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## PREVALENCE OF TOXOPLASMOSIS IN WHO HAVE RECENTLY GIVEN BIRTH HOSPITALIZED IN A MATERNITY PUBLIC REFERENCE MOTHER AND CHILD, IN THE MUNICIPALITY OF BELÉM, PARÁ, BRAZIL

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### ABSTRACT

This study aimed to estimate the prevalence of the toxoplasmosis between puerperas attended in a public motherhood in the city of Belém of the Pará. We conducted a cross-sectional analytical study, involving puerperas to obtain data of serum positivity for Toxoplasmosis and their correlations through the application of an instrument Protocol and blood collection. The predominant sampling was between 19 to 23 years (30,5%); the majority residing in the metropolitan region of Belém (48,3%). Of risk factors, 80,8% of puerperas lack of knowledge about toxoplasmosis; 94,1% referred consumption of quite cooked meats.; 68,5% have had contact with animals, especially with cats (19,7%). Related to prenatal care (88,2%) they frequented, beginning in the second quarter (29,0%); doing from 5 to 7 consultations (27,1%); primigestas (46,3%) and who did not receive guidance on infectious diseases (23,2%). As for the realization of examinations serological, It was observed that 72,4% reported having held these for infectious diseases in prenatal care and 75,4% presented positive serology for Toxoplasmosis at time of delivery. The high rate of prevalence obtained demonstrates the evolutionary forms of transmission of *T. gondii* for puerperas, establishing important contact with the risk factors. These are parameters that can steer new paths of public policies related to prenatal care.

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## INTRODUCTION

Toxoplasmosis is caused by intracellular Protozoan compulsory, the *Toxoplasma gondii*. This infection is acquired through ingestion of oocysts released by feline feces, present in water or food, or by ingestion of raw or undercooked meat containing tissue cysts, and the tachyzoites via transplacental transmission, blood transfusion and laboratory accidents. This Protozoan reproduces asexually in intermediate hosts, such as man and other warm-blooded, having passing infectious variously benign, however, at risk of abortions and fetal transmission, takes on great importance when affects pregnant women (Mitsuka-Breganó, Lopes-Mori, Navarro, 2010; Brasil, 2018). The protozoonosis is considered as a public health problem of great impact in the binomial mother-son, especially in tropical countries with environmental conditions conducive to high prevalence of this interlocutory appeal. In countries with tropical climates, toxoplasmosis is usually acquired in the first years of life, with a variable proportion of adults susceptible. The infection is usually asymptomatic in pregnant women, presenting symptoms in less than 30% of the cases, usually nonspecific; in the same way as with the general population, believing that about a third of the world's population is infected (Brasil, 2014; Brasil 2018). Among pregnant women, the frequency of toxoplasmosis is variable, being directly proportional to the prevalence of each country, generally occurs 1 to 14 cases per 1.000 pregnancies, with an impact of fetal involvement translating into cases of congenital toxoplasmosis in the order of. 0.2 to 2 newborns per 1.000 births (Mitsuka-Breganó, Lopes-Mori, Navarro, 2010; Dubey et al., 2012). Studies in the city of Belém do Pará and the metropolitan region shows that more than half of the population has antibodies to *T. gondii*, evidencing a homogeneity between these areas (Bichara 2001; Carmo, 2010), since both the population of the urban area and rural area presents the same prevalence, regardless of socioeconomic or environmental factors, showing that the infection is acquired in various ways (Costa, 2012; Bichara et al., 2013). In spite of the relevance of the various control strategies, in the State of Pará is not carried out systematically the serological screens for toxoplasmosis in prenatal and neonatal screening and much less this diagnosis is performed in childbirth, excellent opportunity to do these exams (Bichara et al., 2012; 2013). In this way, it is contemplated that it is important to investigate, in representative way the predominance of the toxoplasmosis between puerperas attended in the biggest public motherhood of the state of the Pará, as well as also partner obtains socio demographic information's, conditions of prenatal and exhibition to the factors of risk related the transmission of toxoplasmosis in this group.

