Alqalam Journal of Medical and Applied Sciences. 2025;8(2):874-878
https://doi.org/10.54361/ajmas.258249

Original article

Assessing the Risk Factors and Pregnancy Outcomes of Toxoplasmosis Infection

Mohamed Errmali*[1], Huda Eldeeb[2]

[1]*Department of Medical Technology, Technical College of Applied Sciences -Alawata, Libya*
[2]*Department of Gynecology & Obstetrics, Ali Omar Askar Hospital, Libya*
***Corresponding email**: mohamederrmali@Gmail.com*

Abstract
Toxoplasmosis is considered a zoonotic food-borne infection caused by the parasite *Toxoplasma gondii*. During pregnancy, the *Toxoplasma gondii* infection is found to contribute to miscarriages, stillbirth, neonatal death, or fetal/neonatal abnormalities via vertical transmission, which increases with gestational age. The current study was conducted to determine the risk factors and pregnancy outcomes of Toxoplasmosis infection among Libyan pregnant women. This study was a case series hospital-based study carried out in the obstetrics and gynecology sectors of Ali Omar Askar Hospital, Alkhadra Hospital, and Alafia Clinic between January 2019 and April 2025. A total of 60 pregnant women who were diagnosed with toxoplasmosis in a multicenter hospital which collected from medical records via a standardized questionnaire. The extracted data underwent analysis and processing via SPSS version 24. A total of 60 pregnant women were included, aged between 30 and 34 years, and accounted for 24(40.0%). The mean age was 29.27±5.210SD. The mean gestational age was 14.52 ± 4.019 SD with the minimum gestational age was 9 weeks while the maximum gestational age was 24 weeks and 58.3% (35) of patients had expressed history of animal contact particularly cat accounted 10.0% (6), 68.3% (41) of patients had received antibiotics therapy with 20.0% (12) had received Spiramycin followed by 18.3% (11) had received Pyrimethamine and 16.7% (10) had received Azithromycin. 28.3% (17) of neonates had expressed jaundice, followed by 25.0% (15) had expressed pneumonitis, 13.3% (8) had expressed skin rash, and 8.3% (5) had expressed hydrocephalus. just 11.7% (7) had expressed chorioretinitis, 10.0% (6) had developed epilepsy, 1.7% (1) had blindness, and 1.7% (1) had strabismus after delivery. statistically significant results were reported on the relationship between neonatal complications and toxoplasmosis outcomes (P-value = 0.041). 46.7% (28) of them had required admission to the neonatal intensive care unit. Several risk factors have been identified linked to toxoplasmosis, such as the middle age group, early gestational age infection exposure, history of animal contact, and early antibiotics therapy. Most patients reported that they received antibiotic therapy, which contributed to a lower rate of fetal and neonatal complications. Therefore, early recognition as well as prompt management of toxoplasmosis is our crucial approach to avoid related adverse perinatal outcomes. Also, effective prenatal counseling and antenatal screening for the high-risk group in toxoplasmosis infection are essential to prevent related perinatal morbidity and mortality.
Keywords: Toxoplasmosis, *Toxoplasma gondii,* Pregnant Women, Libya.

Introduction

Toxoplasmosis is considered a zoonotic food-borne infection caused by the parasite *Toxoplasma gondii* [1]. Several risk factors have been reported for toxoplasma infection, such as consumption and eating undercooked or raw meat, drinking contaminated water or unpasteurized milk of goat, and close contact with cat feces [2-3]. The *Toxoplasma gondii* seroprevalence was detected to be higher in rural or suburban regions compared to urban regions. Because the rural area is related to poor sanitary status, drinking unfiltered water and close contact to soil and animals [1,4].

During pregnancy, the *Toxoplasma gondii* infection found to contributed to miscarriages, stillbirth, neonatal death or fetal/neonatal abnormalities via vertical transmission which raised with gestational age approximately 15% in first trimester, 25% in second trimester and 65% in third trimester with more serious condition among immunodeficiency including HIV/AIDS [5-6]. Globally, according to a WHO-supported study, the estimated incidence of congenital toxoplasmosis is found to be highest in the Middle East region and some low-income African countries [7]. Hence, the early treatment of toxoplasmosis during pregnancy has been shown to decrease the adverse congenital outcomes, but despite the therapy still there is still later infant risk from uninfected bradyzoite parasites, which are responsible for reactivation, particularly in the central nervous system and heart organs [8-12]. In this context, this study aims to determine the risk factors and pregnancy outcomes of Toxoplasmosis infection among Libyan pregnant women.

