

Review of Some Veterinary Zoonotic Parasites in Iraq

Hadeel H. Albayati^{1*}, Amal H. Alshibbani², Mustafa H. Albayati³

¹Department of Microbiology, College of Veterinary Medicine, University of Al-Qadisiyah, Al-Diwaniyah/Iraq

²Department of Medical Clinic, College of Pharmacy, University of Al-Qadisiyah, Iraq

³Department of Basic Sciences, College of Dentist, University of Al-Qadisiyah, Iraq

*Corresponding Author: Hadeel H. Albayati

Department of Microbiology, College of Veterinary Medicine, University of Al-Qadisiyah, Al-Diwaniyah/Iraq

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Abstract: Zoonotic parasites are those that can infect humans and live on other animals. Several species, including goats, horses, cattle, and pigs, were later domesticated for meat or dairy products, which contributed to the spread of these diseases. Zoonosis is the term used to describe the spread of disease from one species to another as a result of contact between these two groups. The most zoonotic protozoa found in Iraq are *Giardia lamblia*, *Cryptosporidium parvum*, *Toxoplasma gondii* and *leishmania spp.* The main zoonotic helminths are trematodes, cestodes, and nematodes. Trematodes include *Fasciola hepatica* Cestodes include *Echinococcus granulosus*, *Taenia spp.*, *Diphyllobothrium latum*, *Dipylidium caninum* and *Hymenolepis nana*. Nematodes are *Ancylostoma caninum*, *Toxocara caninum* and *Trichuris trichiura*.

Keywords: Zoonotic parasite, protozoa, helminthes, animal, human.

1- INTRODUCTION

Zoonosis is the spread of disease from one species to another as a result of contact between these two groups, before fourteen thousand years ago, when dogs were domesticated for hunting, humans first developed zoonotic diseases, several species, including goats, horses, cattle, and pigs, were later domesticated for meat or dairy products, which helped spread these diseases [1]. Zoonosis affects not only human health but also the health and well-being of animals, it has recently been estimated that zoonotic pathogens in humans are responsible for about 72% of new infectious illnesses [2]. Over the past three decades, Iraq has faced numerous security and socioeconomic issues that have created the perfect environment for numerous disease epidemics, including zoonotic illnesses [3]. Many parasites that affect humans are dependent on vertebrate animals to complete their life cycle, the most common way for humans to contract zoonotic parasites is through ingesting contaminated food, water, the sick host, or through the fecal-oral pathway [4]. Due to the close relationship between people and domestic animals, the invasion of humans into areas once reserved for wildlife, climate change, which affects flora and fauna, revolutions in cooking techniques, diet, and food availability, as well as the spread of trendy culinary items throughout societies, populations have been exposed to extremely high numbers of zoonotic foodborne parasites [5,6]. Among the 20797 involved cases that were presented, 29% were zoonotic disease cases. The parasite, which comprised 75.4 of the zoonotic diseases [19]. Zoonotic diseases are a broad category of illnesses that can afflict both humans and animals and spread from one to the other, including rabies, leishmaniasis, toxoplasmosis, hydatid cyst, and tuberculosis. The veterinary and human health industries must work together and coordinate efforts to control these diseases [18].

2- Major Zoonotic Protozoa

In Al-Diwaniyah provinces the infection with *Cryptosporidium spp.* & *Giardia lamblia* which consider zoonotic parasites, in which infections with *Cryptosporidium spp.* were more common (88%) than those with *Giardia* (39%), according to the PCR method. [7].

The most frequent zoonotic intestinal protozoan parasites that cause diarrheal illnesses are *Cryptosporidium parvum* and *Giardia lamblia*, due to the serious health issues associated with cryptosporidiosis and giardiasis in both

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humans and animals, these parasites have gained both public and veterinary attention [8]. The relationship between people who handle animals and those who don't handle animals in the province of Basrah showed an increasing rate of 14.8% up to 50% in the case of non-animal handlers and 50% in the case of animal handlers, respectively. Animal handlers had a 5% prevalence of *Cryptosporidium* oocysts compared to 1.14% in non-handlers [9].

