurs mainly in Sudan and Somalia. Zoonotic visceral leishmaniasis, caused by *L. infantum*, occurs in most countries of the region: in Afghanistan, Iran, Iraq, Jordan, Saudi Arabia, Syria, Turkey, Tunisia and Yemen[5] [6]. Iraq is a well-known area for endemicity with the Kala-azar disease[6] . Visceral leishmaniasis was first mentioned in Iraq by Kulz, 1916 (Pringle, 1956) [7]. In 1954, Taj-Eldinand and Al-Alousi

discovered that infantile Kala-azar is endemic in Baghdad [8]. Pringle (1956) described further cases in central Iraq in 1954-1955. Taj-Eldin and Al-Hassani (1961)[9] recorded of new cases in the period between 1954 and 1961.

During the period January 2000 to December 2002, the Central Health Laboratories in Baghdad identified 14502 cases by indirect fluorescent antibody test (IFAT) suspected to be infected with Kala-azar from sixteen governorates in Iraq. It was seems that Wasit governorate had the highest percentage of infections, and then it follows by Diala, Babil and Baghdad governorates[10] .

Hussein (2004)[11] mentioned that most cases of VL were usually detected in infants and children. At 2005, Khadim noticed that most of the focuses of VL located in area 100 Km around Baghdad mainly in AL- Sawira ,Al-Yousifia, Al-Mahamodia, ALLatifia, Salman pak , and Al-Azezea [12].

A cross-sectional study was carried out on children less than five years of both sexes, in Baghdad and Wasit governorates in the period from 1st January 2005 to 30th April 2006 and revealed that the prevalence of visceral leishmaniasis in Wasit

governorate (47.8%) was higher than the prevalence in Baghdad governorate (29%), In Baghdad the highest prevalence was observed in AL-Mahmodia, while in Wasit, the highest rate was recorded in Badra [13].

Other study reviewed cases with Kala-azar from Jan 2005 – Oct 2009, recorded that the Kala-azar was mostly a disease of infants and young children and the majority of Kala-azar cases was from Alkarkh in Baghdad[14] .

In Babylon Province, Al-Hashmya district showed highly number of Kala-azar infection than other districts of Babylon province including AL-Mahaweel, Al-Hilla and Ashomaly respectively[15][16]

In Basrah, only 41 cases were recorded during the period 1971- 1984 [17] and 147 cases for the period of 1993- 1997[18]

According to the data of CDC Surveillance Unit/ Primary Health Care Department/ Basrah, the number of cases that were reported in 2004 and 2005 was 608; about 34.5% of them were from Al-Qurna district [19]. Gani and colleagues (2010)[20] selected epidemiological aspects of VL among children suspected of visceral leishmaniasis and out of 146 suspected VL cases, 132 were positive by DAT [20]

In Thi-Qar, a retrospective study on VL was carried out by Raddam (2007)[21], which recorded highest numbers of cases from Al-Islah, Al- Dawayah and Al-Fohood sub-districts; he also mentioned that VL was considered as one of the most important health problems among children in Thi-Qar.

2 METHODOLOGY

This study was carried out, during the period from January 2014 to March 2015, in the laboratories of Pediatric and Maternal Hospitals of Al-Najaf, Babil, Karbala, and Al-Qadisiyyah provinces(theImmunochromatographic strip test and KAtex test), in laboratories of Alsader Teaching Hospital in Najaf (ELISA tests), and in the Department of Biology in the Faculty of Science – Kufa University (Molecular study).

2.1 Study Groups

Patients Group: including 587 children aged 1-60 months, admitted to pediatric ward of Pediatric and Maternal Hospitals of Al- Najaf, Babil, Karbala, and Al-Qadisiyyah provinces. Most cases had

clinical manifestation of fever, hepatosplenomegally, weight loss, leukopenia, and anemia. Cough and vomiting were frequently reported accompanying symptoms. The diagnosis was under the supervision of pediatrician from each hospital.

3. EXPERIMENTAL RESULTS

The study population was included 587 patients confirmed or clinically suspected visceral leishmaniasis from four Iraqi provinces as shown in figure 4.1: 68 (11.58%) cases were from Al- Najaf, 202 (34.41%) cases were from Babil, 53 (9.02%) cases were from Karbala, and 264 (44.97%) was from Al-Qadisiyyah.

Figure 3:1: The Distribution of the Patients with Confirmed or Clinically Suspected VL.