Methods

This study was a case series hospital-based study carried out in the obstetrics and gynecology sectors of Ali Omar Askar Hospital, Alkhadra Hospital, and Alafia Clinic between January 2019 and April 2025. A total of 60 pregnant women who were diagnosed with toxoplasmosis in a multicenter hospital, which collected data from medical records via a standardized questionnaire that selected relevant data to include

***Received**: 13-03-2025 - **Accepted**: 08-05-2025 - **Published**: 17-05-2025*

any Libyan pregnant women confirmed by serology tests, had toxoplasmosis with excluded non-Libyan patients or unconfirmed cases.
The extracted data underwent analysis and processing via SPSS version 24. The results were interpreted into descriptive analysis in the form of frequency and percentage, while inferential analysis in the form of the Chi square test with considering a P-value of less than 0.05 as a statistically significant finding.

Results

Based on maternal age frequency, the most frequent age was between 30 and 34 years, accounting for 40.0% (24), the mean age was 29.27 ± 5.210 SD, with the minimum age being 20 years, while the maximum age was 38 years (Figure 1).

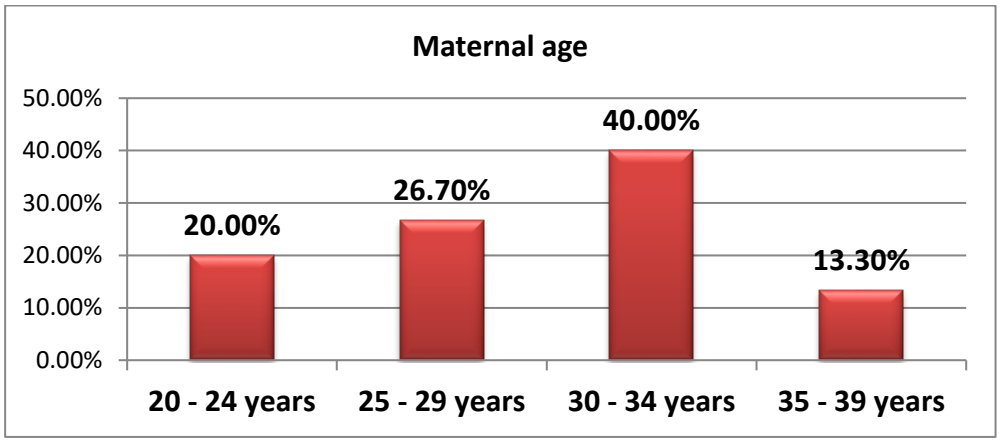

Figure 1. Maternal age, Multicenter, Tripoli, Libya, 2019-2025.

Based on obstetrical characteristics frequency, the mean gravidity was 4.33 ± 1.398 SD, the mean parity was 3.00 ± 1.461 SD, the mean miscarriage was 0.42 ± 0.645 SD, and the mean previous caesarean section was 0.65 ± 1.246 SD (Table 1).

Table 1. Obstetrical characteristics, Multicenter, Tripoli, Libya, 2019-2025.

Variables (n = 60)	Mean ± SD	Minimum	Maximum
Gravidity	4.33 ± 1.398	1	7
Parity	3.00 ± 1.461	0	6
Miscarriage	0.42 ± 0.645	0	2
Previous CS	0.65 ± 1.246	0	5

Based on gestational age at time of diagnosis of toxoplasmosis frequency, the mean gestational age was 14.52 ± 4.019 SD with the minimum gestational age was 9 weeks while the maximum gestational age was 24 weeks and 58.3% (35) of patients had expressed history of animal contact particularly cat accounted 10.0% (6), statistically significant results had reported (P-value = 0.015) (Figure 2).

