Revista ARACÊ
ISSN: 2358-2472

PREVALENCE OF UVEITIS IN PATIENTS REPORTED WITH SYPHILIS AND TOXOPLASMOSIS TREATED AT A UNIVERSITY HOSPITAL IN NORTHERN BRAZIL

PREVALÊNCIA DE UVEÍTE EM PACIENTES COM SÍFILIS E TOXOPLASMOSE TRATADOS EM UM HOSPITAL UNIVERSITÁRIO NO NORTE DO BRASIL

PREVALENCIA DE UVEÍTIS EN PACIENTES CON SÍFILIS Y TOXOPLASMOSIS TRATADOS EN UN HOSPITAL UNIVERSITARIO DEL NORTE DE BRASIL

https://doi.org/10.56238/arev7n11-301

Submission date: 10/24/2025 **Publication Date:** 11/24/2025

Henrique Danin Araújo Rosa[1], Ana Luísa Gonçalves Felipe[2], Rejanne Lima Arruda[3], Cleuber Moreira Cunha Júnior[4], Emanuela Pereira de Holanda Silva[5], Vitor Ruda Silva Aragão[6]

ABSTRACT

Objective: to assess the prevalence of uveitis in patients reported with syphilis and toxoplasmosis treated in Araguaína, Tocantins, from 2020 to 2023.

Methodology: This is a retrospective, cross-sectional, descriptive epidemiological study based on the analysis of medical records of patients with syphilis and toxoplasmosis treated at the University Hospital and reported to surveillance authorities. The following variables were analyzed: age group; gender; race; origin; diagnosis of toxoplasmosis or syphilis; visual acuity; associated comorbidities; and ocular complications developed.

Results: A prevalence of 12% of uveitis was observed in patients reported with the above-mentioned diseases, 80% of which were toxoplasmosis and 20% syphilis. Furthermore, coinfection with human immunodeficiency virus (HIV) was evident in 48% of individuals, as well as macular edema as the main complication of these infectious uveitis cases.

Conclusion: In this regard, there is a notable high prevalence of uveitis in patients reported with infectious diseases, predominantly occurring in those with toxoplasmosis.

Keywords: Infectious Uveitis. Syphilis. Toxoplasmosis.

RESUMO

Objetivo: Avaliar a prevalência de uveíte em pacientes com sífilis e toxoplasmose atendidos em Araguaína, Tocantins, de 2020 a 2023.

[1] Medicine Professor. Universidade Federal do Norte do Tocantins (UFNT).
E-mail: henriquedanin12hd@gmail.com
[2] Medicine Professor. Universidade Federal do Norte do Tocantins (UFNT).
E-mail: ana.felipe@ufnt.edu.br
[3] Dr. in Pharmaceutical Innovation. Universidade Federal do Norte do Tocantins (UFNT).
E-mail: rejanne.arruda@ufnt.edu.br
[4] Ophthalmologist. Hospital de Olhos do Tocantins. E-mail: cleuber_jr@hotmail.com
[5] Ophthalmologist. Hospital de Olhos do Tocantins. E-mail: emanuelaphs@gmail.com
[6] Ophthalmologist. Hospital de Olhos do Tocantins. E-mail: vr.aragao@hotmail.com

Revista ARACÊ
ISSN: 2358-2472

Metodologia: Trata-se de um estudo epidemiológico descritivo, transversal e retrospectivo, baseado na análise de prontuários de pacientes com sífilis e toxoplasmose atendidos no Hospital Universitário e notificados às autoridades de vigilância. Foram analisadas as seguintes variáveis: faixa etária; sexo; raça; origem; diagnóstico de toxoplasmose ou sífilis; acuidade visual; comorbidades associadas; e complicações oculares desenvolvidas.

Resultados: Observou-se uma prevalência de 12% de uveíte em pacientes com as doenças mencionadas, sendo 80% casos de toxoplasmose e 20% de sífilis. Além disso, a coinfecção pelo vírus da imunodeficiência humana (HIV) foi evidente em 48% dos indivíduos, assim como o edema macular como principal complicação desses casos de uveíte infecciosa.