Assessment of age presentation of patients revealed that 12 (4.36%) patients were seen in age group (1m-6m), 119 (43.72%) in age group (7m-12m), 47 (17.09%) in age group (13m-18m), 28 (10.18%) in age group (19m-24m), 18 (6.54%) in age group (25m-30m) , 17 (6.18%) patients in the age group (31m-36m) ,and 15 (5.45%) patients in the age group (37m-42m), and 8 (2.90%) patients in the age group (43m-48m) and 4 (1.45%) patients in the age group (49m-54m) and 7 (2.54%) patients in the age group (55m-60m) (Figure 4.15). The estimated incidence of VL increases significantly ($P < 0.05$) in the second age group (7m-12m) which contains 43.72% of VL patients

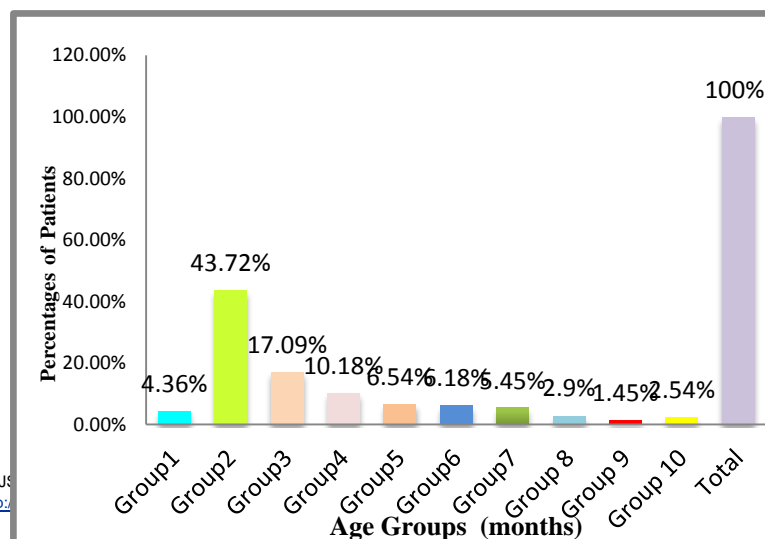
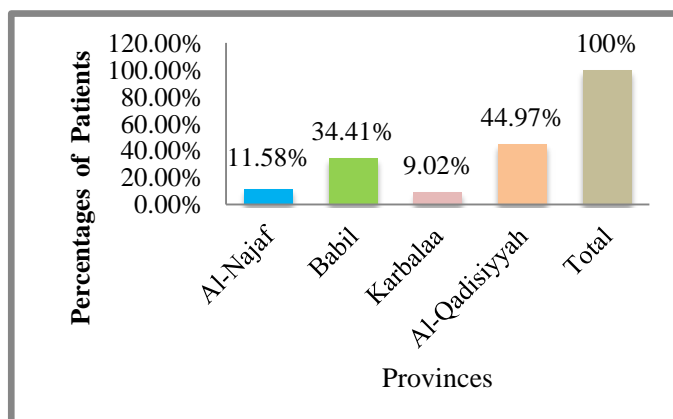


Figure 3.2: Age Distribution of the VL Patients. (Group1: 1m-6m, Group2: 7m-12m, Group3: 13m-18m, Group4: 19m-24m, Group5: 25m-30m, Group6: 31m-36m, Group7: 37m-42m, Group8: 43m-48m, Group9: 49m-54m, Group10: 55m-60m).

The monthly distribution of cases was variable from one month to the other with highest peak of infection during January and February (Figure 4.16). Monthly rates of cases for 2012 were: January 16.36%, February 14.54%, March 6.18%, April 4%, May 3.63%, June 0.27%, July 1.45%, August 1.45%, September 0.27%, October 0.27%, November 3.63%, and December 9.45%. Monthly rates of cases for 2013 were: January 15.63%, February 15.27%, and March 6.18%. The estimated incidence of VL increases significantly ($P < 0.05$) in January and February in the both years

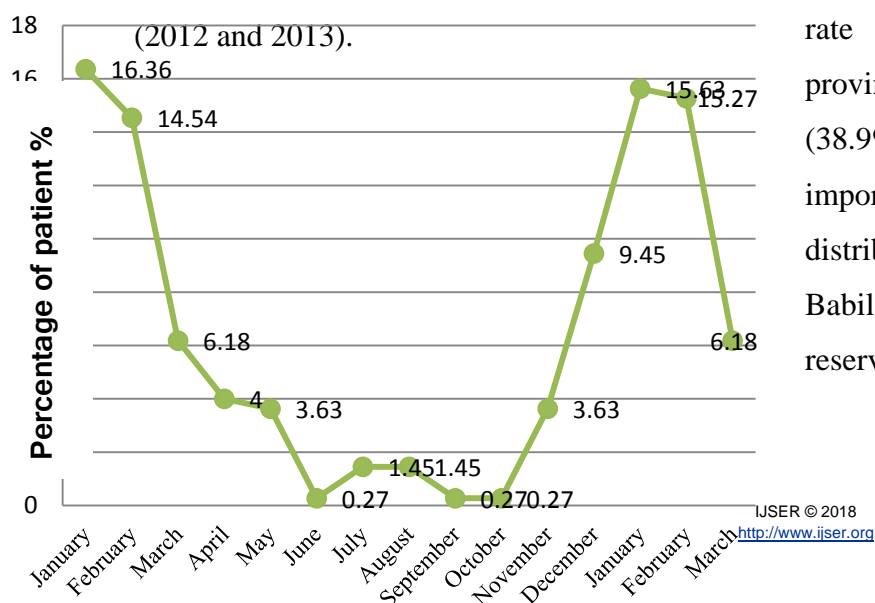


Figure 3.3: The Monthly Distribution of the VL Patients during 2012 and 2013.

