



Case Report

Volume 28 Issue 1 - January 2024
DOI: 10.19080/ARTOAJ.2024.28.556396

Agri Res & Tech: Open Access J

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Toxoplasma gondii and Its Relationship with Food



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Submission: December 21, 2023; **Published:** January 09, 2024

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Abstract

Toxoplasma gondii is an obligate intracellular parasite targeting warm-blooded vertebrates and their hosts. This versatile parasite infects more than a third of the human world. The parasite has no harmful effects on the environment and does not participate in any biochemical synthesis that damages or contributes positively to the biosphere. This is a food parasitic pathology. The environment, the way animals are fed and treated affect the intake of this parasite from food. Accidental ingestion of parasitic oocysts through food is one of the ways of acquiring this parasite. There are several types of professions more vulnerable to this parasite, such as: cooks, slaughterhouse workers, farmers, veterinarians, animal caretakers and breeders, archaeologists, gardeners, laboratory and health workers.

Keywords: Albanian cuisine; Environmental factors; Food; Public health; *Toxoplasma gondii*

Introduction

Toxoplasmosis correlation with food

Albania is a small country located in the west of the Balkan Peninsula. It has a land surface of 28,745 km² and wide access to two seas, the Adriatic and the Ionian, which makes possible its typical Mediterranean climate. Our country has such climatic and environmental conditions that are quite suitable and justify the increased presence of vectors as well the development and living of a variety of microorganisms, including parasites. On the other hand, we can say that these environmental factors enable the production of many types of fruits and vegetables, as well as the growth and breeding of many species and animals, thus bringing a diverse cooking tradition. In our country, the "Mediterranean diet" prevails, which includes high consumption of seafood, vegetables, fruits, nuts and olive oil; without forgetting the consumption of beef, lamb and pork [1].

Some of the parasites, including *Toxoplasma gondii*, have a close relationship with food and these environmental factors. *Toxoplasma gondii* is a parasitic protozoan that causes the disease known as Toxoplasmosis. This is one of the parasites with

the largest range of hosts as it infects almost all warm-blooded animals, both domestic and agricultural, not forgetting the humans who serve as intermediate hosts, completing the life cycle of this microorganism. It was the two French scientists (Nicolle and Manceaux) who in 1908 first described this parasite in the rodent *Ctenodactylus gondi* of North Africa. Infection by *T. gondii* manifests a diverse clinic from the absence of symptoms, the appearance of a flu-like clinic, enlargement of the lymphatic glands, ocular involvement to severe forms involving the central nervous system or other systems and organs. These severe clinical forms appear only when the immune system of the infected person is significantly weakened due to neoplastic, those of the connective tissue or the use of immunosuppressive preparations. An infected person remains a carrier of this parasite for the rest of his life. The first case was described in 1938 in a small girl in New York with convulsions three days after birth and death within a month. The autopsy showed the presence of the parasite in the brain, spinal cord, and retina [2].

In our country, in 1982, this parasite was identified as the cause of an infection [3,4]. The first case of confirmed toxoplasmic

disease was a 28 -year-old girl with the diffuse lymphoglandular form that mimicked lymphoma. It was identified as such by a number of epidemiological, infectological, serological, histopathological and biological research, realized by the team Kraja Dh et al [5]. Articles on this pathology are added over the years. Thus we see not only studies of clinical doctors or epidemiologists on people but also of veterinarians on animals. Epidemiological data on animals are very important to know the risk of occurrence of these vector-transmitted infections in humans, including both normal

residents and travelers. Dogs and cats are increasingly becoming human companions. There is also a study by Lamaj et al that shows a prevalence of *T. gondii* antibodies of 42% in cats, where the highest prevalence was in cats in the wild, which shows a great contamination of the environment with oocysts [6] Evaluating the epidemiology of this pathology, Muco et al showed that women are more affected, 63.91% as they have more chances of infection, referring to work in the garden, lifestyle, hygiene level and contact with domestic animals [7].

