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Epidemiological profile of gestational and congenital toxoplasmosis in the Federal District, Brazil, 2019 to 2023

Perfil epidemiológico da toxoplasmose gestacional e congênita no Distrito Federal, Brasil, 2019 a 2023

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ABSTRACT

Introduction: Toxoplasmosis is a globally prevalent disease, affecting approximately 25% to 30% of the population. Despite its high prevalence, clinical manifestations are rare. Diagnosing *Toxoplasma gondii* infection during pregnancy is crucial, even in asymptomatic cases, with the primary goal of preventing congenital toxoplasmosis and its potential long-term sequelae. **Objective:** To describe the epidemiological profile of gestational and congenital toxoplasmosis in the Federal District, Brazil, from 2019 to 2023. **Methods:** This study is a descriptive, retrospective analysis of gestational and congenital toxoplasmosis, utilizing secondary data obtained from the Notifiable Diseases Information System (Sinan-Net) database. **Results**: During the study period, 370 cases of gestational toxoplasmosis and 253 cases of congenital toxoplasmosis were confirmed. The cumulative incidence was 35 per 100,000 women of childbearing age and 79.7 per 10,000 live births, respectively. Notably, the incidence of congenital toxoplasmosis increased by 143.8% over the study period. Among pregnant women, prevalence was highest in the second trimester and in those aged 20 to 29 years. In both groups, individuals of brown race/color and those residing in urban areas were most affected. The highest cumulative incidences were observed in the Structural Administrative Region for gestational toxoplasmosis and the Fercal Administrative Region for congenital toxoplasmosis. **Conclusion**: The incidence of both gestational and congenital toxoplasmosis increased during the study period. Gestational toxoplasmosis was more frequently observed in the second trimester of pregnancy and among young women. Cases of congenital toxoplasmosis were evenly distributed between sexes but were more prevalent among children of brown race/color residing in urban areas.

Keywords: Toxoplasmosis; Toxoplasma; Toxoplasmosis, Congenital; Gestational Toxoplasmosis; Epidemiological Monitoring.

RESUMO

Introdução: A toxoplasmose é uma doença de abrangência mundial, com prevalência de 25% a 30%. Apesar de ser uma infecção muito comum, as manifestações clínicas são raras. O diagnóstico da infecção por *Toxoplasma gondii* na gravidez é extremamente importante, mesmo na ausência de sintomas, tendo como objetivo principal a prevenção da toxoplasmose congênita e suas sequelas permanentes. **Objetivo**: Descrever o perfil epidemiológico da toxoplasmose gestacional e congênita no Distrito Federal, Brasil, de 2019 a 2023. **Métodos**: Estudo descritivo, retrospectivo sobre toxoplasmose gestacional e congênita, com dados secundários obtidos a partir da base do Sistema de Informação de Agravos de Notificação (Sinan-net). **Resultados**: No período foram confirmados 370 casos de toxoplasmose gestacional e 253 de congênita. A incidência acumulada foi de 35/100 mil mulheres em idade fértil e 79,7/10 mil nascidos vivos, respectivamente, sendo que a incidência de toxoplasmose congênita apresentou um incremento de 143,8% no período. Dentre as gestantes, a prevalência foi maior no segundo trimestre, faixa etária de 20 a 29 anos. Em ambos os grupos prevaleceu a raça/cor parda e a residência em zona urbana; as maiores incidências acumuladas nas Regiões Administrativas de Estrutural e Fercal para toxoplasmose gestacional e congênita, respectivamente. **Conclusão**: Houve um aumento na incidência de toxoplasmose gestacional e congênita no período estudado. A ocorrência de toxoplasmose é mais frequente no segundo trimestre da gravidez, em mulheres jovens. A distribuição dos casos de toxoplasmose congênita foi homogênea entre os sexos, mas com uma maior proporção em crianças de raça/cor parda, residentes em zona urbana.

Palavras-chave: Toxoplasmose; Toxoplasma; Toxoplasmose Congênita; Monitoramento Epidemiológico.