## MATERIALS AND METHODS

**Ethical Aspects:** The research obtained approval of the Research Ethics Committee of the Center for Tropical Medicine of the Federal University of Pará, as authorization n° 040/2009 – CEP/NMT. The data were collected only after signing of the informed consent for each patient participant.

**Type of Study:** We conducted a cross-sectional analytical study, involving puerperas to obtain data of seropositivity for Toxoplasmosis and their correlations through the application of an instrument Protocol and blood collection.

**Place of Study and Research Sample:** The study was fulfilled at the Fundação Santa Casa de Misericórdia do Pará (FSCMPA), in the immediate post-partum rooms and wards. Through the statistical calculation of simple random sampling, analysis of protocols was applied in 202 puerperas. Serological examination of toxoplasmosis using blood collected in the prepartum to

mandatory testing (HIV and VDRL). These samples were processed for separation of serum and packed in freezer to -20° to serological examination technique ELISA (IgG).

**Data Analysis:** The collected data were structured and stored in database in *Microsoft Excel* 2010 program, analyzed in the program *Bioestat* 5.0 for composition of results; with the creation of tables for data presentation. It is considered an alpha significance level of 5%, with "p-value" less than or equal to 0.05. The non-Parametric test of Chi-square test was used to verify that the differences in the proportions found in the various modalities laid out in simple frequency tables and contingency, in different categories presented statistical significance ( $p < 0,05$ ). The non-Parametric test (G) independence, was applied when the Chi-square test was unfeasible (expected frequencies inferior to 5 or in contingency tables, with some frequency to zero).

## RESULTS

A study of prevalence of toxoplasmosis among 202 puerperas of a maternity of FSCMPA, observing that, after application of the nonparametric test of Chi-square of adherence, most of proportions was statistically significant ( $P < 0,05$ ).

**Table 1. Correlation between seropositivity for Toxoplasmosis and socio demographic characteristics of puerperas attended in FSCMPA, January to March 2011**

Studied Variables	Serology for Toxoplasmosis				Statistical Test	
	Reagent		No reagent			
	n	%	n	%		
Age Group						
14 to 18	24	51.1	23	48,9	Chi-square p = 0,9930	
19 to 23	49	79.0	13	21,0		
24 to 28	34	81.0	8	19,0		
29 to 33	26	92.9	2	7,1		
34 to 38	8	100.0	-	-		
39 to 43	5	71.4	2	28,6		
N/I	7	87.5	1	12,5		
Total	153	75.7	49	24,3		
Schooling						
Teaching Primary	72	72.0	28	28,0		Chi-square p = 0,0809
Teaching Secondary	68	77.3	20	22,7		
Teaching Higher	8	100.0	-	-		
N/I	5	83.3	1	16,7		
Total	153	75.7	49	24,3		
Provenance						
Belém/Metropolis	72	74.2	25	25,8	Test G p = 0,9574	
Out of State	4	80.0	1	20,0		
Other Municipalities	69	75.0	23	25,0		
N/I	8	100.0	-	-		
Family income (minimum wages)						
< 1	41	71.9	16	28,1	Chi-square p = 0,4991	
1 a 3	80	78.4	22	21,6		
4 a 6	7	87.5	1	12,5		
N/I	25	71.4	10	28,6		
Total	153	75.7	49	24,3		
Marital Status						
Married/consensual union	96	75.0	32	25,0	Chi-square p = 0,9979	
Single	51	76.1	16	23,9		
Widow	1	100.0	-	-		
N/I	5	83.3	1	16,7		
Total	153	75.7	49	24,3		
Occupation						
Of the home	86	74.1	30	25,9	Chi-square p = 0,0015	
Domestic	11	91.7	1	8,3		
Autonomous	11	68.8	5	31,3		
Student	17	58.6	12	41,4		
Others	21	100.0	-	-		
N/I	7	87.5	1	12,5		
Total	153	75.7	49	24,3		

N/I – Not Informed; – Numeric data equal to zero not result of rounding.