Conclusão: Nesse sentido, há uma prevalência notavelmente alta de uveíte em pacientes com doenças infecciosas, ocorrendo predominantemente naqueles com toxoplasmose.

Palavras-chave: Uveíte Infecciosa. Sífilis. Toxoplasmose.

RESUMEN
Objetivo: Evaluar la prevalencia de uveítis en pacientes con sífilis y toxoplasmosis atendidos en Araguaína, Tocantins, entre 2020 y 2023.

Metodología: Estudio epidemiológico descriptivo, transversal y retrospectivo, basado en el análisis de historias clínicas de pacientes con sífilis y toxoplasmosis atendidos en el Hospital Universitario y notificados a las autoridades de vigilancia epidemiológica. Se analizaron las siguientes variables: grupo de edad; sexo; raza; origen; diagnóstico de toxoplasmosis o sífilis; agudeza visual; comorbilidades asociadas; y complicaciones oculares desarrolladas.

Resultados: Se observó una prevalencia de uveítis del 12% en pacientes con las enfermedades mencionadas, siendo el 80% casos de toxoplasmosis y el 20% de sífilis. Además, se evidenció coinfección por el virus de la inmunodeficiencia humana (VIH) en el 48% de los individuos, siendo el edema macular la principal complicación de estos casos de uveítis infecciosa.

Conclusión: En este sentido, existe una prevalencia notablemente alta de uveítis en pacientes con enfermedades infecciosas, que se presenta predominantemente en aquellos con toxoplasmosis.

Palabras clave: Uveítis Infecciosa. Sífilis. Toxoplasmosis.

Revista ARACÊ
ISSN: 2358-2472

1 INTRODUCTION

Uveitis is defined as an inflammatory intraocular disease that affects the uveal tract, which is formed by the iris, choroid, and ciliary body. The main symptoms that characterize the clinical presentation of this disease are pain, ocular hyperemia, photophobia, changes in visual acuity, and tearing. Furthermore, uveitis is divided into anterior, intermediate, posterior, and panuveitis, in which inflammation of all parts of the uvea is observed (Hou et al, 2019; Oliveira et al. 2024; Ribeiro et al,2019).

The etiologies of uveitis include autoimmune diseases, infectious diseases, and neoplasms. Among the infectious causes, toxoplasmosis, syphilis, and tuberculosis stand out as the main ones (London et al, 2011; Jahnke et al, 2021).

Furthermore, according to the study by Fernandez et al (2017), which showed that 10.1% of patients with infectious uveitis were carriers of the human immunodeficiency virus (HIV), it is important to investigate the prevalence of HIV in these patients. This is essential, as this disease can trigger HIV-induced uveitis, related to co-infection, induced by antiretroviral drugs or immune recovery (Yang et al, 2023).

In Brazil, according to the largest prospective study on the subject, the main causes of uveitis are ocular toxoplasmosis, followed by idiopathic anterior uveitis and Vogt–Koyanagi–Harada syndrome (Fernandez et al, 2017).

The main complications of uveitis include macular edema, retinal detachment, glaucoma, and cataracts, which can lead to permanent blindness. Therefore, it has been demonstrated that these problems stem from the inflammatory process or prolonged treatment with corticosteroids, which cause excessive fluid accumulation in the macula region and can also increase intraocular pressure. It should also be noted that the pathogenesis of many of these complications is unknown (Teo et al, 2023).

In this sense, in the absence of similar studies in the Tocantins region and emphasizing the relevance of Araguaína as one of the health hubs in this location, the present study aims to evaluate the prevalence of infectious uveitis in patients reported with syphilis and toxoplasmosis treated at the University Hospital (UH) of the Federal University of Northern Tocantins, between 2020 and 2023.

2 METHODOLOGY

This is a retrospective, cross-sectional, descriptive epidemiological study based on the analysis of medical records of patients diagnosed with syphilis and toxoplasmosis who were

Revista ARACÊ
ISSN: 2358-2472

treated at the ophthalmology outpatient clinic of the Hospital for Tropical Diseases of the Federal University of Tocantins in Araguaína -TO (HDT-UFT), between January 2020 and December 2023.

