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Analysis of the Situation of Toxoplasmosis in the Socio-Health Field in Venezuela

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ABSTRACT

Toxoplasmosis is a zoonotic disease caused by Toxoplasma gondii, with the domestic cat as the intermediate host. In Latin America, some statistical data on the seroprevalence of this disease have been reported. However, the Venezuelan health system lacks a coherent and up-to-date research repository on this subject. The objective of this article was to analyze the situation of toxoplasmosis within the socio-health context in Venezuela. The results reveal limited information on this disease, with only four studies reported: one in eastern, two central, and western Venezuela, which served as the reference for this document. Other studies dated back to 1984, but no relevant information was found for the rest of the country, although some information was presented by physicians treating the symptoms in obstetric consultations. The conclusion is that there is a need to create interdisciplinary research networks to address this disease. Furthermore, a review of the medical records of various health centers is necessary to obtain accurate information on registered cases.

Keywords: Toxoplasma Gondii, Toxoplasmosis, Zoonosis, Domestic Cat, Venezuela.

INTRODUCTION

Health is a public good and a fundamental human right, guaranteed by the State and available equally to all citizens. This socio-political perspective recognizes that social and economic conditions play a crucial role in determining people's health, advocating for public policies that address social and health inequalities. These policies must promote prevention, education, and ensure equitable access to health services [1].

From this perspective, health is not merely an individual matter, but a social right that implies the interconnection between individual and public health. The view of health as a social right is comprehensive and holistic, recognizing that people's health is closely linked to the socioeconomic conditions in which they live. By providing benefits and improvements to a social group, it seeks to create more just, equitable, and healthy societies. Each individual becomes a key agent of change based on their own practices and lived experiences, which implies active and committed participation in building a healthier and more equitable future.

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In this sense, health as a social right is not only an individual right, but also a collective right that implies the shared responsibility of all social actors, including the State, civil society, and individuals. Therefore, by recognizing the interconnection between individual and public health, the aim is to create community change that benefits all members of society, not just a few.

Similarly, health and illness are intrinsic characteristics of individuals, with a subjective dimension that manifests in how people perceive their own state of well-being. For a long time, health was understood as the absence of disease and disability; however, this negative approach was superseded by the World Health Organization's (WHO) 1948 definition, which states that "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (p. 1) [2].

Among the pathologies of medical importance are zoonotic diseases, which are infections transmitted from animals to humans and represent a significant challenge to global public health. These diseases can be caused by various pathogens, including bacteria, viruses, fungi, and parasites. It is estimated that approximately 60% of all known infectious diseases are zoonotic, and 65% of emerging infectious diseases also fall into this category [3].

Furthermore, zoonoses can be transmitted in several ways. Transmission can occur through direct contact, such as bites or scratches, or by handling infected animals. They can also be acquired by consuming contaminated food, such as undercooked meat, unpasteurized milk, or contaminated water. In addition, some pathogens are transmitted by vectors, such as insects or animals that act as intermediaries.

Indeed, the impact of zoonoses on public health is significant, affecting not only human health but also having major economic repercussions, especially in sectors related to agriculture and animal production. Close interaction between humans and animals, along with factors such as climate change and urbanization, has increased the spread of these diseases. Toxoplasmosis is one of the most relevant zoonoses for human health, standing out as a frequent and potentially significant cause of reproductive problems and psychological disorders in women.

In this regard, toxoplasmosis is a parasitic infection caused by the protozoan Toxoplasma gondii, which affects a large portion of the world's population. Although asymptomatic in many cases, its impact can be significant in certain vulnerable groups, such as pregnant women. Traditionally, toxoplasmosis has been studied from a biomedical perspective, focusing on epidemiological, clinical, and treatment aspects. However, little is known about the subjective experience of patients who suffer from it and how it impacts their lives [1].

As previously stated, there is little verifiable scientific information in peer-reviewed journals on this issue in Venezuela; only a few isolated cases have been reported, and no comprehensive information matrix exists. Therefore, the objective of this study was to analyze the situation of toxoplasmosis within the socio-health context in Venezuela.

