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# Frequency and associated factors of ocular involvement in patients with chronic inflammatory rheumatic diseases in Burkina Faso (West Africa).

## *Fréquence et facteurs associés à l'atteinte oculaire chez les patients atteints de rhumatismes inflammatoires chroniques au Burkina Faso (Afrique de l'Ouest).*

Yamyellé Enselme Zongo[1], Pierre W. Djiguimdé[2], Ismael Ayouba Tinni[1], Tresor Teddy Kounda[1], Carine Lydia Diaouri/Ouédraogo[2], Aboubakar Ouédraogo[1], Fulgence Kaboré[1], Irénée Compaoré[1], Wendlassida Joelle Stéphanie Tiendrebeogo/Zabsonre[1], Dieu-Donné Ouédraogo[1].

[1]Service de rhumatologie du Centre Hospitalier Universitaire (CHU) de Bogodogo ; Ouagadougou, Burkina Faso.
[2]Service d'ophtalmologie du Centre Hospitalier Universitaire (CHU) de Bogodogo ; Ouagadougou, Burkina Faso.

**Auteur correspondant :** Dr Ismael AYOUBA TINNI ; service de rhumatologie du centre hospitalier universitaire (CHU) de Bogodogo ; Ouagadougou, Burkina Faso.
**E-mail :** iayoubatinni2@gmail.com

## RESUME

**Objectif :** déterminer la fréquence de l'atteinte oculaire et d'identifier les facteurs associés chez les patients atteints de rhumatismes inflammatoires chroniques.
**Patients et méthodes** : Nous avons mené une étude transversale descriptive et analytique portant sur l'atteinte oculaire chez des patients suivis pour des rhumatismes inflammatoires chroniques dans le service de rhumatologie d'un hôpital universitaire de niveau tertiaire, d'avril à octobre 2023. Les associations entre l'atteinte oculaire (incluant la sécheresse oculaire, la kératite, la kératite ponctuée superficielle, la cataracte et la conjonctivite) et les facteurs de risque potentiels ont été évaluées à l'aide du test du chi carré pour les variables qualitatives et du test t de Student pour les variables quantitatives, avec un seuil de significativité fixé à 5 %.
**Résultats** : Au total, 114 patients ont été inclus, avec un âge moyen de 46,05 ± 15,52 ans. Une atteinte oculaire a été observée chez 66 patients (57,89 %), dont 59 femmes (89,40 %) et 7 hommes (10,60 %). Les patients présentant une atteinte oculaire étaient significativement plus âgés que ceux n'en présentant pas (49,16 vs 41,77 ans ; p = 0,011). Les manifestations oculaires les plus fréquentes étaient la sécheresse oculaire (75,75 %), la kératite (51,51 %) et la kératite ponctuée superficielle (28,78 %). Les maladies rhumatismales sous-jacentes étaient principalement le syndrome de Sjögren (83,33 % ; n = 5/6), la polyarthrite rhumatoïde (61,33 % ; n = 46/75) et le lupus érythémateux systémique (41,17 % ; n = 7/17). L'atteinte oculaire était plus fréquente chez les patients âgés de ≥ 50 ans (34 vs 32 cas ; p = 0,053), tandis que la sécheresse oculaire (p = 0,021) et la cataracte (p = 0,003) étaient significativement associées à un âge plus avancé.
**Conclusion** : L'atteinte oculaire est fréquente chez les patients atteints de rhumatismes inflammatoires chroniques et survient à un âge relativement jeune dans notre contexte. La sécheresse oculaire était la manifestation la plus fréquente. Ces résultats soulignent l'importance d'un dépistage ophtalmologique systématique dans cette population.

**Mots clés** : *Rhumatismes inflammatoires ; atteinte oculaire ; sécheresse oculaire ; kératoconjonctivite sèche ; Afrique subsaharienne.*

# ABSTRACT

**Objective:** This study aimed to determine the frequency of ocular involvement and to identify associated factors in patients with chronic inflammatory rheumatic diseases.

**Patients and Methods**: We conducted a descriptive and analytical cross-sectional study of ocular involvement in patients followed for chronic inflammatory rheumatic diseases at the rheumatology department of a tertiary university hospital from April to October 2023. Associations between ocular involvement (including dry eye, keratitis, superficial punctate keratitis, cataract, and conjunctivitis) and potential risk factors were assessed using the chi-square test for categorical variables and the Student's t-test for continuous variables, with a significance threshold set at 5%.