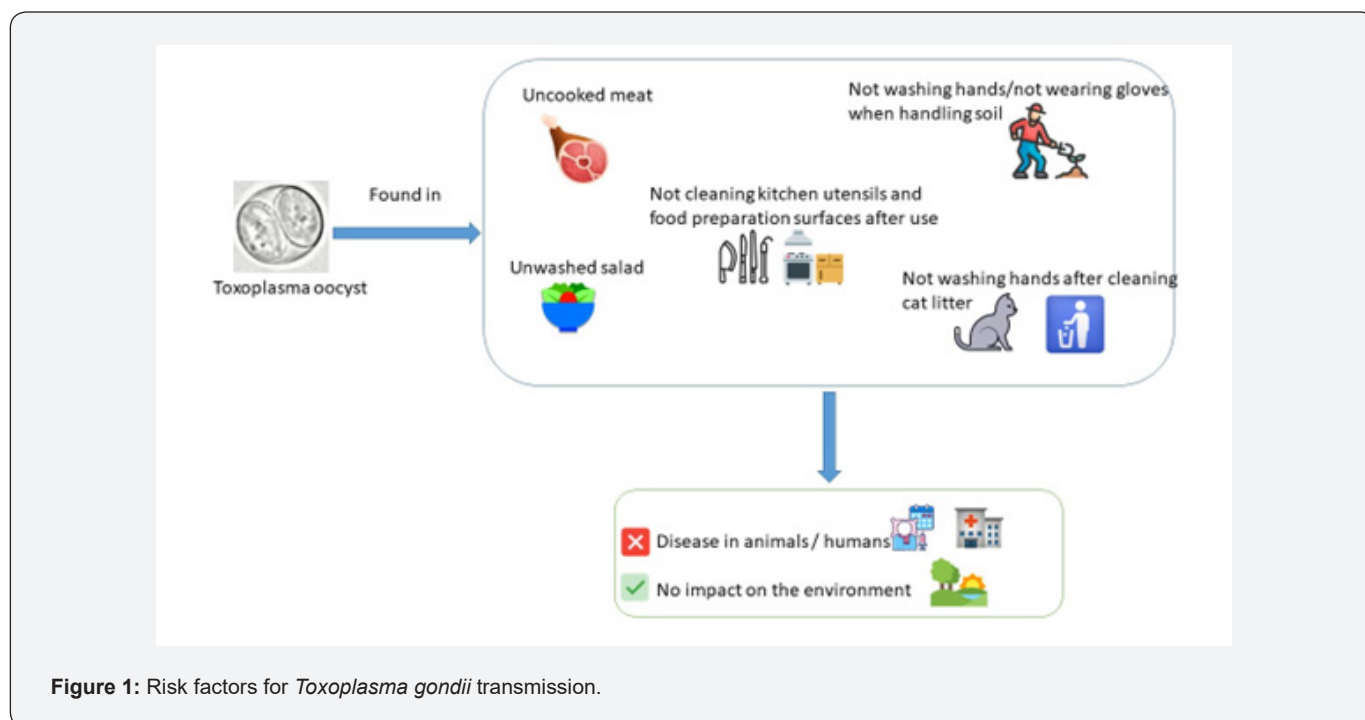


Figure 1: Risk factors for *Toxoplasma gondii* transmission.

In Albanian families in rural areas housewives take care of cattle and other domestic animals as much as they work in the fields, being exposed just like their husbands. Transmission of *T. Gondii* from food remains a key epidemiological factor. This is a food parasitic pathology. Food habits are one of the elements that significantly affect the prevalence of this infection. About 750 deaths are attributed to this parasite every year in the USA, 50% of which are foodborne, ranking it as the third leading cause of foodborne deaths [8]. Consumption of uncooked meat is one of the most important risk factors in humans. This is emphasized by Bobic in his article [9]. However, the risk of infection from meat is also based on eating habits and the prevalence of this infection in meat-producing animals. We Albanians consume more beef and chicken, maybe because of their reduced cost, but also because of the fact that we have a muslim dominance and in our custom we do not consume pork. We are also consumers of sea products. This is how we increase the risk of getting an infection since it is known that the consumption of seafood is a risk factor. Contaminated water

and soil are part of the transport of parasite oocysts in vegetables and fruits, so consuming them unwashed and untreated is a major risk factor [10]. Risk factors for transmission of *Toxoplasma gondii* are described in Figure 1.

Oocysts remain infectious in water for a long time as they resist both low and high water temperatures. Transmission of the parasite through consumption of spring water is not considered unusual. Although this parasite causes health problems, there are still no standardized methods for its detection in the food industry. Thus, in one of its reports, EFSA found that transmission caused by food accounts for 40-60% *T.gondii* infections [11]. Due to its presence in various food samples, this parasite is included in category III of zoonotic agents to be monitored, along with the two microorganisms such as *Campylobacter* and *Yersinia* [12]. There are several types of professions more vulnerable to this parasite, such as: cooks, slaughterhouse workers, farmers, veterinarians, animal caretakers and breeders, archaeologists, gardeners, laboratory and health workers.

Conclusion

Infectious diseases that spread through vectors are a serious concern for the health of people and animals in our country as well. Knowing well the parasite *Toxoplasma gondii* as well as the epidemiology of the pathology related to it, we contribute even more to the quality of human and animal health and consequently to food safety. Our country is still a small developing country that needs to perfect the health system even better to avoid possible implications for public health.

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DOI: [10.19080/ARTOAJ.2024.28.556396](https://doi.org/10.19080/ARTOAJ.2024.28.556396)

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