In relation to the socio demographic variables (age, origin, ethnicity and education), predominated the age range of 19 to 23 years (30.5%); the majority residing in the metropolitan region of Belém (48.3%); identifying as Browns (36.9%) presenting education until elementary school (49.2%). How much at socioeconomic variables (marital status, occupation, and income), the puerperas married or living in consensual Union presented a high percentage (63,1%); the occupation of the home was the most frequent (57,1%) and the predominant household income was between 1 to 3 minimum wages (50,3 %).

**Table 2. Correlation between seropositivity for Toxoplasmosis and sanitary housing conditions of puerperas attended in FSCMPA from January to March 2011**

Studied Variables	Serology for Toxoplasmosis				Statistical Test
	Reagent		No reagent		
	n	%	n	%	
Provenance of water					Chi-square p = 0,2443
Piped and filtered	84	74,3	29	25,7	
Artesian well	42	82,4	9	17,6	
Open pit	12	60,0	8	40,0	
River/Streams	3	60,0	2	40,0	
Mineral water	3	100,0	-	-	
N/I	9	90,0	1	10,0	
Total	153	75,7	49	24,3	
Treatment of water					Chi-square p = 0,8647
Treated	87	75,0	29	25,0	
Not treated	57	75,0	19	25,0	
N/I	9	90,0	1	10,0	
Total	153	75,7	49	24,3	
Basic Sanitation					Chi-square p = 0,9385
Yes	105	75,5	34	24,5	
No	48	76,2	15	23,8	
Total	153	75,7	49	24,3	

SOURCE: research protocol. N/I – Not Informed.: – Numeric data equal to zero not result of rounding.

**Table 3. Correlation between seropositivity to Toxoplasma and toxoplasmosis transmission-related characteristics of puerperas attended in FSCMPA, between January and March 2011**

Studied Variables	Serology for Toxoplasmosis				Statistical Test
	Reagent		No reagent		
	N	%	n	%	
Know Toxoplasmosis					Chi-square p = 0,9869
No	123	75,5	40	24,5	
Yes	30	76,9	9	23,1	
Total	153	75,7	49	24,3	
Cooking of foods					Test G p = 0,9392
Well cooked	144	75,8	46	24,2	
Undercooked	7	77,8	2	22,2	
Vegetarian	2	66,7	1	33,3	
Total	153	75,7	49	24,3	
Contact with animals					Chi-square p = 0,9930
Yes	105	75,5	34	24,5	
No	48	76,2	15	23,8	
Total	153	75,7	49	24,3	
Kind of animal					Chi-square p = 0,4025
None	48	76,2	15	23,8	
Just cats	32	80,0	8	20,0	
Just Dogs	31	79,5	8	20,5	
Cats and Dogs	29	76,3	9	23,7	
Others	13	59,1	9	40,9	
Total	153	75,7	49	24,3	

SOURCE: research protocol. N/I – Not Informed: The total of 202 is due to an indeterminate result.

The profile on the sanitary conditions revealed that most consumes piped water and filtered (55.7%) and considered treated (57.1%) claimed not to have basic sanitation (31%) and reside in unpaved streets (70%), as shown in (Table 2). In the analysis of the variables related to risk factors, 80.8% of puerperas claimed lack of knowledge about toxoplasmosis; 94.1% reported consumption of meat well cooked; 68.5% had contact with

animals, particularly cats (19.7%). Variables related to the prenatal, prevailed among the puerperas who performed prenatal care (88,2%); beginning in the second quarter (29,0%); realizing of 5 to 7 queries (27,1%); primigestas (46,3%); no reports of abortion (74,9%) and who did not receive guidance on infectious diseases (23,2%). When analyzed the information related to serologic tests, it was observed that 72,4% performed serological tests reported for infectious diseases in prenatal care and 75,4% presented positive serology for Toxoplasmosis at time of delivery, content regarded as the prevalence of toxoplasmosis in this study.