Authors' contributions: MFLP study design, tabulation, data analysis, manuscript writing and critical review. GMM study design, data analysis, manuscript writing and critical review. FLB manuscript writing and critical review. MHDC data analysis, discussion of findings and critical review. RBA discussion of findings and critical review. RMSM discussion of findings and critical review. IAdV manuscript writing and review.

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INTRODUCTION

Toxoplasmosis is an anthropozoonosis, caused by *Toxoplasma gondii*, one of the most common zoonotic parasites worldwide[1] which can contaminate soil and water, where it is capable of persisting under extreme environmental conditions and remaining infectious for one or more years. The main routes of transmission occur through the ingestion of oocysts present in contaminated water and food, as well as vertically[2].

It's estimated that around one to two billion (prevalence of 25% to 30%) of the world's population is infected with the parasite. In Brazil, some serological studies in adults have demonstrated a prevalence of 50% to 80%, in addition, affected patients may present differences in clinical pictures, possibly due to the high genetic diversity of the pathogen[3].

Despite being a highly prevalent infection, clinical manifestations of toxoplasmosis are rare. Most cases are asymptomatic or present with nonspecific symptoms that are common to other diseases[2,4-5]. Diagnosing *Toxoplasma gondii* infection during pregnancy is crucial, even in the absence of symptoms, as the primary goal is to prevent congenital toxoplasmosis and its long-term sequelae[2,4-5].

In 2008, the Federal District was a pioneer in implementing expanded neonatal screening, which included congenital toxoplasmosis. Nationally, this screening was only introduced in 2021. In Brazil, gestational and congenital toxoplasmosis was designated as a notifiable disease in 2016, but surveillance efforts were only implemented starting in 2018. The notification, investigation, and timely diagnosis of acute cases in pregnant women are essential for identifying outbreaks, rapidly determining sources of transmission, and implementing prevention and control measures. Additionally, early detection enables appropriate therapeutic intervention, ultimately reducing complications, long-term sequelae, and mortality.[6]

Considering the significance of toxoplasmosis as a public health concern and the limited number of studies at the district level; this study was conducted to describe the epidemiological profile of gestational and congenital toxoplasmosis in the Federal District, Brazil, from 2019 to 2023.

METHODS

This is a descriptive, retrospective study with secondary data obtained from the Notifiable Diseases Information System (Sinan-net) database for the period from 2019 to 2023 among residents of the Federal District. Sinan is a system for recording, processing, and analyzing data on notifiable diseases throughout Brazil[7] and belongs to the Information Technology Department of the Unified Health System (DATASUS).

The Federal District consists of 35 Administrative Regions established for administrative decentralization and coordination of public services[8]. According to the 2022 census[9], the district has an estimated population of 2,817,381 inhabitants, with 81% having access to sewage services, 95% to treated water, and 97.8% to garbage collection. The region's climate is predominantly tropical, characterized by a hot and rainy season (summer) from October to March and a cold, dry season (winter) from April to September.

The inclusion criteria were:

- **For gestational toxoplasmosis**: residents of Federal District, over 10 years of age, pregnant women (pregnant variable; fields 1, 2, 3 and 4), reported using CID-10 codes B58 and 098.6.
- **For congenital toxoplasmosis**: residents of Federal District, up to 12 months of age, reported using CID-10 code P37.1.
- The variables studied were:
- **For gestational toxoplasmosis**: confirmed cases, age group, gestational trimester, education, race/color, residence area, and distribution among Administrative Regions.
- **For congenital toxoplasmosis**: confirmed cases, sex, race/color, residence area, and distribution among Administrative Regions.

To calculate the incidence rate of congenital toxoplasmosis in the Federal District, the population of live births per Administrative Region, provided by SINASC, was used as a basis. The calculation was carried out by dividing the total number of cases per year by the total number of children living in the Federal District multiplied by 10,000 children.