After analyzing 208 medical records of individuals reported with these diseases, 25 were eligible for the study with the development of uveitis. These medical records are stored electronically in the Hospital Management Application of University Hospitals (Aplicativo de Gestão para Hospitais Universitários - AGHU), as well as in physical form. The variables included in the study were: age group; gender; race; origin; etiological diagnosis of syphilis or toxoplasmosis; visual acuity; comorbidities; number of CD4+ lymphocytes if HIV-positive; and ocular complications developed after uveitis.

All patients diagnosed with syphilis and toxoplasmosis reported between 2020 and 2023 were included in the study. Patients who did not have all the complete data proposed in the study variables in their medical records were excluded, as were those who did not have a diagnosis of syphilis or toxoplasmosis, or those who were not reported.

The information was obtained using an adapted collection form (Teixeira et al, 2016), which covers sociodemographic data, underlying diseases or comorbidities and the classification of uveitis. It should be noted that this classification complies with the criteria established by the *International Uveitis Study Group*. Thus, in accordance with ocular anatomy, it was established that anterior uveitis would be the inflammatory process that includes iritis, anterior cyclitis, and iridocyclitis. Intermediate uveitis occurs when inflammation affects the vitreous body (pars planitis, posterior cyclitis, hyalitis). Finally, posterior uveitis occurs when manifestations are observed in the choroid or retina, and panuveitis affects all chambers of the eye.

The collected data were tabulated with double entry in Microsoft Office Excel 2024 and subsequently imported into the Statistical Package for the Social Sciences (SPSS) for Windows, version 21.0. In this regard, nominal and ordinal qualitative variables were presented as percentages in tables. Therefore, qualitative data were presented in absolute and relative frequencies. Quantitative variables were displayed as mean and standard deviation (SD) or median (range), minimum value, and maximum value.

In addition, in order to verify the association between dichotomous categorical variables, 2x2 contingency tables were used, applying Fisher's exact test, given that the study sample size was small and that the expected frequencies were less than 5 in more than 25% of the cells, which would invalidate the use of the chi-square test in this case (Kim, 2017).

Revista ARACÊ
ISSN: 2358-2472

Thus, an alpha error level of 5% and a confidence level of 95% were considered in this statistical test, i.e., the test results were considered statistically significant when the “p” value is less than 0.05 ($p < 0.05$).

From an ethical standpoint, the research was conducted in accordance with Resolution 196/96 of the National Health Council, which concerns the guidelines and regulatory standards for research involving human subjects, and was reviewed and approved by the Research Ethics Committee (Comitê de Ética em Pesquisa - CEP) of HDT/UFT under informed opinion number 7.110.483.

3 RESULTS

From 2020 to 2023, 208 cases of syphilis and toxoplasmosis were reported at the UH. Among these, 25 patients developed uveitis resulting from one of these diseases, demonstrating a prevalence of 120 cases per 1,000 patients treated at the health institution, or 12%. The predominant age group of the individuals in the study, according to Table 1, was between 20 and 40 years of age with 44% (n = 11), followed by 40 to 59 years with 36% (n = 9), and finally between 0 and 19 years with 20% (n = 5). Furthermore, it should be noted that, in the population analyzed, 56% (n = 14) were men, while 44% (n = 11) were women.

Table 1

Sociodemographic profile of patients with infectious uveitis

Variable	N	(%)
Gender	14	56
Male	11	44
Female		
Age group	5	20
0–19 years	11	44
20–40 years	9	36
40–59 years		
Origin	19	76

Revista ARACÊ
ISSN: 2358-2472

Araguaína	6	24
Race		
White	3	12
Brown	21	84
Black	0	0
Indigenous	1	4
Etiological diagnosis		
Syphilis	5	20
Toxoplasmosis.	20	80

Source: Author's own elaboration based on research data.

Regarding origin, it was observed that 76% (n = 19) were from Araguaína-TO, while 24% (n = 6) were from other municipalities in the state or from states close to the northern region of Tocantins. Furthermore, when evaluating race, the prevalence of brown-skinned individuals is notable, with 84% (n = 21) compared to 12% (n = 3) of white individuals and 4% (n = 1) of indigenous individuals. In addition, the etiological diagnosis of uveitis shows that 80% (n = 20) of the sample consists of toxoplasmosis and 20% (n = 5) of syphilis (Table 1).