**Table 4. Correlation between seropositivity to Toxoplasmosis and prenatal conditions of puerperas attended at FSCMPA, January to March 2011**

Studied Variables	Serology for Toxoplasmosis				Statistical Test
	Reagent		No reagent		
	n	%	n	%	
Prenatal					Chi-square p = 0,8064
Yes	135	75,8	43	24,2	
No	10	76,9	3	23,1	
N/I	8	72,7	3	27,3	
Total	153	75,7	49	24,3	
Start of prenatal					Chi-square p = 0,9533
1° Quarter	26	76,5	8	23,5	
2° Quarter	41	78,8	11	21,2	
3° Quarter	6	75,0	2	25,0	
Unknown Period	62	73,8	22	26,2	
Didn't do	10	76,9	3	23,1	
N/I	8	72,7	3	27,3	
Total	153	75,7	49	24,3	
Number of Gestations					Chi-square p = 0,9999
G 1	63	67,7	30	32,3	
G 2	50	83,3	10	16,7	
G 3	22	84,6	4	15,4	
> G 3	18	78,3	5	21,7	
Total	153	75,7	49	24,3	
Abortion					Chi-square p = 0,0783
No	110	72,0	42	28,0	
Yes	43	86,0	7	14,0	
Total	153	76,0	49	24,0	
Directions about infectious diseases					Chi-square p = 0,8957
Yes	48	77,4	14	22,6	
No	35	74,5	12	25,5	
Don't remember	70	75,3	23	24,7	
Total	153	75,7	49	24,3	

Source: research protocol. N/I – Not Informed

**Table 5. Description related to serologic tests realization in prenatal care of puerperas in FSCMPA, from January to March 2011**

FEATURES RELATED TO SEROLOGIC TESTS	Distribution of cases		Statistical Test
	N	%	
Serology for infectious diseases in prenatal care			Chi-square p < 0,0001
Yes	147	72,4	
No	56	27,6	
Total	203	100,0	
Serology for toxoplasmosis (IgG) in childbirth			Chi-square p < 0,0001
Reagent	153	75,4	
No reagent	49	24,1	
Indeterminate	1	0,5	
Total	203	100,0	

SOURCE: Research protocol. N/I – Not Informed.

## DISCUSSION

This study covers the main aspects that involve the transmission of this disease and conditions relating to prenatal care, as toxoplasmosis one of the diseases included among those of great importance with vertical transmission. Of 202 puerperas of this study, 75,4% (153/228) presented in front of seropositivity anti-

*T.gondii*IgG at the time of childbirth, content regarded as the prevalence of toxoplasmosis in this study. The result keeps the regional pattern is 78,2% in the general population and of 80,2% among pregnant women in Belém(Bichara, 2001; Carmo, 2011). The scenario that supports the high prevalence of toxoplasmosis among the puerperas of this study, does reflect the transmission of this pathology in northern Brazil is multifactorial, especially when the statistical tests applied in correlations between seropositivity and epidemiological variables, did not reveal any causal relationship, valuing the reasoning that all are equally exposed, whereas the prevalence remained above 70% in almost all parameters analyzed and storied. This observation remained on evaluation with the age, education, origin, household income and marital status; as well as the risk factors related to sanitation conditions and of prenatal, only domestic occupation variable, showed significant association ( $P<0,5$ ) between result of reagent for Toxoplasmosis serology. This fact can be associated with the concept of home labour activity reflects about the risks of acquiring the parasite, since the long stay at home in performing household chores, is directly connected to the ground handling of gardens, collection of animal feces as the cat, as well as the handling of raw meat and or raw food intake or poorly cooked with hand bad sanitized (Remington *et al.*, 2006; Fan *et al.*, 2015; Mangiavacchi, 2015). Thus, this comparative data obtained with discussion of other experiments will be done based on the sample as a whole, since the puerperas seropositive (75.4%), about the seronegative (34,6%, considered susceptible) they live under the same epidemiological conditions. Sociodemographic characteristics are pointed out by several authors as risk factors for toxoplasmosis, such as: age greater than 35 years, low socioeconomic status (Esquivel *et al.*, 2009; Pappas, Roussos, Falagas, 2009). Such features, in part, are compatible with the data obtained in this study, puerperas in age between 19 to 23 years (30,5%); who studied until primary education (48,8%); residents in the metropolitan region of Belém (48,3%); identifying as Browns (36,9%) and with household income of 1 to 3 minimum wages (50,7 %). In the universe of puerperas of this study, related to the mentioned risk factors, as the consumption of meat well cooked with (94,1%), being important the contact with the animals, primarily dogs (19,2%) and cats (19,7%) is increased use of filtered and piped water (55,7%). However, there was no correlation of this information with seropositivity for Toxoplasmosis. Probably, this could show that although the disease is of high prevalence in the region with strong epidemiological pressure to acquire toxoplasmosis, the transmission is done differently and heterogeneous, that is multifactorial (Pappas, Roussos, Falagas, 2009; Dubey *et al.*, 2012; Bittencourt *et al.*, 2012).