To calculate the incidence rate of gestational toxoplasmosis the population of women of childbearing age (FIM) living in each Administrative Region was used as a basis, provided by the Federal District Planning Company (CODEPLAN)[10]. The calculation was carried out by dividing the total number of cases per year by the total number of women of childbearing age living in the Federal District multiplied by 100,000.

The data was downloaded from Sinan using Data Base File and tabulated in spreadsheets in Microsoft Office Excel 2016. Databases used were from official health information systems, available in the public domain and without individual identification, thus approval by the Research Ethics Committee following Resolution of the National Health Council (CNS) Nº 466 from December 12,2012[11] is dismissed.

RESULTS

Regarding gestational toxoplasmosis from 2019 to 2023 in the Federal District; 577 cases were reported; 493 (85.4%) in residents. Of these, 370 (75.1%) were confirmed, 22 (4.5%) were discarded and 1,011 (20.5%) were left without closure.

The predominant age group among the years analyzed was pregnant women between 20 and 29 years old (46.2%). Furthermore, 60 (16.2%) cases were confirmed in children and adolescents under 20 years of age. The occurrence of toxoplasmosis was most frequent in the second trimester of pregnancy across all years studied (43,5%). Regarding education, 53% had no information, while among those with recorded data; 13.5% of the pregnant women had completed high school. Of the pregnant women; 47.6% were classified as brown race/color, and 83.0% lived in urban areas. According to educational level and race/color variables, high percentages of ignored or blank information (no information) could be observed, demonstrating high incompleteness of the data (see Table 1).

The incidence of gestational toxoplasmosis increased between 2019 and 2020 and between 2021 and 2022, being more pronounced between the first two years. The accumulated incidence in the Federal District was 35 per 100,000 women of childbearing age, with 2020 having the highest rate (8.8/100,000). Among the Administrative Regions, the one with the highest accumulated incidence was SCIA/Estrutural, followed by Núcleo Bandeirante and Planaltina. The regions of Planaltina and SCIA/Estrutural maintained, in all years evaluated, incidence rates higher than those presented in the entire Federal District. The regions of Arniqueiras, Fercal, Park Way, SIA, Sol Nascente/Pôr do Sol did not present any cases in the studied period, Table 2.

Table 1. Demographic characteristics of confirmed cases of gestational toxoplasmosis, Federal District, Brasilia, Brazil, 2019 to 2023.

Character	2019		2020		2021		2022		2023		Total	
	n=59	%	n=93	%	n=70	%	n=80	%	n=68	%	n=370	%
Age group												
10 a 19	13	22,0	17	18,3	10	14,3	14	17,5	6	8,8	60	16,2
20 a 29	27	45,8	43	46,2	33	47,1	37	46,3	31	45,6	171	46,2
30 a 39	18	30,5	24	25,8	24	34,3	26	32,5	25	36,8	117	31,6
40 a 49	0	0,0	8	8,6	3	4,3	3	3,8	6	8,8	20	5,4
50 a 59	1	1,7	1	1,1	0	0,0	0	0,0	0	0,0	2	0,5
Gestational trimester												
1º	17	28,8	21	22,6	19	27,1	21	26,3	17	25,0	95	25,7
2º	23	39,0	50	53,8	29	41,4	30	37,5	29	42,6	161	43,5
3º	18	30,5	20	21,5	22	31,4	29	36,3	22	32,4	111	30,0
No information	1	1,7	2	2,2	0	0,0	0	0,0	0	0,0	3	0,8
Education												
Incomplete Elementary I	1	1,7	1	1,1	0	0,0	0	0,0	0	0,0	2	0,5
Complete Elementary II	2	3,4	0	0,0	1	1,4	0	0,0	0	0,0	3	0,8
Incomplete Elementary II	3	5,1	5	5,4	4	5,7	7	8,8	1	1,5	20	5,4
Complete Elementary II	4	6,8	3	3,2	4	5,7	4	5,0	1	1,5	16	4,3
Incomplete High School	2	3,4	9	9,7	2	2,9	6	7,5	6	8,8	25	6,8
Complete High School	5	8,5	12	12,9	11	15,7	11	13,8	11	16,2	50	13,5
Incomplete Higher Education	1	1,7	6	6,5	5	7,1		0,0	5	7,4	17	4,6
Complete Higher Education	7	11,9	8	8,6	9	12,9	4	5,0	13	19,1	41	11,1
No information	34	57,6	49	52,7	34	48,6	48	60,0	31	45,6	196	53,0
Race/color												
White	10	16,9	20	21,5	19	27,1	14	17,5	19	27,9	82	22,2
Black	4	6,8	4	4,3	4	5,7	8	10,0	6	8,8	26	7,0
Asian	0	0,0	0	0,0	1	1,4	1	1,3	0	0,0	2	0,5
Brown	29	49,2	42	45,2	31	44,3	40	50,0	34	50,0	176	47,6
Indigenous	0	0,0	0	0,0	0	0,0	1	1,3	0	0,0	1	0,3
No information	16	27,1	27	29,0	15	21,4	16	20,0	9	13,2	83	22,4
Area												
Urban	40	67,8	76	81,7	65	92,9	64	80,0	62	91,2	307	83,0
Rural	9	15,3	9	9,7	4	5,7	7	8,8	3	4,4	32	8,6
Peri-urban	0	0,0	0	0,0	0	0,0	1	1,3		0,0	1	0,3
No information	10	16,9	8	8,6	1	1,4	8	10,0	3	4,4	30	8,1