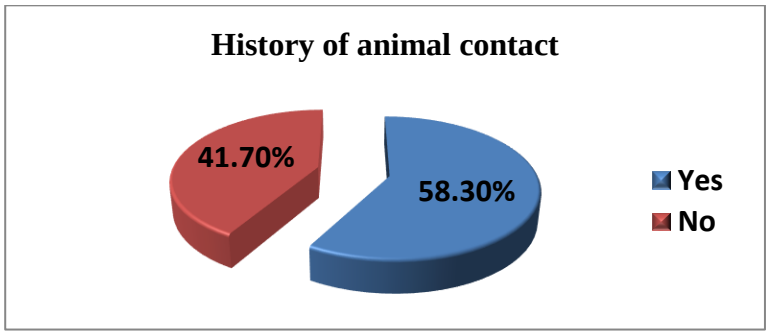

Figure 2. History of animal contact, multicenter, Tripoli, Libya, 2019-2025.

Based on maternal antibiotics treatment frequency, 68.3% (41) of patients had received antibiotics therapy, with 20.0% (12) having received Spiramycin, followed by 18.3% (11) having received Pyrimethamine, and 16.7% (10) having received Azithromycin (Table 2).

Received*: 00-00-2025 -* ***Accepted****: 00-00-2025 -* ***Published****: 02-01-2025*

Table 2. Maternal antibiotics treatment, Multicenter, Tripoli, Libya, 2019-2025.

Variables (n = 60)	Frequency (N)	Percentage (%)
Spiramycin	12	20.0%
Pyrimethamine	11	18.3%
Azithromycin	10	16.7%
Clindamycin	6	10.0%
Sulfadiazine	2	3.3%
No Treatment	19	31.7%

Based on mode of delivery frequency, nearly half of pregnant women had delivered by vaginal delivery accounted for 55.0% (33) and the mean gestational age at time of delivery was 36.82 ± 1.228 SD (Figure 3).

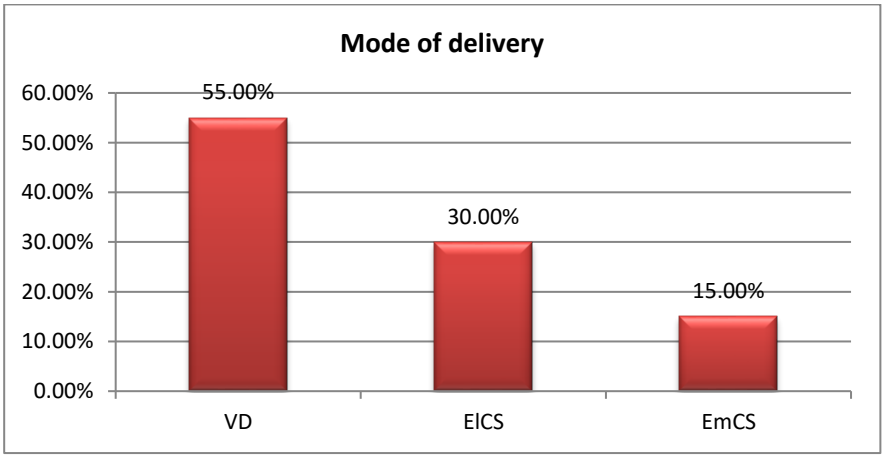

Figure 3: Mode of delivery, Multicenter, Tripoli, Libya, 2019-2025.

Based on the clinical manifestations of neonates at the time of delivery, 28.3% (17) of neonates had expressed jaundice, followed by 25.0% (15) had expressed pneumonitis, 13.3% (8) had expressed skin rash, and 8.3% (5) had expressed hydrocephalus (Table 3).

Table 3: Clinical manifestations of neonates at time of delivery, Multicenter, Tripoli, Libya, 2019-2025.

Variables (n = 60)	Frequency (N)	Percentage (%)
Jaundice	17	28.3%
Pneumonitis	15	25.0%
Skin rash	8	13.3%
Hydrocephalus	5	8.3%
Hepatosplenomegaly	3	5.0%
Microcephaly	2	3.3%
None	10	16.7%

Based on neonatal outcomes frequency, the majority of neonates had born alive accounted for 88.3% (53) with the mean birth weight was 2.689 ± 0.358 SD, 48.3% (29) were males while 51.7% (31) were females and 46.7% (28) of them had required admission to neonatal intensive care unit (Table 4).