With regard to comorbidities in patients with uveitis, there was a predominance of individuals with human immunodeficiency virus (HIV), accounting for 48% (n = 12) of patients, compared to 44% (n = 11) who had no comorbidities. It is also worth noting the presence of 8% (n = 2) of individuals with systemic arterial hypertension.

Regarding classification by anatomical position, posterior uveitis was the most prevalent, accounting for 80% (n = 16) of the cases. Of this total, toxoplasmosis was the leading cause of this disease in 93.75% (n = 15) of cases, with only 6.25% (n = 1) triggered by syphilis. On the other hand, anterior uveitis accounted for 16% (n = 4) of the medical records, all of which were caused by syphilis. Finally, panuveitis was seen in 20% (n = 5) of cases, in which 80% (n = 4) had *Toxoplasma gondii* as the etiological agent, while 20% (n = 1) had *Treponema pallidum*.

Revista ARACÊ
ISSN: 2358-2472

When observing the clinical evolution, it is evident that 72% (n = 18) of the cases were acute, 16% (n = 4) were chronic, 4% (n = 1) were recurrent, and 8% (n = 2) were not followed up. In addition, regarding the clinical aspect, 100% (n = 25) of the uveitis cases found in the study were granulomatous.

Regarding the analysis of the association between visual acuity impairment in HIV-positive patients with uveitis (Table 2), it should be noted that, in the sample evaluated, no statistically significant association between the variables was observed. Therefore, there was an impact on acuity in neither the right nor the left eye. Furthermore, Fisher's exact test was performed to assess the degree of immunosuppression based on the number of CD4+ lymphocytes (severe: < 200; moderate: 200-499; mild: > 500) and visual acuity impairment, as well as the association between the number of these leukocytes and the etiological diagnosis. Both tests were not statistically significant, with the first having a p-value of 0.498 for left eye acuity and 0.358 for right eye acuity. The second test obtained a p-value of 0.103, with a higher frequency of severe immunosuppression in patients with toxoplasmosis.

Table 2

Association between HIV serological status and visual acuity (RE and LE) among patients with uveitis

Eye / Visual acuity	HIV positive (n = 12)	HIV negative (n = 13)	P - value (Fisher's exact test)
Right eye / Preserved	10	11	
Right eye / Compromised	2	2	1,000
Left eye / Preserved	8	10	
Left eye / Compromised	4	3	0,673

Source: Author's own elaboration based on research data.

In terms of ocular complications (Table 3), there was no statistically significant association between the etiological diagnosis of toxoplasmosis or syphilis uveitis and the various types of complications, such as macular edema, retinal detachment, blindness, and

Revista ARACÊ
ISSN: 2358-2472

glaucoma, with both Fisher tests showing $p > 0.05$. In terms of the frequency of complications, 8% (n = 2) developed macular edema, glaucoma, and blindness, while 4% (n = 1) had cataracts. Other complications accounted for 24% (n = 6) of the sample.

Table 3

Association between etiological diagnosis (toxoplasmosis or syphilis) and ocular complications in patients with uveitis (n = 25)

Eye complication	Statistical test	P - value (Fisher's exact test)	Significant association
Macular edema	Fisher's exact test	1,000	No
Glaucoma	Fisher's exact test	1,000	No
Cataracts	Fisher's exact test	1,000	No
Blindness	Fisher's exact test	1,000	No

Source: Author's own elaboration based on research data.

4 DISCUSSION

This study analyzed the prevalence of uveitis in patients reported with syphilis and toxoplasmosis treated at the University Hospital of the Federal University of Northern Tocantins, in Araguaína, Tocantins, over a four-year period. As this was a retrospective study, in which data were compiled by analyzing medical records after the events occurred (Medronho et al, 2025), the study had minimal patient losses due to the unavailability of medical records, even with formal records of care and notification. However, that did not prevent the analysis of the other records.