METHODOLOGY

The research was based on the interpretive paradigm, grounded in a qualitative approach, which is characterized by its focus on understanding and describing social and human phenomena based on the subjective experiences of individuals [4]. A literature review was also conducted, supported by the hermeneutic method, to identify the published literature and theoretical gaps surrounding toxoplasmosis in Venezuela [5].

Relationship between domestic cats and Toxoplasma gondii.

Over the years, toxoplasmosis has posed a serious threat to public health in many countries around the world. Originating in South America, toxoplasmosis has spread globally, becoming one of the most common parasitic diseases worldwide. The seroprevalence of this disease varies significantly, ranging from 30% to 80% in the human population [6].

Currently, it is common to see many families keeping cats as pets. These felines can harbor the Toxoplasma gondii parasite, which is the most frequent way to contract the parasitic infection. The role of the domestic cat in this cycle and the socio-environmental implications stemming from deficient practices by both the uninformed population and state health entities and livestock professionals are aspects that require special attention. Disseminated data highlight the supposed imminent risk attributed to domestic cats and their ability to spread the disease, which generates particular concern for pregnant women due to the potential risks of miscarriage or complications in fetal development [7].

Generally, in most cases, toxoplasmosis infection goes unnoticed by the affected person. Symptoms usually manifest similarly to those of the flu, including fatigue, muscle aches, malaise, and fever. It is important to note that, generally, toxoplasmosis infection occurs only once in a lifetime and provides lifelong immunity.

Although the parasite Toxoplasma gondii can remain dormant in the body without causing harm, in situations where the immune system is not functioning properly, such as in people with weakened immune systems, the parasite can become active and cause health problems. Women who acquire immunity to toxoplasmosis before pregnancy are not at risk of transmitting the disease to their babies.

However, those who contract the infection during pregnancy can expose their children to serious complications, such as hydrocephalus, brain calcifications, microcephaly, chorioretinitis, and even, in extreme cases, miscarriage. Several studies have shown that toxoplasmosis can affect human behavior, impacting reaction time, and has been linked to cases of schizophrenia and excessive weight gain during pregnancy [8,9].

Context of Toxoplasmosis in Venezuela

Toxoplasmosis is a significant zoonosis that poses a risk to human and animal health. In Venezuela, the prevalence is 60%, highlighting the need to investigate and develop prevention and control strategies at both the individual and public health levels [6].

However, this parasitic disease is not subject to mandatory reporting, leading to limited awareness of the harm it causes to public health. The lack of a surveillance system underestimates the economic and social costs of this infection, as it generates high treatment costs for individuals with congenital, immune, and neurological problems. Furthermore, cat husbandry practices, such as allowing cats to roam freely, feeding them raw diets, or failing to control their access to high-risk areas, are associated with the prevalence of toxoplasmosis, increasing the likelihood of infection and transmission of the parasite [10].

It is important to note that toxoplasmosis is a disease that can be transmitted from animals to humans and is of great relevance to public health, as it can cause serious reproductive problems in humans and animals, such as miscarriages, fetal death, and developmental delays. This represents a threat to maternal and child health and animal production, justifying its in-depth study.

Thus, I was able to identify a series of theoretical gaps, not only to guide the development of this research but also to delineate the symptoms, problems, or critical issues for approaching the focus of study, which is toxoplasmosis. Each of these will be developed below: The relationship between Toxoplasma gondii infection and the subjective perception of mental health in pregnant women is a topic that has begun to receive attention in the scientific literature, given that the complications associated with this infection can significantly influence the emotional well-being of patients [11].

Furthermore, the lived and reported experiences of some women with toxoplasmosis in obstetric consultations are frequently marked by social stigma, which can contribute to mental health problems such as anxiety and depression, and lead to avoidance of medical care for fear of discrimination. In addition, it can result in workplace discrimination and affect family relationships, generating misunderstanding and rejection. Self-stigmatization is also common, impacting their self-esteem, which can worsen their psychological state and hinder access to adequate support [6].