Table 4. Neonatal outcomes, Multicenter, Tripoli, Libya, 2019-2025.

Variables (n = 60)	Frequency (N)/Percentage (%)
Neonatal status	
Alive	53 (88.3%)
IUFD	7 (11.7%)
Gender	
Males	29 (48.3%)
Females	31 (51.7%)
NICU admission	
Yes	28 (46.7%)
No	32 (53.3%)

Based on neonatal complications frequency, just 11.7% (7) had expressed chorioretinitis, 10.0% (6) had developed epilepsy, 1.7% (1) had blindness and 1.7% (1) had strabismus after delivery, statistically

Received*: 00-00-2025 -* ***Accepted****: 00-00-2025 -* ***Published****: 02-01-2025*

significant results had reported on relationship between neonatal complications and toxoplasmosis outcomes (P-value = 0.041) (Figure 4).

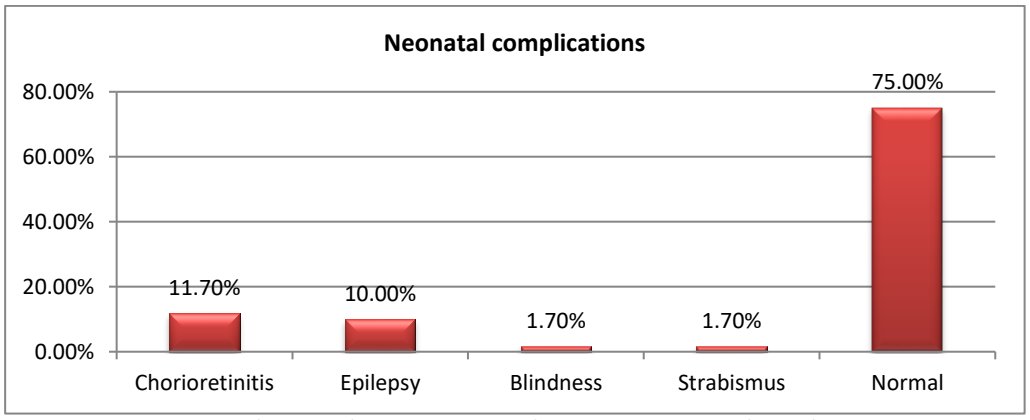

Figure 4. Neonatal complications, Multicenter, Tripoli, Libya, 2019-2025.

Discussion

Toxoplasmosis is considered a parasitic disease caused by an intracellular protozoan parasite named *Toxoplasma gondii*. Toxoplasmosis is acquired during pregnancy and transmitted via the placenta to the fetus, leading to congenital toxoplasmosis, that attributed to adverse consequences [13-14]. In this context, the present study included 60 Libyan pregnant women who were diagnosed with toxoplasmosis in a multicenter hospital in Tripoli during 2019 and 2025, which assessed risk factors and pregnancy outcomes. The toxoplasmosis is reported to be more frequent among the middle-aged group, while Rostami A et al study had found that the acute toxoplasmosis infection is higher among younger age on compared to older age groups [15].

Several studies have shown that the risk of vertical transmission, exhibiting severe symptoms, and expressing fetal symptomatic disease had been affected by gestational age at the time of maternal infection [16-18]. On the current study, the toxoplasmosis had found to impact on fetus and newborn which results to jaundice (28.3%), pneumonitis (25.0%), skin rash (13.3%) and hydrocephalus (8.3%) while after delivery (11.7%) had expressed chorioretinitis, (10.0%) had developed epilepsy, (1.7%) had blindness and (1.7%) had strabismus.

Our findings are lower than the Olariu TR et al study, which showed that the prevalence of eye findings (62.5%) and hydrocephalus (38.5%) in the group of infants born to treated mothers [19]. While on Peyron F et al study had found that the hydrocephalus and systemic diseases, such as splenomegaly or pneumonia, have not been identified in recent years due to preventive screening measures and early treatment during pregnancy [20]. Hence, some studies have suggested that the absence of prenatal screening programs and early management can lead to an increased rate of chorioretinitis and cerebral lesions [18].