Also Bittencourt *et al.* (2012) in his research did not bring about a relationship between toxoplasmosis and behavioral habits, like eating raw vegetables, eating raw or undercooked meat, manipulation of Earth or sand, eating raw meat, presence of domestic garden, the presence of cats in the House, likely by the effectiveness of the monitoring program for Toxoplasmosis in pregnancy and congenital. But, there are other studies, with the same type of sample, where the observations of Fallah *et al.* (2004), that accompanied 576 primigestas in Hamadan, the Islamic Republic of Iran, to investigate risk factors related to toxoplasmosis, and identified increased positivity associated with increasing age ( $> 35$  years), the consumption of fresh meat undercooked and frequent consumption of raw vegetables. So similar to what was observed for Castillo *et al.* (2005) in Colombia, where the risk factors more strongly predictive of acute toxoplasmosis are: eating undercooked meat, food prepared with not boiled water and contact with puppies' cats. In this study, paradoxically the consumption of untreated water was mentioned by only 4.7% of the interviewed, given that most consumes water

piped and filtered (55,7%) and considered treated (57,1%), also claimed do not have basic sanitation (31%) and reside in unpaved streets (70%). As with other epidemiological variables with these there was no correlation with seropositivity, which somehow has already been mentioned by Avelino *et al.* (1999) that observed in Goiânia, which are larger the chances of acquiring this infection, when women live in contaminated environments. However, these same authors, five years later, in another survey in the same area, where inadequate environmental sanitation results were not significantly correlated with infection with toxoplasmosis, showing that the fundamental cause for the transmission of toxoplasmosis is not only environmentally (Avelino *et al.*, 2004).

The data from this study disagree with Issa *et al.* (2006) that among pregnant women of Michelena Venezuela observed higher seropositivity to Toxoplasmosis infection among those who did not consume drinking water, as this is associated with the 4.5 times higher risk of infection by *T. Gondii* (Castillo *et al.*, 2005). In relation to prenatal care, it was observed that prevailed the puerperas who performed prenatal care (88,2%), commencing on the 2<sup>o</sup> quarter (29,0%), performing of 5 to 7 queries (27,1%), they were primigestas (46,3%) and no reports of abortion (74,9%). These puerperas reported that they performed serological tests in prenatal care (72,4%) most of the time, the VDRL and HIV, few cited the screening for Toxoplasmosis. Although prenatal care has been undertaken by almost all of the puerperas and with adequate number of queries, the late start, the lack of preventive measures and low for Toxoplasmosis tests, let see that the assistance even being frequent, does not seem to be of quality. The data obtained are far below the desired, and are faced with the observed by Figueiró Filho *et al.* (2005) in Mato Grosso do Sul, achieved high coverage rates (95%) the first screening for Toxoplasmosis. However, Azevedo (2008) analyzing the history of mothers who had toxoplasmosis in pregnancy and who have transmitted their children in Belo Horizonte, noted that nearly half did not do prenatal care. This data is supported by the observations of Mario *et al.* (2013) that carry out pre-natal, does not ensure the screening for toxoplasmosis, and concluded that prenatal care is the most effective measure and less harmful, but with uncertain effectiveness.