Furthermore, risk perception and knowledge about toxoplasmosis among women who live with cats is crucial, as these beliefs can affect their behavior and mental well-being. Cultural beliefs related to cats also play an important role in the transmission of the parasite, creating a context that can increase anxiety among pregnant women. Despite the relevance of these issues, there is a notable lack of qualitative research exploring the lived experiences of these patients, which limits a comprehensive understanding of their realities.

During 17 years of experience as research professor, we have observed the lack of a strict policy for the surveillance and control of toxoplasmosis in Venezuela. This is because positive cases of toxoplasmosis are not reported to the agencies responsible for epidemiological surveillance in the country, which has generated significant interest in addressing this problem.

Although the diagnosis of toxoplasmosis is made through laboratory tests, these analyses are part of the routine tests that should be carried out in pregnant women. Early detection of the disease through these tests allows for early diagnosis and the possibility of providing timely treatment. However, compliance is not complete due to various circumstances, such as a lack of economic resources and a lack of awareness among healthcare professionals, who do not adequately inform pregnant women about the risks associated with this disease [12].

Likewise, I have observed a lack of specific studies addressing the lived experience of women with toxoplasmosis, especially during pregnancy. Furthermore, in Venezuela, there is no scientific literature that addresses this pathology from a qualitative perspective. The identified weaknesses include a lack of adequate information about the risks associated

with toxoplasmosis, cultural beliefs related to cats, a limited understanding of the emotional and social implications faced by women affected by this disease, and a lack of epidemiological surveillance. These deficiencies could be addressed by developing a theory that strengthens medical processes, primary healthcare, and the creation of public policies that protect pregnant women.

Biology of Toxoplasma gondii.

First, it should be noted that the causative agent of this zoonosis is called Toxoplasma gondii (Nicolle and Manceaux, 1908). Its name, gondii, comes from the North African rodent in which it was first identified. It is an obligate intracellular parasitic protozoan of the family Apicomplexa, order Coccidia, so named for the apical complex of its cytoskeleton, which is also found in the spores of the malaria parasite (Plasmodium) and Cryptosporidium [13].

T. gondii is the only species in its genus. Its definitive hosts are cats, as the intestines of these animals are the site of sexual reproduction. Numerous potential intermediate hosts exist, including humans, non-feline mammals (warm-blooded animals), and birds. The distribution of this parasite worldwide and among many potential hosts is such that it has been found not only in domestic and farm animals such as pigs, sheep, goats, cattle, horses, dogs, and chickens, but also in wild animals ranging from Australian kangaroos to Norwegian Arctic foxes, including monkeys, migratory birds, and various predators [14].

The oocysts found in cat feces are spherical and measure between 11–15 and 9–11 microns; they contain a pair of ellipsoidal sporocysts, each containing four sporozoites. Tachyzoites, the virulent forms that cause lesions in humans, divide rapidly into asexual stages; these cells containing many tachyzoites are called pseudocysts (because they lack a cyst wall). They have a curved, arrowhead shape. Bradyzoites (avirulent form) differ from tachyzoites in that they divide slowly, are comma-shaped, and are surrounded by a true cyst-forming membrane that parasitizes various body cells, and are lethargic or inactive in immunocompetent hosts [14].

Regarding the epidemiology of toxoplasmosis, it is estimated that one-third of the world's population is affected by this parasite. Seroprevalence varies considerably among geographic regions and is particularly common in Western Europe, South America, and African countries. In developed countries, the seroprevalence of human toxoplasmosis ranges from 10% to 50%; in developing countries, it reaches up to 80%, especially in tropical areas. Sánchez et al., 92, indicate that the main risk factors for infection are drinking water contaminated with oocysts (excreted by cats in their feces) or consuming food contaminated with tissue cysts, primarily raw or undercooked pork and lamb. It is also associated with the consumption of raw oysters, shellfish, and mussels contaminated with oocysts. Immunocompromised patients and pregnant women should avoid contact with cat feces [15].