In the present study, the frequency of animal contact, particularly the cat exposure, was low (10.0%) while on various studies had documented that the cats contact is considered as a major risk factor and important source for Toxoplasma gondii oocyst in contaminated environment that get shed from infected cats during pregnant women exposure [21-22]. The majority of pregnant women in our study had received treatment (68.3%), and the more frequent antibiotics used were Spiramycin (20.0%), Pyrimethamine (18.3%), and Azithromycin (16.7%), which contributed to reducing the rate of fetal and neonatal complications.

In comparison to the Mandelbrot et al study, had found that the rate of congenital disease was low in those treated with sulfadiazine and pyrimethamine (18.5%) compared to patients treated by Spiramycin (30%) [23] The limitation of the study was retrospective study, while the strength of the study was an appropriate sample size over a long period.

Conclusion

Several risk factors have been identified linked to toxoplasmosis, such as the middle age group, early gestational age infection exposure, history of animal contact, and early antibiotics therapy use. Most patients reported that they received antibiotic therapy, which contributed to a lower rate of fetal and neonatal complications. Therefore, early recognition as well as prompt management of toxoplasmosis is a crucial approach to avoid related adverse perinatal outcomes. Also, effective prenatal counseling and antenatal screening for the high-risk group in toxoplasmosis infection are essential to prevent related perinatal morbidity and mortality.

Conflict of interest. Nil

Received: *00-00-2025* - ***Accepted***: *00-00-2025* - ***Published***: *02-01-2025*