Although there is a limitation due to the small sample size (n = 25), the statistical analysis was performed using Fisher's Exact Test, which is suitable for small samples and frequencies. Thus, the results should be interpreted with caution and considered indicative, demonstrating the need for more multicenter studies with a larger number of cases to confirm the findings.

Within the age range affected by uveitis, there is a predominance of adults who developed the disease, as observed in other studies, indicating that approximately 75% of patients were between 18 and 64 years of age when affected by toxoplasmosis, while in syphilitic uveitis, this same variable included all middle-aged individuals in 26 cases of

Revista ARACÊ
ISSN: 2358-2472

syphilitic uveitis (Arruda et al, 2021; Schulz et al 2021). This fact can be explained given that individuals in this age group are more exposed to environmental and behavioral risk factors, such as ingestion of contaminated water and food, in addition to risky sexual practices.

Furthermore, from a racial perspective, the Brazilian population is notoriously mixed, a process that began centuries ago during colonization, resulting in a population that is the product of the union and mixing of genes from various peoples from all continents, but mainly from Amerindian, African, and European peoples. Therefore, the majority of the Brazilian population self-identifies as brown in demographic censuses conducted in the national territory (Brasil, 2012; Florencio, 2025).

Regarding the etiologies of uveitis, toxoplasmosis has been shown to be the main infectious cause of this condition in several studies in Brazil and worldwide. However, syphilitic uveitis is of great importance, as it is one of the most recurrent infectious diseases on the planet. When analyzing ocular syphilis, uveitis is one of its main manifestations (Da Trindade Junior et al, 2023; De Angelis et al, 2021; Thomas et al, 2023; Smith et al, 2021) This high proportion of infectious uveitis shows the importance of preventive measures both in the context of health vulnerability regarding toxoplasmosis and in risky sexual practices concerning syphilis infection. This demonstrates that the implementation of public education policies and epidemiological surveillance actions are essential to mitigate the spread of these infections throughout society.

The predominance of posterior uveitis in the present study corroborates with the pathophysiology of ocular toxoplasmosis, which mainly affects the retina. It should be noted, therefore, that the parasite of this pathology mainly infects the Müller glial cells of the retina, as well as the retinal pigment cells, causing damage in this region. Thus, the retina, located in the posterior portion of the uveal tract, becomes susceptible to the onset of posterior uveitis (Teo et al, 2023). In addition, the need for rigorous clinical and therapeutic surveillance is emphasized in order to decrease unfavorable clinical prognoses, such as blindness.

The pathogenesis of syphilis bacteria differs from that of the *Toxoplasma gondii* parasite, as it can affect any area of the uveal tract, triggering various eye diseases, including anterior uveitis, posterior uveitis, and panuveitis. It should also be noted that ocular syphilis may be the only manifestation of neurosyphilis in these patients (Jahnke et al, 2021; Teixeira et al, 2016).

Furthermore, it was found that 100% of uveitis cases had a granulomatous clinical appearance, exhibiting the inflammatory pattern characteristic of the infectious diseases

Revista ARACÊ
ISSN: 2358-2472

investigated in the study. Thus, it can be seen that the *Toxoplasma gondii* parasite causes granulomatous inflammatory infiltrates, mainly causing necrotizing granulomatous retinitis. *Treponema pallidum* has varied presentations throughout the uvea and may or may not be granulomatous infiltrates. The presence of granulomatous patterns suggests infectious etiologies in the context of uveitis (Engelhard et al, 2015; Kahn et al, 2023).

The prevalence of 12% found in the study is higher than the findings of other reference centers in ophthalmological care, which had a prevalence between 5 and 10%. In a global systematic review, toxoplasmosis uveitis was observed in 9% of cases (Moraes et al, 2022). This divergence may be associated with local epidemiological factors, including social vulnerability, HIV coinfection, and late diagnosis (Faria et al, 2024; Kantzanou et al, 2024; Moro; Moreira, 2020; Kalogeropoulos et al, 2022). This emphasizes the importance of regional strategies for prevention, early diagnosis, and outpatient follow-up without losing contact with these patients, especially those with HIV coinfection.