The situation is more worrisome to observe that 80.8% of puerperas claimed lack of knowledge about toxoplasmosis, realizing that this fact is common, reinforced by the lack of guidance on infectious disease by prenatal care. Thus, deserve special attention to information about the low level of knowledge of the toxoplasmosis for the general population, more specifically between the puerperas interviewed, which possibly represent the majority of the women who do the network prenatal public. These data differ from studies regarding the knowledge of pregnant women about toxoplasmosis, where, Cook *et al.* (2000), in a study conducted in Europe depict the proportion of women who did not know to inform the risk factors of toxoplasmosis was 2% only in Brussels. But the data are not compatible with research involving 425 pregnant in Pelotas-RS, identifying that 65% of them were unaware of the disease (Cadermatori *et al.*, 2008). However, in order for the strategy to be effective prevention guidelines, it is necessary for the proposal to be understood by pregnant women, and that the education level can directly affect such understanding, as noted in this study, where the low schooling (49.2%), primary teaching, exposed the puerperas (80,8%) bigger the lack of knowledge about toxoplasmosis, which sends to us what still suffered with the disadvantage for the lack of information's of the team that assisted them in the prenatal care. For Beck *et al.* (2010), prenatal care offers the ideal time for them to be carried out the actions for prevention of maternal and fetal diseases like toxoplasmosis. In this context, the Ministry of health recommends that the first consultation occurs early, with at least

six queries throughout pregnancy (Brazil, 2013). The results of this study are embodied by the scientific evidence and consolidated by the observations of Mitsuka-Breganó, Lopes-Mori, Navarro (2010) and Remington *et al.* (2011), that showed the risk of acquiring toxoplasmosis during pregnancy involving three factors, such as: the prevalence in the community, the number of contacts with a source of infection and the number of susceptible women. The prevalence rate was 75.4%, epidemiological aspects showed that risk factors are present in the everyday life of the population, including susceptible group that can seroconverted at any time, being a concern in pregnancy.

## Conclusion

It is concluded that toxoplasmosis is an important regional public health pathology by high prevalence presented, and that the analysis of the results of this study on the epidemiological conditions in the socio economic demographic and shows that the transmission of toxoplasmosis is multifactorial, where several conditions provide the contact with the various forms of *T. gondii* exposing the population to one of the highest prevalence of toxoplasmosis in the world.