Source: Sinan. Data accessed on 05.01.2024.

Concerning congenital toxoplasmosis; 722 suspected cases were reported, of which 451 (62.5%) were residents from the Federal District. Of these, 253 (56.1%) were confirmed; 37 (8.2%) were discarded and 161 (35.7%) remained without closure.

Of the confirmed cases, 50.2% were female children; 49.0% were of brown race/color; 10.7% were white and 0.8% were black. Among 39.1%, there was no information about this variable. Regarding place of residence, 90.5% lived in urban areas, 5.1% in rural areas, and 2.8% in peri-urban areas, Table 3.

Table 2. Incidence rate of gestational toxoplasmosis according to Administrative Region of residence, Federal District, Brasilia, Brazil, 2019 to 2023.

Administrative Region	2019	2020	2021	2022	2023	Cumulative incidence
Águas Claras	1,7	4,5	9,0	0,0	4,5	20,3
Arniqueiras	0,0	0,0	0,0	0,0	0,0	0,0
Brazlândia	4,8	14,5	9,6	9,6	9,6	48,0
Candangolândia	18,8	0,0	0,0	0,0	0,0	19,9
Ceilândia	2,7	11,0	8,5	12,1	8,7	44,3
Cruzeiro	0,0	0,0	0,0	0,0	10,9	10,9
Fercal	0,0	0,0	0,0	0,0	0,0	0,0
Gama	8,4	6,4	4,3	13,1	8,8	41,8
Guará	2,2	2,2	0,0	0,0	6,7	11,1
Itapoã	17,5	4,3	8,5	11,4	3,5	38,4
Jardim Botânico	0,0	0,0	6,0	23,8	11,8	41,3
Lago Norte	0,0	35,9	0,0	9,0	9,0	53,7
Lago Sul	0,0	12,7	12,8	0,0	0,0	26,3
Núcleo Bandeirante	12,5	38,0	0,0	0,0	12,9	64,4
Paranoá	15,6	11,7	3,9	15,8	4,0	51,6
Park Way	0,0	0,0	0,0	0,0	0,0	0,0
Planaltina	16,8	13,7	15,1	11,8	7,3	63,0
Plano Piloto	4,3	2,8	8,3	1,4	2,8	19,4
Recanto das Emas	4,4	13,3	10,9	6,5	6,4	40,4
Riacho Fundo I	13,2	0,0	6,5	6,5	6,4	32,0
Riacho Fundo II	3,0	3,7	0,0	0,0	7,3	14,7
Samambaia	7,4	7,3	7,2	13,1	9,5	43,8
Santa Maria	4,5	6,6	13,4	18,1	11,4	54,9
São Sebastião	5,0	18,1	4,5	6,9	11,6	46,2
SCIA/Estrutural	7,9	31,1	7,7	15,3	15,1	75,7
SIA	0,0	0,0	0,0	0,0	0,0	0,0
Sobradinho	4,4	17,1	8,6	12,9	4,3	47,8
Sobradinho II	0,0	4,1	4,1	4,1	4,2	16,7
Sol Nascente/Pôr do Sol	0,0	0,0	0,0	0,0	0,0	0,0
Sudoeste/Octogonal	0,0	5,7	0,0	0,0	0,0	5,8
Taguatinga	6,0	12,2	3,0	1,5	1,5	24,4
Varjão	0,0	0,0	31,7	0,0	0,0	31,6
Vicente Pires	8,2	7,8	3,9	7,8	0,0	27,4
Federal District	5,8	8,8	6,6	7,7	6,3	35,0

