



The prevalence of parasitic protozoan diseases in Iraq, 2016

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Abstract

Parasitic diseases including leishmaniasis, toxoplasmosis, malaria, giardiasis and amoebiasis are all globally wide spread with harmful consequences. The present study was carried out to provide information on the prevalence of these diseases in Iraq in 2016. The data was gathered from the Communicable Diseases Control Center, Parasitology and Helminthology Units in Baghdad from January 2016 until June 2016. The data analysis was based on results of transmitted parasitic protozoan diseases tests that were done by the laboratory system service. The results of this study showed that Diala governorate recorded the highest rate of visceral and cutaneous leishmaniasis infection (21.91%, 13.85%) respectively. On the other hand, Najaf and Misan governorate showed the highest rates of toxoplasmosis prevalence (20.00%). No infections with malaria were recorded in Iraq in 2016. In addition, Baghdad-Karkh showed the highest rates of giardiasis and amoebiasis (20.21%, 12.72%) respectively. The ratio of males infected with visceral leishmaniasis was 53.28%, while the female ratio was 46.72%. The ratio of males for cutaneous leishmaniasis was 55.34% while the female ratio was 44.66%. Regarding toxoplasmosis, the male ratio was 1.49% and the female ratio was 98.51%. Moreover, the main age group of individuals infected with visceral leishmaniasis was the group 1–4 years which recorded the highest rate of 62.04% while the main age group of individuals infected with cutaneous leishmaniasis was the group 5–14 years which recorded the highest rate of 37.81%. The main age group of individuals infected with toxoplasmosis was the age group 15–45 years which recorded the highest rate of 97.91%. This epidemiological study provides valuable data that are essential to plan strategies to control parasitic diseases in Iraq.

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1. Introduction

Leishmaniasis is a disease caused by an obligate intracellular protozoan of the genus *Leishmania* [1]. It is spread through the bite of female *Phlebotomus* in the Old World and *Lutzomyia* in the New World. There are three main forms of leishmaniasis: visceral leishmaniasis (VL) or (kala-azar), cutaneous leishmaniasis

(CL), and mucocutaneous leishmaniasis. VL is highly endemic in the Indian subcontinent and in East Africa. According to several studies, leishmaniasis is endemic in 98 countries, and around 1.3 million new cases are reported every year. Over 90% of cases occur in Bangladesh, Brazil, Ethiopia, India, and Sudan [2]. In Iraq, VL represent one of the severe public health problems mostly in the south and the middle and less in the north of the country, with highest incidence in winter followed by spring and less in summer and autumn [3].

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Toxoplasmosis is caused by the infection with an obligate intracellular protozoan parasite *Toxoplasma gondii*. It is a chronic infection that affect one third of the world's human population [4]. Human infection can result from the ingestion of uncooked meat containing tissue cysts. Otherwise, the infection result from direct contact with cats or from the consumption of water or food contaminated by oocysts excreted in the feces of infected cats [5]. Epidemiological studies of *T. gondii* infection in pregnant women around the world indicate significant variation between countries, from 9% to 67% in European countries and reach to 92.5% in Ghana. Also, high prevalence of *T. gondii* infection has been found in some American countries while the prevalence was low in East Asian countries, especially in Korea and Japan [6]. Worldwide, over 6 billion people have been found infected with *T. gondii*. Seroprevalence is measured by IgG against *T. gondii*. In the United States, approximately 14% of the individuals are seropositive to toxoplasmosis by the age of 40 years, with one million new infections each year. Thus, there are 20,000 cases of retinal infection and 750 deaths, which mean that it is the second common cause of deaths related to food-borne diseases [7].

Malaria in humans is caused by five species of parasites belonging to the genus *Plasmodium*. Four of these – *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale* infect humans and spread from one person to another by the bite of female mosquitoes of the genus *Anopheles*. A study reported that the malaria mortality is higher than previously estimated, especially in adults [8]. Malaria is endemic throughout most of the tropics. Around 3.2 billion people live in areas affected by malaria, 1.2 billion are at high risk; the World Health Organization (WHO) reported that there were 214 million cases of symptomatic malaria in 2015. Between 2000 and 2015, the annual malaria cases decreased by 18% and the number of malaria deaths decreased by 48%. Iraq has effectively participated in the battle against this disease and stands proud with its achievements today. In 2014, zero indigenous cases of malaria were diagnosed in Iraq [9].

The etiological agents for infectious diseases include viruses, bacteria, and protozoan parasites. The most important protozoan parasites are *Giardia lamblia* and *Entamoeba histolytica*. *G. lamblia* is one of the most common intestinal parasites in the world and is the source cause of giardiasis. The primary victims of *Giardia* sp. are school going children. In Asia, Africa and Latin America, the WHO estimated that about 280 million people are annually infected with *Giardia* sp. *E. histolytica* is another important parasite of the human

gut. The disease caused by *E. histolytica* is called amoebiasis. Worldwide, 40–50 million cases are recorded annually. About 90% of the cases are asymptomatic. Amoebiasis is more common in older individuals and occurs mostly among homosexual men [10,11].

Health was not considered a priority in Iraq during the last two decades. The health system suffered from neglect and did not reflect population needs. Iraq currently suffers from many infectious parasitic diseases which remain major causes of morbidity and mortality [12]. Iraq has 19 governorates; there have been no major epidemic parasitic diseases studies during 2016. The present study was carried out to provide information on the prevalence of leishmaniasis, toxoplasmosis, malaria, giardiasis and amoebiasis in Iraq from January, 2016 until June, 2016. Such epidemiological surveys are important since they provide data that are essential to frame strategies to control these parasitic diseases. Fig. 1.

2. Methods

The data presented in this paper was gathered from the Communicable Diseases Control Center, Parasitology and Helminthology Units in Baghdad for the period from January 2016 until June 2016. The data analysis was based on results of protozoan parasitic diseases from most Iraqi governorates to the Communicable Diseases Control Center. The dataset was rigorously tested.

2.1. Statistical analysis

The Statistical Analysis System- SAS (2012) program was used to study the effect of difference factors in study parameters and compare between percentages in this study.

3. Results

During the year 2016 until June, 137 patients with kala-azar, 12,323 patients with CL, 335 patients infected with toxoplasmosis, 0 patients with malaria, 15,013 patients with giardiasis and 36,661 with amoebiasis in all Iraqi governorates were reviewed as shown in Table 1. The highest incidence rate of kala-azar was in Diala governorate which was 30 (21.90%) while there were no infections in the following governorates: Dahok, Erbil, Sulimania, Ninawah and Anbar (Table 1). The highest incidence rate of CL was in Thi-Qar governorate 2425 (19.68%). Concerning toxoplasmosis, Najaf and Misan

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