ISSN (O): 2320-5407 Int. J. Adv. Res. 13(04), Apr-2025 1037-1041

Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/20808
DOI URL: http://dx.doi.org/10.21474/IJAR01/20808

RESEARCH ARTICLE

PREVALENCE OF TOXOPLASMA GONDII AMONG PREGNANT WOMEN IN MOGADISHU, SOMALIA: A SINGLE-CENTER STUDY

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Manuscript Info

Manuscript History
Received: 17 February 2025
Final Accepted: 20 March 2025
Published: April 2025

Keywords:-
Toxoplasma Gondii, Pregnant Women, Poorsanitation and Hygiene, Parasitic Infection

Abstract

Background: Toxoplasmosis is a disease caused by the parasite Toxoplasma gondii. It is found worldwide, including in Africa, where it is a common parasitic infection. The prevalence of toxoplasmosis in Africa varies widely depending on the region and population. Some studies have found high infection rates in certain areas, such as rural regions with poor sanitation and hygiene, and among people who work with livestock. There is a scarcity of information on toxoplasma gondii infection prevalence in Somalia. This study was conducted to contribute to the scientific knowledge on the prevalence of toxoplasma gondii among pregnant women and variation among different age groups.

Methods and materials: This is a single-centre cross-sectional study design of toxoplasmosis among pregnant women patients seeking healthcare services in Kalkaal Hospital from August 2022 to December 2022. The blood samples were collected from pregnant women patients visiting the Hospital for antenatal purposes. Statistical analyses were performed using IBM SPSS Statistics for Windows, version 25.0. Descriptive statistics were used to summarize the data. The Chi-square test was used to test for associations between categorical variables. The t-test was used to compare the mean age between the two groups.

Results: During the study period, a total number of 299 pregnant women attended various healthcare services. The results of this study indicate a prevalence of (24/299) 8% for IgG Positive. The data analysis results present a study investigating the prevalence of Toxoplasma gondii infection among pregnant women in different districts of Somalia. The study found that out of the 299 women who attended various healthcare services, 24 (8%) were positive for IgG, indicating a past infection with the parasite. Grouping according to residence indicates a slightly higher proportion of IgG Positive among rural(9.33%) those living in residence compared to urban those living in residence (8.04%). However, there was no statistically significant evidence of a difference between rural and urban(P=0.443). Overall, the results provide important information about the prevalence of Toxoplasma infection among pregnant women in Somalia, highlighting the importance of identifying high-risk areas for targeted interventions.

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In conclusion, handling the health problem of Toxoplasma infection among pregnant women requires routine screening, health education on avoiding undercooked meat, practising good hygiene, and avoiding contact with cat feces.

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Introduction:-

Toxoplasmosis is an infectious disease caused by the Toxoplasma gondii parasite. It is found worldwide, including in Africa, where there is a ommon parasitic infection.(1) It can be contracted by ingesting contaminated food or water or contacting infected cat feces. Most healthy individuals do not experience symptoms, but the disease can be severe in people with weakened immune systems, pregnant women, and newborns. Treatment typically involves antibiotics, and prevention measures include proper food handling and hygiene practices.(2)

The prevalence of toxoplasmosis in Africa varies widely depending on the region and population. Some studies have found high infection rates in certain areas, such as rural regions with poor sanitation and hygiene, and among people who work with livestock. Other studies have found lower infection rates in urban areas and among people with higher socioeconomic status.(3)

There is a dearth of information on toxoplasma gondii infection prevalence in Somalia. Limited data suggest that up to 60% of the Somali population has been exposed to the parasite, with higher rates in rural areas. Risk factors for infection in Somalia include contact with cats, consumption of raw or undercooked meat, and poor sanitation and hygiene practices. In addition, toxoplasmosis has been identified as a fundamental cause of ocular disease and congenital malformations in Somali refugees living in other countries. The lack of reliable diagnostic facilities and limited access to healthcare services in Somalia may contribute to underdiagnosis and undertreatment of toxoplasmosis. Therefore, there is a need for increased awareness and improved prevention and control measures for toxoplasmosis in Somalia.(2)

Toxoplasmosis is generally a mild disease; most infected people do not experience any symptoms. However, in people with weakened immune systems, such as those with HIV/AIDS, toxoplasmosis can cause severe illness and even be life-threatening.(4)