The researcher found that *Giardia lamblia* infection in humans was 66.6% more common in rural areas than in urban areas in Al-Qadisiya (54% infection rate) [10]. In the Babil province's case report study on Giardiasis in a local breed queen in which many cysts were discovered using the centrifugal flotation method and magnesium sulfate with a specific gravity of 1.20. Both minor diarrhea and steatorrhea affected the cat [11]. In Baghdad, in domesticated cats, *Cryptosporidium parvum*, *Cryptosporidium muris* and *Giardia sp.* all had infection rates of 3.75, 6.25, and 2.5%, respectively [12]. Due to poor environmental and personal hygiene caused by improper human and animal excreta disposal, gastrointestinal parasite protozoal diseases occur often and widely dispersed in Iraq, *Giardia* and *Cryptosporidium* infections happen through the fecal-oral pathway [13].

Toxoplasmosis, a serious zoonotic illness, is brought on by the obligate intracellular protozoan parasite *Toxoplasma gondii*, which can infect humans and all warm-blooded animals. In the province of Al-Diwaniyah/ Iraq, the infection rate of local beef was higher (22%) than that of imported beef (13.5%) [14]. [15] were first reported the incidence of *T. gondii* among stray cats in Iraq, allowing for a more accurate assessment of the possible zoonotic risk that feral cat colonies pose to the Iraqi populace and deployed military personnel. Toxoplasmosis is a very common zoonotic disease worldwide [16]. Toxoplasmosis was one of four prevalent zoonotic infections that were the subject of a community-based seroepidemiological investigation that was conducted in Basra Governorate, southern Iraq, in all three areas, toxoplasmosis was relatively common (41.1%–52.1%) [17].

[18] were using comparison statistical methods to examine various zoonotic diseases reported in human beings by the health sector over 8 years (2008-2015) in the Basra Governorate, the findings of this study revealed the occurrence of the many zoonotic diseases including toxoplasmosis and leishmaniasis. Data was gathered between the years 2010 and 2016 by the Food Research Institute, Public Health Directorate, Iraq for diseases such toxoplasmosis and Cutaneous leishmaniasis, there are multiple cases of zoonotic diseases in Al-Ressafa, Baghdad, before they were obvious because of changing human and climatic patterns [19].

In Muthanna, parasitic, bacterial, and viral infections can pass from person to person directly or indirectly and with a variety of clinical symptoms, leishmaniasis, for example, can afflict animals when it is transmitted to people [20].

3- Most Zoonotic Trematodes

Fascioliasis is one of the most common neglected zoonotic disease caused by *Fasciola* species, in Duhok city/ Iraq determined the rate of fascioliasis among domestic animals [21]. Fascioliasis is a frequently overlooked zoonotic disease that is currently on the rise in Iraq, It was an unexpected observation that fascioliasis was prevalent in the governorate of Sulaimaniyah, we hope that increasing medical knowledge and training in early detection and treatment to prevent unnecessary surgery will result from bringing this condition to light in our community [22]. In Sulaimaniyah/ Iraq in the field of public health, human fascioliasis is a trematode zoonosis of interest [23]. In Iraq, fascioliasis is a disease that affects the entire nation and is very common [24].

4- Major Zoonotic Cestodes

As echinococcosis is a zoonotic infection, humans and domestic animals serve as intermediate hosts for *E. granulosus*, with dogs serving as the infection's final host [25]. The incidence of hydatid cysts among the slaughtered animals was investigated in the Al-Najaf slaughterhouse [26]. prevalence of several parasitic helminthes in Kirkuk, Iraq's laughing ruminants [27]. Hydatidosis has been identified in both humans and animals as one of the leading endemic illnesses in Iraq [28, 29]. In the medical City Teaching Hospital in Baghdad, 8 out of every 1000 patients who were admitted for a variety of reasons had hydatid diseases [29]. According to studies in Mosul,[30] young and middle-aged people are more likely to experience it.

Bovine taeniasis, is the zoonotic parasite disease caused by the larval stage of *Taenia saginata*, which consider the greatest economic and public health significance [31]. Ancylostomiasis, Ascariasis, Enterobiasis, Hymenolepiasis, Strongyloidiasis, Taeniasis, Trichuriasis, Schistosomiasis, and Echinococcosis are among the diseases that spread. These helminthes have a significant impact on global human population health. In a study conducted by some researchers noted Hymenolepiasis highest incidence rate was in Najaf province and the highest incidence rate of Taeniasis was in Diala [32].