HIV seropositivity among the individuals in the study was 48%; however, there was no statistically significant association between human immunodeficiency syndrome and visual acuity impairment, nor between the degree of immunosuppression and loss of visual acuity. In addition, the analysis between CD4+ lymphocyte levels and the etiological agent was not statistically significant. This may predict relatively effective immune control in patients undergoing treatment, who have preserved CD4+ lymphocyte counts and, possibly, therapeutic adherence to antiretrovirals.

On the other hand, studies from large centers emphasize that severe immunosuppression leads to more severe and recurrent forms of infectious uveitis, but does not cause greater visual complications (Bazeed et al, 2023;Karami et al, 2023).

Thus, the divergence between these findings and those of the present study is attributed to the small sample size and the reduced frequency of some categorical variables, thereby compromising the statistical power of the tests applied. In short, the absence of statistical significance does not exclude the relevance of immunosuppression in the context of more severe forms of uveitis.

Regarding ocular complications, there was no association between etiology (toxoplasmosis or syphilis) and the development of complications (macular edema, cataract, glaucoma, or blindness). However, a reduced incidence of complications was observed. This may be related not only to effective clinical management but also to the limited sample size.

Revista ARACÊ
ISSN: 2358-2472

5 CONCLUSION

The prevalence of uveitis in patients reported with syphilis and toxoplasmosis was 12%, with toxoplasmosis uveitis being the most frequent, accounting for 80% of the cases. A higher number of uveitis cases was observed when compared to other studies, a fact that may be associated with the limitations of the present study, as well as with HIV coinfection, which represented 48% of the individuals in the sample.

Therefore, there is a need for prospective, multicenter studies with larger sample sizes and longitudinal analyses of visual outcomes, with the aim of obtaining a better understanding of the clinical evolution and functional impact of infectious uveitis.

REFERENCES

Arruda, S., et al. (2021). Clinical manifestations and visual outcomes associated with ocular toxoplasmosis in a Brazilian population. Scientific Reports, 11(1), Article 3137. https://doi.org/10.1038/s41598-021-82830-z

Bazeed, M. A., et al. (2023). Clinical features and outcomes of ocular toxoplasmosis in HIV-infected versus non-infected individuals. International Journal of Infectious Diseases, 132, 1–7. https://doi.org/10.1016/j.ijid.2023.03.025

Brasil. Instituto Brasileiro de Geografia e Estatística. (2022). Censo demográfico 2022 por população residente, cor ou raça, segundo a situação do domicílio, o sexo e a idade. https://sidra.ibge.gov.br/pesquisa/censo-demografico/demografico-2022/universo-indigenas-caracteristicas-pessoas-e-domicilios-situacao-urbana-ou-rural

Da Trindade Junior, C. J. S., et al. (2023). Perfil epidemiológico das uveítes infeciosas em hospital terciário em Belém, Pará. Brazilian Journal of Health Review, 6(1), 3798–811. https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article/view/57369

De Angelis, R. E., et al. (2021). Frequency and visual outcomes of ocular toxoplasmosis in an adult Brazilian population. Scientific Reports, 11(1), Article 3420. https://doi.org/10.1038/s41598-021-83051-0

Engelhard, S. B., et al. (2015). Infectious uveitis in Virginia. Clinical Ophthalmology, 9, 1589–1594. https://doi.org/10.2147/OPTH.S86578

Faria, P. A., et al. (2024). A 14-year retrospective clinical analysis of ocular manifestations of syphilis in a Portuguese tertiary center. Clinical Ophthalmology, 18, 3053–3069. https://doi.org/10.2147/OPTH.S494585

Florêncio, M. R. (2024). O pardo no Brasil: o dilema da identidade mestiça no país miscigenado [Dissertação de mestrado, Universidade de São Paulo]. Repositório da USP. https://doi.org/10.11606/D.8.2024.tde-15102024-162545

Gonzalez Fernandez, D., et al. (2017). Uveitis in São Paulo, Brazil: 1053 new patients in 15 months. Ocular Immunology and Inflammation, 25(3), 382–387. https://doi.org/10.3109/09273948.2015.1132741