Pregnant women are at risk of adverse outcomes in the case of infections. Toxoplasmosis can cause congenital disabilities in the fetus. The age of pregnant women has been reported as an essential factor in the risk of Toxoplasma infection.(5) Studies have shown that younger pregnant women are at higher risk of Toxoplasma infection, likely due to a greater likelihood of exposure to the parasite and a weaker immune system than older pregnant women. It has been reported that older pregnant women are more likely to have been exposed to Toxoplasma earlier in life, developing immunity to the infection. This immunity may protect against Toxoplasma infection in future pregnancies. Overall, age is essential when assessing the risk of Toxoplasma infection in pregnant women. However, it is essential to note that other factors, such as diet, hygiene practices, and exposure to infected animals, can also affect the risk of infection.(5)

Preventing toxoplasmosis involves practising good hygiene, such as washing hands and utensils thoroughly, cooking meat properly, and avoiding contact with cat faeces, which can be a source of the parasite.(6)

There is little to no information about the prevalence of Toxoplasma among pregnant women in Mogadishu. This study was conducted to contribute to the scientific knowledge on the prevalence of toxoplasma gondii among pregnant women and variation among different age groups.

Method and Materials:-

Study Design

The study is a single-centre cross-sectional study of toxoplasmosis among pregnant women patients seeking healthcare services in Kalkaal Hospital from August 2022 to December 2022. The blood samples were collected from pregnant women patients visiting the Hospital for antenatal purposes. The ethical review board of Kalkaal

Hospital, Mogadishu, Somalia, approved the study, and the researchers conducted all the procedures according to the approved guidelines.

Sample Collection and Transportation

During sample collection, a 5ml volume of blood samples was collected using sterile plain Vacutainer tubes(BD Vacutainer Systems, Plymouth, UK). The collected sample was allowed to clot for 10 minutes and centrifuged to separate the serum from the red blood cells. The sera were transferred to Eppendorf tubes (Eppendorf-AG, Hamburg, Germany) labelled according to the patient's details, like the patient's name, date of birth, and collection date. The sera were kept refrigerated at 3oC, transported to the microbiology laboratory within 1 hour after sample collection, and kept at -20oC until tested—samples having equivocal test results (1%) from the analysis.

Data Collection and Analysis

Data collected from the hospital management system were collated and cleaned for analysis. The study variables include residence, age, and the results of toxoplasma gondii. We performed descriptive statistics, including frequency for categorical variable residence and age group. Also, the mean age for the two groups was analyzed, and a t-test was conducted.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, version 27.0. Descriptive statistics were used to summarize the data. The Chi-square test was used to test for associations between categorical variables. The t-test was used to compare the mean age between the two groups.

Limitations:-

The study was conducted in a single hospital, so the results may not be generalizable to other settings. Additionally, the study was cross-sectional, so we cannot establish causality.

Results:-

During the study period, a total number of 299 pregnant women attended various healthcare services. The results of this study indicate a prevalence of (24/299) 8% for IgG Positive. According to age, the highest proportion of positive pregnant women, 14(12.39%), were younger, aged between 16-26, followed by ages 26-36, 8(5.44%), and lastly, 36-46, 3(8.11%), none among 2 patient older than 46 years had a positive result for the diseases.

Age Group	Positive	Negative	Grand Total
16-26	14(12.39%)	99(87.61%)	113
26-36	8(5.44%)	139(94.56%)	147
36-46	3(8.11%)	34(91.89%)	37
46-56	0%	2(100%)	2
Grand Total	25	274	299

Howlwadaag district, 5(14.2%, had the highest proportion of patients with IgG Positive for Toxoplasma, followed by Afmadow(13.0%), 1 in 10 patients for both Waaberi and Dharkenley positive, SHALANBOOD was 4(9.5%), while Wadajir was 4(6.5%), Hodan was 4(4.7%) while Afmadow had a proportion of 3(13.0%). A combination of other districts indicated 2(6.7%)

Districts	IgG Positive	Negative	Grand Total
Hodan	4(4.7%)	82	86
Wadajir	4(6.5%)	58	62
SHALANBOOD	4(9.5%)	38	42
Howlwadaag	5(14.2%)	30	35
Afmadow	3(13.0%)	20	23
Waaberi	1(10%)	9	10
Dharkenley	1(10%)	9	10
Other districts	2(6.7%)	28	30

Residence

Grouping according to residence indicates a slightly higher proportion of IgG Positive among rural(9.33%) residents living in residences than urban residents (8.04%). However, there was no statistically significant evidence of a difference between rural and urban(P=0.443).