## REFERENCES

- Avelino, M. M.; Campos Junior, D.; Parada, J. B.; Castro, A. M. 2004. Risk factors for *Toxoplasma gondii* infection in women of childbearing age. *Brazilian Journal Infectious Diseases*, Salvador, v. 8, n. 2, p. 164-174.
- Avelino, M. M.; Campos Junior, D.; Parada, J. C. B.; Castro, A. M. 1999. Distribuição sociogeográfica da toxoplasmose em Goiânia. *Rev. Bras. Ginecol. Obstetr.* São Paulo, v. 72, n. 1.
- Azevedo, D. O. M. 2008. Triagem neonatal para toxoplasmose congênita no estado de Minas Gerais: resultados do primeiro exame oftalmológico. 2008, 124f. Tese (Doutorado em Medicina). Belo Horizonte: Universidade Federal de Minas Gerais.
- Beck, S. T.; Konopka, C. K.; Silva, A. K.; Diehl, F. P.; Silva, A. K. de. 2010. A importância do rastreamento sorológico da toxoplasmose em gestantes atendidas em ambulatório de pré-natal de alto risco. *Revista Saúde (Santa Maria)*. Rio Grande do Sul, v. 36, n. 1, p. 29-36.
- Bichara, C. N. C. 2001. Perfil epidemiológico da Toxoplasmose humana na área metropolitana de Belém/PA: A experiência no serviço de Parasitologia do Instituto Evandro Chagas. 2001. 96 f. Dissertação (Mestrado em Doenças Tropicais) Universidade Federal do Pará.
- Bichara, C. N. C.; Canto, G. A. C.; Tostes, C. L.; Freitas, J. J. S.; Carmo, E. L.; Póvoa, M. M.; Silveira, E. C. 2012. Incidence of congenital toxoplasmosis in the City of Belém, State of Pará, Northern Brazil, determined by a neonatal screening program: preliminary results. *Rev. Soc. Bras. Med. Trop.* Uberaba- MG, v. 45, n. 1, p. 122-4.
- Bichara, C. N. C.; Laisson, R.; Póvoa, M. M.; Carmo, E. L. 2013. Toxoplasmose. In: Leão R. N. Q. *Doenças tropicais e infectologia na Amazônia*, p.1317
- Bittencourt, L. H. F. B.; Mori, F. M. R. L.; Breganó, R. M.; Zabott, M. V.; Freire, R. L.; Pinto, S. B.; Navarro, I. T. 2012. Seroepidemiologia da toxoplasmose em gestantes a partir da implantação do programa de vigilância da toxoplasmose adquirida e congênita em municípios da região oeste do Paraná. *Rev. Bras. Ginecol. Obstet.* Rio de Janeiro, v. 34, n. 2.
- Brasil. Ministério da Saúde. Atenção ao pré-natal de baixo risco. *Cadernos de Atenção Básica*, nº 32. Brasília: Editora do Ministério da Saúde. 2013.
- Brasil. Ministério da Saúde. Toxoplasmose congênita. In: *Atenção à saúde do recém-nascido: guia para os profissionais de saúde*. 2. ed. atual. Brasília: Ministério da Saúde, 2014.
- Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância das Doenças Transmissíveis. Protocolo de Notificação e Investigação: Toxoplasmose gestacional e congênita [recurso eletrônico]/ Ministério da Saúde, Secretaria de Vigilância em Saúde, Departamento de Vigilância das Doenças Transmissíveis. – Brasília: Ministério da Saúde, 2018. 31 p. : il.
- Cadernatori, B. G.; Farias, N. A. R.; Brod, C. S. 2008. Soroprevalência e fatores de risco à infecção por *Toxoplasma gondii* em gestantes de Pelotas, Sul do Brasil. *Revista Panamericana de Infectologia*, v. 10, n. 4, p. 30-35.
- Carmo, E. L.; Póvoa, M. M.; Monteiro, N. S.; Marinho, R. R.; Nascimento, J. M.; Freitas, S. N.; Bichara, C. N. C. 2010. Surto de Toxoplasmose Humana no Distrito de Monte Dourado, Município de Almeirim, Pará, Brasil. *Revista Pan Amazônica de Saúde. Ananindeua*, v. 1, n. 1, p. 61-66.
- Castillo, C. A. L.; Ramirez, J. D.; Marinje, G. 2005. Risk factors for *Toxoplasma gondii* infection in pregnant women in Amenia, Colombia. *Revista de Salud Pública. Bogotá*, v. 7 n. 2, p. 180-190.
- Cook, A. J. C.; Gilbert, R. E.; Buffolano, W.; Zufferey, J.; Petersen, E.; Jenum, P. A. 2000. Sources of toxoplasma infection in pregnant women: European multicentre case-control study. *The BMJ. Londres*, v. 321, n. 1, 2000, p. 142-147.
- Costa, A. C. 2011. Conhecimento sobre a toxoplasmose e associação com os fatores de risco pelas parturientes de um hospital de referência materno infantil. 2011. 76 f. Dissertação (Mestrado em Doenças Tropicais). Universidade Federal do Pará.
- Dubey, J. P., Lago, E. G., Gennari, S. M., SU, C., Jones, J. L. 2012. Toxoplasmosis in humans and animals in Brazil: high prevalence, high burden of disease, and epidemiology. *Parasitology*, 139(11):1375–424.
- Fan, C. K., Lee, L. W., Liao, C. W., Huang, Y.C., Lee, Y. L., Chang, Y. T., Da Costa, Á. D. S. R. J., Gil, V., Chi, L. H., Nara, T., Tsubouchi, A., Akinwale, O. 2012. Toxoplasma gondii infection: relationship between seroprevalence and risk factors ISSN: 2236-0867 *Acta Biomédica Brasiliensia / Volume 6/ nº 2/ Dezembro de 2015*.
- Esquivel, C. A.; Castorena, A. T.; Liesenfeld, O.; Lopez, C. R. G.; Martinez, S. E.; Alvarez, A. S.; Hernández, J. F. M.; Cruz, R. E.; Herrera, F. S.; Castañeda, J. A.; Dubey, J. P. 2009. Seroepidemiology of *toxoplasma gondii* infection in pregnant women in rural Durango, Mexico. *The Journal of Parasitology*. v. 95, n. 2, p. 271-274.
- Fallah, M.; Rabiee, S.; Atini, M.; Taherkhani, H. 2004. Seroepidemiology of toxoplasmosis in primigravida women in Hamadan, Islamic Republic of Iran. *Eastern Mediterranean Health Journal, Republic Islamic*, v. 14, n. 1, p. 163-17.
- Figueiró Filho, E. A.; Lopez, A. H. A.; Senefonte, F. R. A.; Souza Junior, V. G.; Botelho, C. A.; Figueiredo, M. S.; Duarte, Geraldo. 2005. Toxoplasmose aguda: estudo da frequência, taxa de transmissão vertical e relação entre os testes diagnósticos materno-fetais em gestantes em estado da Região Centro-Oeste do Brasil. *Rev. Bras. Ginecol. Obstet.* Rio de Janeiro, v. 27, n. 8, p. 442-449.
- Issa, D.; Rosales, R.; Wilmary, Y.; Ramirez, R.; Peres, F. 2006. Frequência de fatores de risco para adquirir toxoplasmosis em embarazadas que acuden a control prenatal em El ambulatorio urbano i Michelena, septiembre 2005. *Colégio de Médicos del Estado Táchira. San Cristóbal*, v. 15 n. 1, p. 20-25.
- Lopes, F. M. R.; Breganó, R. M.; Gonçalves, D. D.; Freire, R. L.; Karigyo, C. J. T.; Wedy, G. F.; Matsuo, T.; Reiche, E. M. V.; Morimoto, H. K.; Capobianco, J. D.; Inoue, I. T.; Garcia, J. L.; Navarro, I. T. 2009. Factors associated with seropositivity for anti-*toxoplasma gondii* antibodies in pregnant women of