The larval stage *Cysticercus tenuicollis* of the dog cestoda thin neck *Taenia hydatigena* was isolated and identified from dead animals in the Basrah abattoir [33]. [34] recorded *Taenia spp.* in young dogs in Diyala province /Iraq.

[35] showed presence case of infection with *Diphyllobothrium latum* in a man of 42 year from Kurdistan Region, Iraq, was complaining of the presence of small white fragments in his stool where macroscopically examination that the patient was affected with the broad fish tapeworm which is cause diphyllobothriasis and he was treated with antihelminthes in the hospital. Morphological examination of these pieces.

Dipylidium caninum is the zoonotic intestinal cestode that causes dipylidiasis, infections were in dogs living in Baghdad [36].

In Kirkuk province, Iraq gastrointestinal parasite incidence in stray cats and dogs these were *Dipylidium caninum* (16.88%), *Taenia hydatigena* (14.29%), *Echinococcus spp.* (6.49%) and *Diphyllobothrium latum* (23.38%) [37]. In developing countries, intestinal parasite infection is a serious medical and public health problem as *Hymenolepis nana* in incidence 6.67 % in Abu-Ghraib City /Baghdad/Iraq [38].

The presence of numerous zoonotic internal parasites in dogs' intestines in the Duhok province/Iraq, including *Hymenolepis nana* and *Taenia spp.* [41].

5- Major Zoonotic Nematodes

The nematodes found were: *Toxocara canis* (25.98%), *Ancylostoma caninum* (2.59%) and *Stongyloides sp.* (1.3%) infected with agents of *zoonotic diseases* in Kirkuk province, Iraq [37]. The usage of animal and human waste as manure during the implantation and sowing of the lettuce plant caused a widespread outbreak of *A. duodenale* infection in the Hilla city [39].

The prevalence of many zoonotic internal parasites in the intestine of dogs in Duhok province/ Iraq, such as *Ancylostoma caninum* recorded [40]. The highest incidence rate of Ancylostomiasis was in Anbar governorate by [32]. In Basra province, the southern of Iraq [41] were found the risk of zoonotic transmission common canine gastrointestinal helminthes such as *Ancylostoma caninum* and *Toxocara canis*.

There have been reports of parasites on cats in the provinces of Iraq recorded many zoonotic parasite as *Toxocara cati* [42].

[32] showed highest incidence rate of Trichuriasis was in Muthana governorate. The majority of Ascariasis, Ancylostomiasis, Trichuriasis, Strongyloidiasis, and Enterobiasis were noticed in the 5-14 year age group in Iraq [43].

In (contrast to hymenolepiasis and taeniasis, which are mostly documented in adults, the majority of cases of ascariasis, ancylostomiasis, trichuriasis, strongyloidiasis, and enterobiasis were found in youngsters [44].

Poor sanitation, hazardous human waste disposal, a lack of safe drinking water, low socioeconomic position, demographic variables, and geographic location are all linked to infections with gastro-intestinal parasites, the three most common parasites detected are *Entamoeba histolytica/dispar*, *Enterobius vermicularis*, and *Giardia lamblia*. Males are often more susceptible to infections than females are, and the age categories of 5 to 14 and 15 to 45 years recorded the majority of cases in all provinces of Iraq [45].

One of the most common parasite infections impacting the global human population is enterobiasis, Females were more parasitized than males, as well as children who are between 4 to 15 years ago in South region provinces of Iraq (Thiqar, Miasan, Basrah and Wassit) [46].

CONCLUSION

The current study examined zoonotic parasites in Iraq and serves as a crucial resource for all writers and researchers who intend to continue studying this area in-depth in the future. Our research showed that numerous intestinal parasites can cause diseases in both humans and animals and are spread via tainted food and water.

Data Availability

The data that backed the study's conclusions is cited in the article. Articles in full text are available upon request.

Conflict of Interest

The authors certify that they have no competing interests.

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Authors' Contributions

After the author examined and revised the final draft, Hadeel Hadi Albayati and her team came up with the concept and authored the first draft of the text.

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