**Results:** A total of 114 patients were included, with a mean age of 46.05 ± 15.52 years. Ocular involvement was observed in 66 patients (57.89%), including 59 women (89.40%) and 7 men (10.60%). Patients with ocular involvement were significantly older than those without (49.16 vs. 41.77 years; p = 0.011). The most common ocular manifestations were dry eye (75.75%), keratitis (51.51%), and superficial punctate keratitis (28.78%). The underlying rheumatic diseases were predominantly Sjögren's syndrome (83.33%; n = 5/6), rheumatoid arthritis (61.33%; n = 46/75), and systemic lupus erythematosus (41.17%; n = 7/17). Ocular involvement was more frequent in patients aged ≥50 years (34 vs. 32 cases; p = 0.053), while dry eye (p = 0.021) and cataract (p = 0.003) were significantly associated with older age.

**Conclusion:** Ocular involvement is common in patients with chronic inflammatory rheumatic diseases and occurs at a relatively young age in our setting. Dry eye was the most frequent manifestation. These findings highlight the importance of systematic ophthalmologic screening in this population.


**Key words**: *Inflammatory rheumatic diseases; ocular involvement; dry eye; keratoconjunctivitis sicca; sub-Saharan Africa.*

## 1. Introduction

Chronic inflammatory rheumatic diseases (CIRDs) comprise a group of autoimmune and autoinflammatory disorders characterized by dysregulation and hyperactivation of the immune system [1]. They affect approximately 5% of the population in the United States, with a higher prevalence among women [2,3]. In Burkina Faso, these conditions account for 3.41% of rheumatology consultations [4].

The clinical manifestations of CIRDs are heterogeneous and may involve both articular and extra-articular systems. Ocular involvement is a significant extra-articular manifestation and may serve as an early indicator of disease activity or flare in several autoimmune conditions. Although ocular manifestations generally account for less than 10% of extra-articular involvement in CIRDs overall [5], their clinical impact can be substantial.

Data on ocular involvement in CIRDs remain scarce in sub-Saharan Africa. However, hospital-based studies have reported high frequencies, ranging from 61.1% in Cameroon to 100% in Guinea [6,7]. In a Cameroonian series of 36 patients with CIRDs, 22 (61.1%) presented with ocular lesions, predominantly glaucoma and cataract, particularly in patients aged over 50 years [6]. Early detection of these manifestations is essential, as it may reduce morbidity and improve patients' quality of life [7].

To date, no study has specifically investigated ocular involvement in CIRDs in Burkina Faso. Therefore, the present study aimed to determine the frequency of ocular involvement and to identify associated factors in patients with CIRDs attending a tertiary referral hospital in Burkina Faso.

## 2. Patients and methods

### Study design

We conducted a descriptive and analytical cross-sectional study assessing ocular involvement in patients with chronic inflammatory rheumatic diseases (CIRDs) attending the rheumatology department of a tertiary referral university hospital from April to October 2023.

### Study population

The study included all patients aged ≥18 years with a confirmed diagnosis of CIRDs, including systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), primary Sjögren's syndrome (pSS), axial and peripheral spondyloarthritis, and systemic sclerosis, according to established classification criteria [8–12].

The diagnosis of primary Sjögren's syndrome was based on clinical features (ocular and/or oral dryness), Schirmer test results, the presence of anti-SSA and/or anti-SSB antibodies, and/or histological findings from minor salivary gland biopsy (Chisholm stage 3 or 4).

Since 2018, a dedicated consultation for patients with CIRDs has been established in the department, based on a tight control (treat-to-target) strategy [13].

Patients with a history of ocular surgery were excluded.

**Study procedures**
Eligible patients were interviewed using a standardized data collection form to record sociodemographic and clinical characteristics. All patients were systematically referred for a comprehensive ophthalmologic evaluation performed by a senior ophthalmologist.
The ophthalmologic examination included:
Measurement of visual acuity using the Monoyer chart for literate patients and the Snellen chart for non-literate patients
Slit-lamp examination of the ocular surface, adnexa, anterior segment, and fundus
Measurement of intraocular pressure using a non-contact (air-puff) tonometer
Assessment of tear function using the Schirmer I test and tear break-up time (TBUT)

**Data collection**
Data were collected using a standardized case report form and included:
Sociodemographic variables: age, sex, occupation, marital status, educational level
Clinical and biological variables: medical history, weight, height, body mass index (BMI), type of CIRD, and ophthalmologic findings
A BMI ≥25 kg/m² was considered abnormal.