- Londrina, Paraná, Brazil. Memórias do Instituto Oswaldo Cruz. Rio de Janeiro, v. 104, n. 2, p. 378-82.
- Mangiavacchi, B. M. 2015. Toxoplasmose: uma revisão sistemática dos fatores de risco relativos à infecção toxoplásmica em crianças no Brasil. *Acta Biomédica Brasiliensia* / volume 6/ nº 2/ dezembro de.
- Mario, S. D.; Basevi, V.; Gagliotti, C.; Spettoli, D.; Gori, G.; D'amico, R.; Magrini, N. 2013. Prenataleducation for congenital toxoplasmosis. Primary health care, general medicine, planning and development of health services, Regional health authority of Emilia-Romagna, Bologna, Italy. *Cochrane Database Syst Rev*, v. 28, n. 2.
- Mitsuka-Breganó, R.; Lopes-Mori, FMR; Navarro, I. (Org). Toxoplasmose adquirida na gestação e congênita: vigilância em saúde, diagnóstico, tratamento e condutas. Londrina: EDUEL, 2010. 62 p
- Pappas, G., Roussos, N. Falagas, M. E. 2009. Toxoplasmosis snapshots: Global status of *Toxoplasma gondii* seroprevalence and implications for pregnancy and congenital toxoplasmosis. *International Journal for Parasitology* 39:1385–1394.
- Remington, J. S.; Klein J. O. ; Wilson, C. B. ; Baker, C. J. Toxoplasmosis. In: Remington, J. S.; Klein, J. O. 2006. *Infectious diseases of the fetus and newborn infant*. 6<sup>a</sup> ed. Philadelphia: WB Saunders, p. 947.

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