Row Labels	IgG Positive	Negative	Grand Total	P-Value
Rural	7(9.33%)	68(90.67%)	75(100.00%)	0.443
Urban	18(8.04%)	206(91.96%)	224(100.00%)	
Grand Total	8.36%	91.64%	100.00%	

Discussion:-

The data analysis results present a study investigating the prevalence of Toxoplasma gondii infection among pregnant women in different districts of Somalia. The study found that out of the 299 women who attended various healthcare services, 24 (8%) were positive for IgG, indicating a past infection with the parasite. Toxoplasmosis is a parasitic infection caused by the Toxoplasma gondii parasite. It is of particular concern among pregnant women because the parasite can be transmitted from the mother to the developing fetus, leading to congenital toxoplasmosis, which can result in severe and potentially life-threatening complications.

The study's results suggest that the prevalence of Toxoplasma infection among pregnant women varies by age. The highest proportion of positive cases was observed among women aged between 16-26, followed by women aged 26-36 and those aged 36-46. This finding is consistent with previous research, showing that younger women are at higher risk of Toxoplasma infection. Younger women are disproportionately infected, likely due to several factors, such as lifestyle habits, occupation, and level of education, which may affect the risk of exposure to the parasite. (7). A study conducted in Taiwan found that the seroprevalence of Toxoplasma infection among pregnant women varied by age, with younger women having a higher prevalence than older women. Other studies conducted in different regions have also reported similar findings. It is important to note that the study did not detect any Toxoplasma infection cases among pregnant women over 46 years. This finding may suggest that older pregnant women may have a lower risk of Toxoplasma infection due to developing immunity to the infection over time.

These findings highlight the importance of considering age in the risk of Toxoplasma infection among pregnant women. Healthcare providers should be aware of the higher risk of infection among younger women and provide appropriate screening and education to prevent and manage the infection. Further research is needed to understand the underlying factors contributing to the age-specific variation in Toxoplasma infection prevalence among pregnant women.

The study also identified differences in the prevalence of Toxoplasma infection across different districts. Howlwadaag had the highest proportion of patients with IgG positivity (14.2%), followed by Afmadow (13.0%), while Shalanbood had the lowest proportion (9.5%). The remaining districts had prevalence rates ranging from 6.5% to 4.7%. The findings suggest that the risk of Toxoplasma infection among pregnant women in Somalia may vary by location and highlight the importance of considering location-specific factors when developing prevention and control measures.

Overall, the results provide important information about the prevalence of Toxoplasma infection among pregnant women in Somalia, highlighting the importance of identifying high-risk areas for targeted interventions. However, it is essential to note that the study was conducted in a single centre, and the results may not represent the entire population of pregnant women in Somalia. Therefore, further research may be needed to confirm and expand on these findings. According to residences, grouping indicates a slightly higher proportion of IgG Positive among rural residents than urban residents. However, there was no statistically significant evidence of a difference between rural and urban. Similar studies have been reported in other studies suggesting that up to 60% of the Somali population has been exposed to the parasite, with higher rates in rural areas.

Based on the results discussed, various recommendations can be made for handling the health problem of Toxoplasma infection among pregnant women in Somalia—routine screening. Firstly, the prevalence of

Toxoplasma infection among pregnant women in Somalia is not negligible. Therefore, there should be a routine screening of pregnant women for Toxoplasma infection to detect those infected and provide them with appropriate treatment. Secondly, health education should be of high priority. Given that Toxoplasma infection is preventable, pregnant women should be educated about the associated risks and the measures they can take to reduce their risk of infection. These areas of education include avoiding undercooked meat, practising good hygiene, and avoiding contact with cat faeces. Thirdly, targeted interventions should be conducted. Given the variations in the prevalence of Toxoplasma infection across different districts, targeted interventions should be designed to address the specific risk factors driving infection rates in high-risk areas. Lastly, further research: To fully understand the burden of Toxoplasma infection among pregnant women in Somalia, further research is needed to confirm and expand on the study's findings. Such a study aids in developing more efficient preventative and control methods and contributes to our understanding of the epidemiology of the virus.

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