Source: Sinan. Data accessed on 05.01.2024. Population: CODEPLAN.

Table 3. Demographic characteristics of confirmed cases of congenital toxoplasmosis, Federal District, Brasilia, Brazil, 2019 to 2023.

Character	2019		2020		2021		2022		2023		Total	
	n=35	%	n=48	%	n=44	%	n=62	%	n=64	%	n=253	%
Sex												
Female	16	45,7	26	54,2	22	50,0	31	50,0	32	50,0	127	50,2
Male	19	54,3	22	45,8	22	50,0	31	50,0	32	50,0	126	49,8
Race/color												
White	2	5,7	2	4,2	1	2,3	6	9,7	16	25,0	27	10,7
Black	0	0,0	0	0,0	1	2,3	1	1,6	0	0,0	2	0,8
Asian	0	0,0	0	0,0	0	0,0	1	1,6	0	0,0	1	0,4
Brown	14	40,0	15	31,3	20	45,5	33	53,2	42	65,6	124	49,0
Indigenous	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
No information	19	54,3	31	64,6	22	50,0	21	33,9	6	9,4	99	39,1
Area												
Urban	29	82,9	46	95,8	41	93,2	56	90,3	57	89,1	229	90,5
Rural	5	14,3	1	2,1	1	2,3	4	6,5	2	3,1	13	5,1
Peri-urban	0	0,0	0	0,0	2	4,5	2	3,2	3	4,7	7	2,8
No information	1	2,9	1	2,1	0	0,0	0	0,0	2	3,1	4	1,6

Source: Sinan. Data accessed on 05.01.2024.

The incidence of congenital toxoplasmosis increased by 143.8% between 2019 and 2023, rising from 8.3 to 20.2 cases per 10,000 live births. The only year that showed a decline compared to the previous year was 2021, followed by a 57.1% increase in 2022.

The accumulated incidence in the period was 79.7 per 10,000 live births. Among the Administrative Regions that are part of the Federal District, Riacho Fundo I maintained throughout the period a higher incidence than that presented by the entire Federal District. A similar pattern was observed in the SCIA/Estrutural region; however, it did not reach the Federal District values in all years. In Santa Maria and Gama, there was a progressive increase in incidence between 2020 and 2023. The Fercal and Lago Norte Administrative Regions presented higher incidence values in 2019 (103.1%) and 2023 (95.5%), respectively, but did not present any cases in the other years evaluated. The Administrative Regions of Arniqueiras, Candangolândia, Cruzeiro, SIA, Sol Nascente/Pôr do Sol, Sudoeste/Octogonal and Varjão did not report cases in the period, Table 4.

Table 4. Incidence rate of congenital toxoplasmosis, according to Administrative Region of residence, Federal District, Brasilia, Brazil, 2019 to 2023.