References

1. Pappas G, Roussos N, Falagas ME. Toxoplasmosis snapshots: global status of Toxoplasma gondii seroprevalence and implications for pregnancy and congenital toxoplasmosis. Int J Parasitol. 2009;39(12):1385-94. doi:10.1016/j.ijpara.2009.04.003
2. Jones JL, Dargelas V, Roberts J, Press C, Remington JS, Montoya JG. Risk factors for Toxoplasma gondii infection in the United States. Clin Infect Dis. 2009;49(6):878-84. doi:10.1086/605433
3. England J, Bailin SS, Gehlhausen JR, Rubin DH. Toxoplasmosis: The Heart of the Diagnosis. Open Forum Infect Dis. 2019;6(5):ofy338. doi:10.1093/ofid/ofy338
4. Gao XJ, Wang H, Wang H, Qin H, Xiao J. Toxoplasma gondii infection in pregnant women in China. Parasitology. 2012;139(2):139-47. doi:10.1017/S0031182011001880
5. Dunn D, Wallon M, Peyron F, Petersen E, Peckham C, Gilbert R. Mother-to-child transmission of toxoplasmosis: risk estimates for clinical counselling. Lancet. 1999;353(9167):1829-33. doi:10.1016/S0140-6736(98)08220-8
6. Lebech M, Andersen O, Christensen NC, Hertel J, Nielsen HE, Peitersen B, et al. Feasibility of neonatal screening for toxoplasma infection in the absence of prenatal treatment. Lancet. 1999;353(9167):1834-7. doi:10.1016/s0140-6736(98)11281-3
7. Torgerson PR, Mastroiacovo P. The global burden of congenital toxoplasmosis: a systematic review. Bull World Health Organ. 2013;91(7):501-8. doi:10.2471/BLT.12.111732
8. Berrébi A, Assouline C, Bessières MH, Lathière M, Cassaing S, Minville V, et al. Long-term outcome of children with congenital toxoplasmosis. Am J Obstet Gynecol. 2010;203(6):552.e1-6. doi:10.1016/j.ajog.2010.06.002
9. Mets MB, Holfels E, Boyer KM, Swisher CN, Roizen N, Stein L, et al. Eye manifestations of congenital toxoplasmosis. Am J Ophthalmol. 1996;122(3):309-24. doi:10.1016/S0002-9394(14)72057-4
10. Wallon M, Kodjikian L, Binquet C, Garweg J, Fleury J, Quantin C, et al. Long-term ocular prognosis in 327 children with congenital toxoplasmosis. Pediatrics. 2004;113(6):1567-72. doi:10.1542/peds.113.6.1567
11. Peyron F, Garweg JG, Wallon M, Descloux E, Rolland M, Barth J. Long-term impact of treated congenital toxoplasmosis on quality of life and visual performance. Pediatr Infect Dis J. 2011;30(7):597-600. doi:10.1097/INF.0b013e31820bb5f3
12. Wallon M, Garweg JG, Abrahamowicz M, Cornu C, Vinault S, Quantin C, et al. Ophthalmic outcomes of congenital toxoplasmosis followed until adolescence. Pediatrics. 2014;133(3):e601-8. doi:10.1542/peds.2013-2153
13. Yamada H, Nishikawa A, Yamamoto T, Mizue Y, Yamada T, Morizane M, et al. Prospective study of congenital toxoplasmosis screening with use of IgG avidity and multiplex nested PCR methods. J Clin Microbiol. 2011;49(7):2552-6. doi:10.1128/JCM.02092-10
14. Kieffer F, Wallon M. Congenital toxoplasmosis. Handb Clin Neurol. 2013;112:1099-101. doi:10.1016/B978-0-444-52910-7.00028-3
15. Rostami A, Riahi SM, Contopoulos-Ioannidis DG, Gamble HR, Fakhri Y, Shiadeh MN, et al. Acute Toxoplasma infection in pregnant women worldwide: A systematic review and meta-analysis. PLoS Negl Trop Dis. 2019;13(10):e0007807. doi:10.1371/journal.pntd.0007807
16. Montoya JG, Remington JS. Management of Toxoplasma gondii infection during pregnancy. Clin Infect Dis. 2008;47(4):554-66. doi:10.1086/590149
17. Fallahi S, Rostami A, Shiadeh MN, Behniafar H, Paktinat S. A literature review on maternal-fetal and reproductive disorders of Toxoplasma gondii infection. J Gynecol Obstet Hum Reprod. 2017;47(3):133-40. doi:10.1016/j.jogoh.2017.12.003
18. Thiébaut R, Leproust S, Chêne G, Gilbert R, SYROCOT (Systematic Review on Congenital Toxoplasmosis) study group. Effectiveness of prenatal treatment for congenital toxoplasmosis: a meta-analysis of individual patients' data. Lancet. 2007;369(9556):115-22. doi:10.1016/S0140-6736(07)60072-5
19. Olariu TR, Press C, Talucod J, Olson K, Montoya JG. Congenital toxoplasmosis in the United States: clinical and serologic findings in infants born to mothers treated during pregnancy. Parasite. 2019;26:13. doi:10.1051/parasite/2019013
20. Peyron F, Wallon M, Kieffer F, Garweg J. Toxoplasmosis. In: Remington JS, Klein JO, Wilson CB, Nizet V, Maldonado Y, editors. Infectious diseases of the fetus and newborn infant. 7th ed. Philadelphia: Elsevier Saunders; 2016. p. 949-1042.
21. Rabaan AA, Uzairue LI, Alfaraj AH, Halwani MA, Muzaheed, Alawfi A, et al. Seroprevalence, risk factors and maternal-fetal outcomes of Toxoplasma gondii in pregnant women from WHO Eastern Mediterranean Region: systematic review and meta-analysis. Pathogens. 2023;12(9):1157. doi:10.3390/pathogens12091157
22. Marín-García PJ, Planas N, Llobat L. Toxoplasma gondii in foods: prevalence, control, and safety. Foods. 2022;11(16):2542. doi:10.3390/foods11162542
23. Mandelbrot L, Kieffer F, Sitta R, Laurichesse-Delmas H, Winer N, Mesnard L, et al. Prenatal therapy with pyrimethamine + sulfadiazine vs spiramycin to reduce placental transmission of toxoplasmosis: a multicenter, randomized trial. Am J Obstet Gynecol. 2018;219(4):386.e1-9. doi:10.1016/j.ajog.2018.05.031

Received*: 00-00-2025 -* ***Accepted****: 00-00-2025 -* ***Published****: 02-01-2025*