Solid organ transplant recipients and hematopoietic stem cell recipients are at risk of developing severe disease. If pregnant women develop an acute infection, they can transmit the disease vertically to the fetus, and the fetus may develop a birth defect. This disease has been shown to primarily affect low-income families with limited access to sanitation and clean water, suggesting that socioeconomic factors influence toxoplasmosis infection in the population. The socioeconomic impact of toxoplasmosis extends beyond human suffering and the care of children with intellectual disabilities and blindness. While the parasite itself is not directly related to economic and social factors, cultural factors, such as the custom of consuming raw or undercooked meat, are a major risk factor [16].

Clinical symptoms depend on the host's immune status. Severe symptoms can occur in congenital toxoplasmosis and in immunocompromised individuals. In immunocompetent individuals, acute infection is usually asymptomatic; in some cases, lymphadenopathy may be present, with or without fever, fatigue, myalgia, sore throat, and headache. Ocular diseases in immunocompetent individuals are also frequently reported in South America [16].

In immunocompromised patients (HIV/AIDS patients, immunomodulator users, and transplant recipients), acute infection can cause encephalitis. Furthermore, in individuals with chronic infection, reactivation with systemic dissemination of the parasite can occur, which may manifest as neoplastic changes in the central nervous system, encephalitis, or diffuse meningitis, with motor syndromes, altered consciousness, or seizures, leading to serious consequences and death. Cases of pneumonia, meningitis, chorioretinitis, myocarditis, or disseminated toxoplasmosis with multi-organ involvement have been reported in transplant recipients [17].

In congenital toxoplasmosis, symptoms in the fetus depend on the trimester of pregnancy in which transmission occurs. The severe form is characterized by Sabin's tetrad (hydrocephalus with macrocephaly or microcephaly,

chorioretinitis, cerebral calcifications, and intellectual disability or neurological disorders). Many children are asymptomatic at birth, and some develop ocular or central nervous system disorders in childhood, adolescence, or early adulthood [18].

For laboratory diagnosis, numerous immunodiagnostic techniques exist, both molecular and histological. Their performance and capabilities depend on the clinical setting. Regarding serology, several antibodies against *T. gondii* are produced, and their levels in the host's peripheral blood can increase or decrease over time after infection. Specific markers include IgM and IgG antibodies, and the most commonly used techniques are enzyme-linked immunosorbent assays (ELISA) and immunofluorescence assays (ELFA). The Sabin-Feldman assay, which only detects IgG antibodies, was previously the gold standard [18].

Serological tests are routinely performed as the first diagnostic step in immunocompetent patients with suspected acute infection, including pregnant women. Vázquez et al. [19] mention that, in an acute infection, IgM antibodies generally appear within a week, and their titers continue to rise. Thereafter, the IgM titer gradually declines, but the rate of decline varies considerably from person to person and can take months to disappear. IgG antibodies appear approximately two weeks after the initial infection, peak at around eight weeks, and generally persist for life. An IgM binding ELIZA can be performed in cases of concurrent negative acute serology.

Molecular diagnosis using polymerase chain reaction (PCR) can detect parasite DNA in blood, cerebrospinal fluid, aqueous humor, bronchoalveolar lavage fluid, and amniotic fluid. This test can be useful in immunocompetent patients with ocular involvement, during pregnancy, and in immunocompromised patients. Its specificity is high (>98%); however, its sensitivity is relatively low (25–75%) [20].

Histological examination may reveal tachyzoites or tissue cysts. Tachyzoites usually indicate an acute infection; in contrast, tissue cysts may represent a latent infection or a reactivation of the disease. Clinical samples are stained with histological dyes such as hematoxylin and eosin, Wright, or Giemsa.

However, toxoplasmosis treatment primarily targets the tachyzoite form, so it does not eliminate the parasite, which remains in the form of tissue cysts (bradyzoites). Pyrimethamine is the most effective antiparasitic drug and is included in most treatment regimens. A second drug, such as sulfadiazine or clindamycin, should be added (if the patient has a hypersensitivity reaction to sulfonamides). As alternatives, with less evidence of their efficacy, cotrimoxazole has been widely used, and pyrimethamine with azithromycin was commonly used as an alternative, but its efficacy was less established [20,21].