**Statistical analysis**
Data were analyzed using IBM SPSS Statistics version 20. Quantitative variables were expressed as mean ± standard deviation or median, depending on their distribution. Categorical variables were expressed as frequencies and percentages. Associations between ocular involvement (including dry eye, keratitis, superficial punctate keratitis, cataract, and conjunctivitis) and independent variables were assessed using the chi-square test for categorical variables and Student's *t*-test for continuous variables. A *p*-value <0.05 was considered statistically significant.
Variables with a *p*-value <0.20 in univariate analysis were included in a multivariate logistic regression model to identify independent factors associated with ocular involvement.

**Ethical considerations**
The study protocol was approved by the institutional ethics committee of Bogodogo University Hospital (approval No. 2023-01-005). Administrative authorization was obtained from the hospital administration.
All procedures were conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants, and data confidentiality and anonymity were strictly maintained.

## 3. Result

### Patient characteristics

A total of 114 patients were included. The mean age was 46.05 ± 15.52 years (range: 19–89 years), with a median of 45.5 years (interquartile range: 35–55) and a mode of 50 years. The majority of patients were female (n = 102; 89.5%) , giving a sex ratio (male/female) of 0.11. The mean body mass index (BMI) was 24.56 ± 4.56 kg/m² (range: 15–44 kg/m²). Twenty-four patients (21.05%) had hypertension. Rheumatoid arthritis was the most common condition, affecting 75 patients (65.78%). The mean disease duration was 48.42 ± 40.43 months (range: 2–178 months). The general characteristics of the study population are summarised in table I.

*Table I: Distribution of patients with chronic inflammatory rheumatism during the study period at the university hospital, by general characteristics.*

| Variables | Number | Percentage |
|---|---|---|
| **Age (years)** | | |
| <50 | 64 | 56.14 |
| ≥50 | 50 | 43.86 |
| **Gender** | | |
| Female | 102 | 89.50 |
| Male | 12 | 10.50 |
| **Marital status** | | |
| Married | 72 | 63.15 |
| Unmarried | 42 | 36.85 |
| **Educational level** | | |
| Educated | 86 | 75.44 |
| Uneducated | 28 | 24.56 |
| **History** | | |
| High blood pressure | 24 | 21.05 |
| Diabetes mellitus | 11 | 9.65 |
| Other* | 7 | 6.14 |
| None | 72 | 63.15 |
| **BMI (kg/m2)** | | |
| Normal | 69 | 60.53 |
| Abnormal | 45 | 39.47 |
| **Duration of disease (years)** | | |
| <10 | 100 | 87.72 |
| ≥10 | 14 | 12.28 |
| **Type of CIR** | | |
| RA | 75 | 65.78 |
| SLE | 17 | 14.91 |
| Primary GSS | 6 | 5.27 |
| Ankylosing spondylitis | 5 | 4.38 |
| IIR | 5 | 4.38 |
| Dermatomyositis | 2 | 1.75 |
| Psoriatic arthritis | 2 | 1.75 |
| Behçet's disease | 1 | 0.88 |
| Systemic scleroderma | 1 | 0.88 |
| **Eye disease (n=66)**** | | |
| Dry eye | 50 | 75.75 |
| Keratitis | 34 | 51.51 |
| SPK | 19 | 28.78 |
| Conjunctivitis | 11 | 16.66 |
| Cataract | 10 | 15.15 |
| Decreased visual acuity | 8 | 12.12 |
| Other*** | 17 | 25.76 |

*BMI: body mass index; CIR: chronic inflammatory rheumatism; RA: rheumatoid arthritis; SLE: systemic lupus erythematosus; GSS: Gougeröt Sjogren's syndrome; IIR: indeterminate inflammatory rheumatism; SPK: superficial punctate keratitis.*

** Goiter, sickle cell anemia, gout, pulmonary tuberculosis, stroke, hepatitis B.*

*** one patient may have several lesions ***Macula defect, papillary atrophy, corneal dystrophy, choroidosis, pterygium, papilledema, vasculitis, retinal hemorrhage, excavation, uveitis, glaucoma.*

**Frequency and characteristics of ocular involvement**

Ocular involvement was observed in 66 patients (57.89%). Dry eye was the most frequent manifestation, affecting 50 patients (75.75%). Among patients with rheumatoid arthritis and ocular involvement, 36 (78.26%) had dry eye. Details of ocular manifestations according to disease type are presented in table II.