Administrative Region	2019	2020	2021	2022	2023	Cumulative incidence
Águas Claras	0,0	13,9	5,1	5,2	12,5	43,7
Arniqueiras	0,0	0,0	0,0	0,0	0,0	0,0
Brazlândia	0,0	9,6	29,0	0,0	74,5	124,2
Candangolândia	0,0	0,0	0,0	0,0	0,0	0,0
Ceilândia	6,5	8,7	25,3	34,1	35,2	137,5
Cruzeiro	0,0	0,0	0,0	0,0	0,0	0,0
Fercal	103,1	0,0	0,0	0,0	0,0	160,0
Gama	5,2	5,9	11,8	13,3	41,4	82,9
Guará	11,0	18,1	0,0	19,7	56,7	121,5
Itapoã	0,0	10,4	0,0	32,2	0,0	44,4
Jardim Botânico	0,0	17,4	0,0	16,3	19,6	58,9
Lago Norte	0,0	0,0	0,0	0,0	95,5	95,5
Lago Sul	33,7	0,0	0,0	0,0	0,0	60,2
Núcleo Bandeirante	0,0	34,0	0,0	0,0	0,0	41,5
Paranoá	0,0	49,3	0,0	11,1	67,0	133,9
Park Way	0,0	0,0	0,0	0,0	52,4	52,4
Planaltina	20,8	7,5	30,0	29,4	4,3	103,1
Plano Piloto	3,9	8,4	0,0	0,0	5,9	23,8
Recanto das Emas	0,0	20,6	5,5	12,1	7,1	56,5
Riacho Fundo I	25,7	14,0	13,4	28,3	33,9	135,6
Riacho Fundo II	24,5	12,0	28,8	16,2	0,0	95,2
Samambaia	10,9	26,0	12,0	16,9	0,0	79,4
Santa Maria	13,9	9,8	10,0	30,4	48,1	120,3
São Sebastião	0,0	17,0	12,3	25,6	21,1	84,6
SCIA/Estrutural	26,2	14,8	28,9	14,6	28,5	114,0
SIA	0,0	0,0	0,0	0,0	0,0	0,0
Sobradinho	23,3	0,0	18,6	49,9	10,9	120,4
Sobradinho II	0,0	9,7	0,0	0,0	0,0	10,5
Sol Nascente/Pôr do Sol	0,0	0,0	0,0	0,0	0,0	0,0
Sudoeste/ Octogonal	0,0	0,0	0,0	0,0	0,0	0,0
Taguatinga	3,4	4,1	8,4	18,2	5,5	49,2
Varjão	0,0	0,0	0,0	0,0	0,0	0,0
Vicente Pires	11,8	0,0	0,0	11,5	0,0	24,6
Distrito Federal	8,3	12,2	11,1	17,4	20,2	79,7

Source: Sinan. Data accessed on 05.01.2024.

DISCUSSION

Gestational toxoplasmosis continues to be a preventable condition in most cases and is subject to treatment to avoid or reduce sequelae in fetuses[12]. Despite this, Brazil is among the countries with the highest seroprevalence of toxoplasmosis in pregnant women[13].

In the Federal District, confirmed cases of gestational toxoplasmosis predominated among women aged 20 to 29 years. A similar study in Amazonas found a higher proportion of gestational toxoplasmosis in women between 20 and 39 years old[13]. In general, the serum prevalence of *T. gondii* in a population increases with advancing age[12,14-15], probably due to a greater risk of exposure to the microorganism[13].

Regarding education, data from the Federal District are like those found in Pernambuco, where high school level prevailed, which can be attributed to the sociodemographic characteristics highlighted by CODEPLAN, which demonstrate a high level of education among the population of Federal District[16].

The association between living in rural areas and toxoplasma infection has been tested across the country and around the world with mixed results. In Minas Gerais and Paraná, a higher prevalence of toxoplasmosis was observed in residents of rural areas[15,17], while in Pará the prevalence was higher in urban areas, as in the present analysis[18]. A meta-analysis that analyzed the risk factors associated with toxoplasma infection showed notable heterogeneity; pointing out the complexity involved in the infection and the multiplicity and interaction between these factors[19].