Revista ARACÊ
ISSN: 2358-2472

Hou, S., et al. (2020). Uveitis genetics. Experimental Eye Research, 190, Article 107853. https://doi.org/10.1016/j.exer.2019.107853

Jahnke, S., et al. (2021). Ocular syphilis: A case series of four patients. Journal der Deutschen Dermatologischen Gesellschaft, 19(7), 987–991. https://doi.org/10.1111/ddg.14464

Kahn, J. B., et al. (2023). Ocular manifestations of infectious diseases in immunocompromised patients: A comprehensive review. Ophthalmology and Therapy, 12(1), 45–60. https://doi.org/10.1007/s40123-022-00568-7

Kalogeropoulos, D., et al. (2022). Ocular toxoplasmosis: A review of the current diagnostic and therapeutic approaches. International Ophthalmology, 42(1), 295–321. https://doi.org/10.1007/s10792-021-01994-9

Kantzanou, M., et al. (2024). Prevalence of ocular toxoplasmosis among people living with HIV: A systematic review and meta-analysis. Future Microbiology, 19(6), 525–534. https://doi.org/10.2217/fmb-2023-0215

Karami, M., et al. (2024). Prevalence of ocular toxoplasmosis in the general population and uveitis patients: A systematic review and meta-analysis. Ocular Immunology and Inflammation, 32(6), 1003–1016. https://doi.org/10.1080/09273948.2023.2190801

Kim, H. Y. (2017). Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test. Restorative Dentistry & Endodontics, 42(2), 152–155. https://doi.org/10.5395/rde.2017.42.2.152

London, N. J., et al. (2011). Prevalence, clinical characteristics, and causes of vision loss in patients with ocular toxoplasmosis. European Journal of Ophthalmology, 21(6), 811–819. https://doi.org/10.5301/EJO.2011.6403

Medronho, R. A., et al. (2025). Epidemiologia. Atheneu.

Moraes, H. M. V., et al. (2022). Causes and characteristics of uveitis cases at a reference university hospital in Rio de Janeiro, Brazil. Arquivos Brasileiros de Oftalmologia, 85(3), 255–262. https://doi.org/10.5935/0004-2749.20220040

Moro, J. C., et al. (2020). Clinico-epidemiological and sociodemographic profile of HIV/AIDS patients who are co-infected with Toxoplasma gondii in the border region of Brazil. Anais da Academia Brasileira de Ciências, 92(4), Article e20200293. https://doi.org/10.1590/0001-3765202020200293

Oliveira, L. A., et al. (2024). The efficacy of adalimumab in the treatment of uveitis. Research, Society and Development, 13(2), Article e1713244915. https://rsdjournal.org/index.php/rsd/article/view/44915

Ribeiro, J. C. M. L., et al. (2019). Oftalmologia para graduação. EdUnichristus.

Schulz, D. C., et al. (2021). The many faces of ocular syphilis: Case-based update on recognition, diagnosis, and treatment. Canadian Journal of Ophthalmology, 56(5), 283–293. https://doi.org/10.1016/j.jcjo.2021.01.006

Smith, J. R., et al. (2021). Pathogenesis of ocular toxoplasmosis. Progress in Retinal and Eye Research, 81, Article 100882. https://doi.org/10.1016/j.preteyeres.2020.100882

Revista ARACÊ
ISSN: 2358-2472

Teixeira, L. P., et al. (2016). Estudo da prevalência das uveítes em hospital oftalmológico terciário em Teresina, Piauí, Brasil. Revista Brasileira de Oftalmologia, 75(3), 174–180. https://doi.org/10.5935/0034-7280.20160037

Teo, A. Y. T., et al. (2023). Intermediate uveitis: A review. Ocular Immunology and Inflammation, 31(5), 1041–1060. https://doi.org/10.1080/09273948.2022.2070503

Thomas, J., et al. (2023). An update on immunological and molecular tests and their impact in infectious uveitis. Frontiers in Ophthalmology, 3, Article 1132131. https://doi.org/10.3389/fopht.2023.1132131

Yang, M., et al. (2023). Human immunodeficiency virus and uveitis. Viruses, 15(2), Article 444. https://doi.org/10.3390/v15020444