*Table II: Distribution of patients seen for rheumatoid arthritis or systemic lupus erythematosus during the study period at the university hospital, according to ocular involvement characteristics.*

| Eye disease* | RA (n=46) | | SLE (n=17) | |
|---|---|---|---|---|
| | Number | Percentage | number | Percentage |
| Dry eye | 36 | 78.26 | 05 | 29.41 |
| Keratitis | 23 | 50 | 04 | 23.52 |
| SPK | 14 | 30.43 | 02 | 11.76 |
| Cataract | 08 | 17.39 | 00 | 00 |
| Conjunctivitis | 08 | 17.39 | 00 | 00 |

**: a patient may have several lesions; SPK: Superficial punctuate keratitis*

**Treatment-related factors**

Twenty-four patients (21.05%) were receiving corticosteroid therapy, including 15 patients with rheumatoid arthritis (62.5%) and 6 with systemic lupus erythematosus (25%). The mean corticosteroid dose was 5.67 ± 3.52 mg/day (prednisone equivalent), with a range of 2–16 mg/day and a median of 4 mg/day.

**Factors associated with ocular involvement**

The mean age of patients with ocular involvement was significantly higher than that of patients without ocular involvement (49.16 vs. 41.77 years; p = 0.011). Ocular involvement was more frequent in patients aged ≥50 years (n = 34) compared with those aged <50 years (n = 32), although this difference did not reach statistical significance (p = 0.053). Dry eye was significantly more common in patients aged ≥50 years (n = 28) than in those aged <50 years (n = 22; p = 0.021). Among patients with dry eye, 25 had a normal BMI and 25 had an elevated BMI (p = 0.042). Keratitis was observed in 26 patients with rheumatoid arthritis and in 4 patients with systemic lupus erythematosus, with no statistically significant difference (p = 0.274). The mean age of patients with superficial punctate keratitis was significantly higher than that of those without (53.10 vs. 44.64 years; p = 0.029). The results of the univariate analyses are presented in table III.

**Cataract and associated factors**

Cataract was identified in 10 patients, including 9 aged ≥50 years and 1 aged <50 years ($p = 0.003$). Among patients with cataract, 5 had hypertension compared with 5 without hypertension ($p = 0.019$). Of the patients with both cataract and rheumatoid arthritis, 3 (30%) were receiving corticosteroid therapy (table III).

**Multivariate analysis**

In multivariate logistic regression analysis, no independent factors were significantly associated with any ocular involvement.

*Table III: Distribution of patients with chronic inflammatory rheumatism during the study period at the university hospital according to analytical tests between dependent and other variables.*

| Variables | Ocular involvement Oui n(%) | Ocular involvement Non n(%) | p | Dry eye p | Keratitis p | SPK p | Cataract p | Conjonctivitis p |
|---|---|---|---|---|---|---|---|---|
| **Sex** | | | | | | | | |
| Female | 59 (57.8) | 43 (42.2) | 0.974 | 0.871 | 0.343 | 0.419 | 0.717 | 0.674 |
| Male | 7 (58.3) | 5 (41.7) | | | | | | |
| **Age (years)** | | | | | | | | |
| < 50 | 32 (50) | 32 (50) | 0.053 | **0.021** | 0.707 | 0.177 | **0.003** | 0.452 |
| ≥ 50 | 34 (68) | 16 (32) | | | | | | |
| Average age | 49.16 | 41.77 | **0.011** | **0.006** | 0.765 | **0.029** | **0.009** | 0.400 |
| **BMI** | | | | | | | | |
| Normal | 35 (50.7) | 34 (49.3) | 0.055 | **0.042** | 0.860 | 0.797 | 0.476 | 0.669 |
| Abnormal | 31 (68.9) | 14 (31.1) | | | | | | |
| **Disease duration** | | | | | | | | |
| < 10 years | 56 (56) | 44 (44) | 0.273 | 0.100 | 0.913 | 0.701 | 0.354 | 0.134 |
| ≥ 10 years | 10 (71.4) | 4 (28.6) | | | | | | |
| **CIR** | | | | | | | | |
| RA | 46 (61.3) | 29 (38.7) | 0.313 | 0.183 | 0.274 | 0.721 | 0.373 | 0.316 |
| SLE | 7 (41.2) | 10 (58.8) | | | | | | |
| Others | 13 (59.1) | 9 (40.9) | | | | | | |
| **Hypertension** | | | | | | | | |
| No | 49 (54.4) | 41 (45.6) | 0.148 | 0.495 | 0.672 | 0.538 | **0.019** | 0.278 |
| Yes | 17 (70.8) | 7 (29.2) | | | | | | |
| **Diabetes mellitus** | | | | | | | | |
| No | 60 (58.3) | 43 (41.7) | 0.813 | 0.911 | 0.730 | 0.206 | 0.653 | 0.310 |
| Yes | 6 (54.5) | 5 (45.5) | | | | | | |