González A, et al. [22] propose a series of general recommendations for the prevention of toxoplasmosis. They suggest consuming only meat cooked to a minimum temperature of 63 °C. In the case of uncooked meat, it should be frozen at -20 °C for at least 48 hours. It is essential to avoid contact with mucous membranes when handling raw meat and to avoid consuming unpasteurized milk. It is also recommended to avoid eating raw shellfish, as well as peeling or thoroughly washing fruits and vegetables before consumption. Surfaces and utensils in contact with raw food should be washed properly. Drinking untreated water, including well water, should be avoided, and contact with material or soil that may be contaminated with cat feces should be minimized, especially when handling cat litter or gardening. If this is not possible, disposable gloves should be worn and hands washed after contact with soil or sand. During pregnancy, it is advisable to avoid contact with unfamiliar cats and change the cat litter box daily, as T. gondii does not become infectious until 1 to 5 days after being shed in feces. Finally, cats should be fed commercial canned or dried food, avoiding raw or undercooked meats [23].

CONCLUSIONS

This approach has revealed that toxoplasmosis is not merely a clinical diagnosis, but a profound experience where facticity, ontological anxiety, authentic care, and coexistence acquired renewed meaning. Patients recount the initial experience of uncertainty and vulnerability as a moment of confrontation with their finitude and contingency, aspects that Heidegger conceptualizes as the throwing of Dasein into facticity and the anxiety that this generates. This encounter with the vulnerable dimension of being highlights the need not only for a rigorous medical approach, but also for support that recognizes the existential dimension of the illness. Biomedical evidence on the psychosocial impact of toxoplasmosis, especially in maternal contexts, confirms the importance of this integrated perspective.

Likewise, the commitment to authentic care emerges as an existential response to the challenge posed by the illness. Patients adopt self-care practices and actively seek support with a responsibility that transcends mere compliance with medical instructions, situating themselves within an

ethical framework that involves caring for themselves and others. This dimension of care reaffirms the relevance of Heideggerian existential ethics in contemporary clinical contexts and demonstrates that the effective management of toxoplasmosis requires integrating daily practice with reflection on the meaning of existence.

Illness also acts as a transformative agent, revealing new perspectives on life, health, and identity. The reinterpretation that patients attribute to this experience reflects a post-illness learning process, where the possibility emerges of reorienting their life project with greater awareness and authenticity. In this sense, the experience of toxoplasmosis becomes an ontological juncture that challenges the reductionist biomedical view and paves the way for an understanding that recognizes the interaction between body, existence, and world.

Furthermore, the relational dimension is essential for understanding how patients construct meaning and support amidst illness. Family, community, and professional support networks act as spaces of coexistence that represent the realization of being-with, another Heideggerian ontological pillar. This highlights the importance of strengthening social bonds and collective care systems to promote holistic health, an aspect corroborated by the literature on mental health and infectious disease management.

The perspective of temporality and historicity offers a renewed understanding of the experience of illness as a continuous process, integrating past, present, and future, and inscribed within patients' life trajectories, particularly in relation to motherhood. This temporal approach allows us to understand toxoplasmosis not as an isolated event, but as part of a life narrative that shapes decisions and redefines everyday normality, in a dynamic balance between health and illness.

However, the research has also identified significant challenges, such as gaps in education, communication, and institutional support, which affect the adequacy of the experience and care from the authentic perspective of the individual. These findings call for a rethinking of public health practices and policies, making them more sensitive to the existential and relational dimensions that shape patients' lived experiences.

Finally, ethical reflection on coexistence with animal vectors and zoonotic risk emphasizes the need for a holistic approach that encompasses not only the clinical aspects but also the ethical implications of our coexistence with other living beings. In this sense, the prevention and management of toxoplasmosis becomes an exercise in shared responsibility, mindful of the ontological interdependence that characterizes the lived world.

In short, the phenomenological perspective enables a deep and holistic understanding of toxoplasmosis from the patients' own voices, which constitute an invaluable resource for guiding clinical practices, health policies, and future research. This approach invites us to transcend the traditional biomedical vision, integrating lived experience, the ethical dimension, and ontological complexity, essential elements for truly human and effective care.

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CONFLICT OF INTEREST

The author declares that there is no conflict of interest.

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