There was a higher prevalence of toxoplasmosis in the second trimester of pregnancy, as well as in studies from São Paulo, Pará and Amazonas[14,20-21]. The risk of vertical transmission increases as pregnancy progresses, being around 2% in the first weeks and reaching approximately 80% in the final weeks, due to increased placental vascularization[22]. Therefore, to start treatment promptly, and, thus, reducing the risk of vertical transmission. It is recommended that the initial testing for toxoplasmosis occurs in the first trimester of pregnancy, always associated with education and guidance for pregnant women.

In studies conducted in Pernambuco, Amazonas, and the Federal District, brown race/color was predominant among the pregnant women evaluated; similar to the findings in the present study. However, it is important to note that the race/color data field had a high percentage of missing information, which complicates the assessment of this variable. Additionally, potential socioeconomic factors, which were not evaluated in this study, may also influence these results.

As a result, although there seems to be a predominance of brown race/color, the interpretation of this finding is limited by incomplete demographic data. Future research should focus on including more comprehensive demographic information to enable a more accurate assessment of the influence of race/color on the prevalence of the observed outcomes.

The incidence of gestational toxoplasmosis in the Federal District is similar to that observed in the state of São Paulo[19]. Despite having one of the highest seroprevalence rates for toxoplasmosis, Brazil is not among the countries with the highest prevalence of acute toxoplasmosis in pregnant women[12]. This may be attributed to early

exposure to *T. gondii* as well as challenges in screening and early detection.

The SCIA/Estrutural Administrative Region, which has the highest cumulative incidence of gestational toxoplasmosis in the Federal District according to data from the 2021 District Household Sample Survey, faces significant infrastructure and sanitation challenges, including unpaved streets and open sewage. Additionally, it has the lowest gross monthly household income in the region. However, the present analysis does not allow for determining a correlation between the incidence of toxoplasmosis and the aforementioned socioeconomic factors, highlighting the need for further studies.

Regarding congenital toxoplasmosis, studies from Santa Catarina and Pernambuco did not identify a statistically significant difference between the sexes[23-26]. Dubey's review found an incidence of congenital toxoplasmosis in Brazil between 5-23 per 10,000 live births[27], like that found in the Federal District. Currently, Brazil has incidences of congenital toxoplasmosis that are among the highest described in the literature[6]. It is not possible to state that the increase in the number of cases between the years analyzed is related to the occurrence of outbreaks or the increased sensitivity of services.

There was a heterogeneity in the incidence rates of congenital toxoplasmosis between the different Administrative Regions of the Federal District, such as those demonstrated by Fercal and Lago Norte, which presented high incidence values in the years 2019 and 2023, respectively. Moreover, this did not present any cases in the other years analyzed; a factor that may be associated with the complexity of the diagnosis, access to health services and socioeconomic factors, which were not addressed in the present study.

It is possible to observe a higher proportion of cases without closure for congenital toxoplasmosis when compared to gestational toxoplasmosis, as observed in an analysis of São Paulo state[20]. This may be related to the greater complexity of diagnosis and follow-up of newborns.

In some Administrative Regions, the number of congenital toxoplasmosis cases exceeded that of gestational toxoplasmosis, which may be attributed to deficiencies in the surveillance and care processes for pregnant women. The lack of a specific notification and investigation form for toxoplasmosis hinders the analysis of the disease's determining factors and the specification of its diagnostic and confirmation criteria. Additionally, the use of a secondary database, incomplete reporting of the evaluated variables, and the overall quality of healthcare including potential underreporting and shortcomings in screening and monitoring represent limitations of the present study.

CONCLUSION

During the study period, the incidence of both gestational and congenital toxoplasmosis has increased, though with variability across the Administrative Regions of the Federal District. Among pregnant women, toxoplasmosis prevalence was higher in the second trimester, particularly among young women of brown race/color residing in urban areas.

The distribution of congenital toxoplasmosis cases was equal between the sexes. However, a higher proportion was observed among children of brown race/color residing in urban areas. It is important to acknowledge that these findings are limited by incomplete race/color data and the lack of more comprehensive demographic information. Further studies are needed to better understand the risk factors associated with toxoplasmosis and to identify gaps and advancements in disease surveillance.

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