4 .DISCUSSION

In the present study there was an increment in the number of reported cases of Kala-azar in the provinces of the Mid-Euphrates area compared to the last epidemiological reports[15][16][19][21][13][20]

This could be attributed to many factors like: agriculture development with subsequent increase in the populations of vector and reservoir, lack of the educational programmes that could be offered to the population and medical staff especially in rural areas with poorly constructed houses, and improvement in recording and registry of cases.

In the present study, the higher incidence rate of VL was seen in Al-Qadisiyyah province (51.27%), following by Babil (38.9%). There are many factors that play an important role in the presence and distribution of VL in Al-Qadisiyyah and Babil, including the presence of animal reservoirs such as rodents, dogs, and the use

of clay to build some of the houses in villages in these areas.

Generally, the estimated incidence of VL patients from all the province of the Mid-Euphrates area increases significantly in rural regions ($P < 0.05$) in comparison with the urban regions, which means that VL in our country may primarily affect families of farmers who they are chiefly exposed to night biting of sand flies.

Furthermore, these provinces contain agricultural areas that district attracts and harbors many kinds of insects, and their children are more exposed to insect's bites.

These explanations is agreed with Gani *et al.* (2010)[20]; they demonstrated that Sand flies were recorded in the environment of all sero-positive cases (100%) (from Basrah, Maysan, Thi-Qar, and Baghdad), stray dogs, rodents and wild canines were also present in these environment in high percentages.

The emergence of leishmaniasis in some foci may be the result of interruption of previously applied methods of control, like insecticide spraying on early diagnosis and treatment of positive cases[22][10]

The most common age group infected with VL was between 7-12 months, they represented 43.72%, which was higher as compared to other age groups, which involved just children between 1-60 months.

This result is in agreement many studies in Iraq. AL-Kassar (2005) [23] mentioned that the increase of infection among less than two year age may be due to the movement and activity of children leading to possibility to contact with contaminated environment beside their immune system is not well developed while 5 year is developed in addition to the continuous exposure with low level of parasite so the infection decreases.

This result is in agreement with Raddam study (2007)[21], which had recorded that the high incidence rate was between 2 months and one year (69.64%). He suggested that small children are at higher risk probably because of low immunity.

Ali *et al.* (2010)[10] mentioned that the decrease in incidence with age may be due to the development of immunity.

Also, in this study, the infection began from one month. This result is in agreement with most workers mainly in Iraq. In Babil Al-Maamori (2004), noticed 30 cases in infant less than one month. This incidence may be due to transplacental infection since the prepatent period of the *Leishmania* needs several weeks to present the symptoms (Al Saqur *et al.*, 2008).

In the study of Al-Hamash (2012) [26] about 2/3 of patients were below 2 years of age. He found that the youngest patient affected in this study was 3 months of age which might be attributed to the incubation period of the disease and also referred to the possibility of congenital transmission of the disease. The same explanation had mentioned earlier by Meinecke *et al.* (1999)[27].

The monthly distribution of cases was variable from one month to the other with highest *peak* of infection during January and February in the both years (2012 and 2013).

Generally, the infections of VL tended to increase in November and December and reach a maximum in January and February. The incidence rate of infection then starts to decline from May and reaches its lowest point from June to September.

This result is in agreement many studies in Iraq. Ali and colleagues (2010) [10] found that infections of VL had, also, reached a maximum in January and February, and the incidence rate of infection started to decline from May and reaches its lowest point in August and September.

This incidence rate of infection is similar that recorded by Sukkar (1976) [28] and Al-Hamash (2012)[26].

This variation in seasonal peak could be due to the existence of various dominant reservoir species in these areas as well as to the activity of the sand flies. The differences in monthly distribution of VL patients might also be related to the development of female insects and their requirement of blood during their life cycle for the maturation and development of eggs, especially in spring season. The lapse of time between when the patient was bitten and the appearance of the symptoms might be related to the long incubation period of leishmaniasis (2-4 months) [29]

Raddam results (2007)[21] was disagreement with these results, it had recorded that the monthly distribution of cases was variable from one month to the other with about one third of cases registered during November and December.

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