**: Primary GSS, Ankylosing spondylitis, Dermatomyositis, indeterminate inflammatory rheumatism, Psoriatic arthritis, Behçet's disease*
*BMI: body mass index; CIR: chronic inflammatory rheumatism; RA: rheumatoid arthritis; SLE: systemic lupus erythematosus; GSS: Gougeröt Sjogren's syndrome; SPK: superficial punctate keratitis; HBP: high blood pressure.*

## 4. Discussion

The frequency of ocular involvement in patients with chronic inflammatory rheumatic diseases (CIRDs) in our study was 57.89%. This finding is consistent with reports from African and Asian studies, where the prevalence of ocular involvement ranges from 55.1% to 100% [6,14–16]. In contrast, a lower prevalence of 35% was reported in a large Colombian cohort of 797 patients [2]. This discrepancy may be explained by differences in study design, duration, and case mix, as the Colombian study was conducted over a six-year period across multiple rheumatology centers and included a broader spectrum of rheumatic diseases [2].
The relatively high frequency of ocular involvement observed in our study may be attributed to the systemic inflammatory nature of CIRDs, which can affect vascular structures and ocular tissues [2,17]. In addition, certain treatments used to control disease activity, particularly long-term corticosteroid therapy, may also contribute to ocular complications [17,18].
Dry eye was the most frequent ocular manifestation in our series (75.75%). This predominance has been widely reported, although with varying frequencies across settings, including Cameroon (31.81%), Guinea (85.71%), and Colombia (30.9%) [2,6,14]. In contrast, studies from Benin and India reported dry eye as less frequent than other ocular conditions such as chronic conjunctivitis and uveitis, respectively [15,16]. These variations may reflect differences in study populations, diagnostic criteria, and access to ophthalmologic evaluation.
The high frequency of dry eye in our study may be explained by its strong association with autoimmune diseases, particularly Sjögren's syndrome, and its increasing frequency with age. Dry eye disease, or keratoconjunctivitis sicca,

affects approximately 10–30% of the general population and is characterized by tear film instability and ocular surface inflammation [17,19,20]. Although its pathophysiology is not fully understood, multiple factors may disrupt ocular surface homeostasis, leading to qualitative and quantitative alterations in tear secretion [17,21,22].

Rheumatoid arthritis was the most common CIRD in our cohort, in line with findings from previous studies [2,14,15]. It is also the most frequently reported rheumatic disease associated with ocular manifestations in several regions, including Colombia, Cameroon, and Benin [2,14,15]. This predominance likely reflects the global epidemiology of rheumatoid arthritis, which remains the most common chronic inflammatory rheumatic disease worldwide [23,24].

In our series, dry eye was the most common ocular manifestation among patients with rheumatoid arthritis (78.26%), consistent with previous reports [2,16,25]. Similar findings have been documented in Colombia and India, as well as in systematic reviews and meta-analyses [2,16,25]. Other authors have also reported that a substantial proportion of patients with rheumatoid arthritis exhibit clinical features of dry eye disease [26–28].

No independent factors were identified as significantly associated with ocular involvement in the multivariate analysis. This finding suggests that ocular manifestations in CIRDs are likely multifactorial, involving complex interactions between disease activity, immune mechanisms, and treatment-related factors. Similar observations have been reported for specific ocular conditions such as keratitis and conjunctivitis.

However, age and body mass index were significantly associated with dry eye. Patients with dry eye were significantly older than those without, which is consistent with previous studies showing an age-related increase in the prevalence of dry eye disease [19]. Indeed, its prevalence has been reported to increase from 8.4% in individuals under 60 years to 20% in those over 80 years [19,22].

Cataract was significantly associated with older age and hypertension, in agreement with findings from previous studies [2,14]. Age is a well-established risk factor for cataract in the general population, and hypertension has also been implicated [2,14,25]. In addition, corticosteroid use, even at relatively low doses over prolonged periods, may contribute to cataract development.

The absence of significant associations in the multivariate analysis may be explained by the relatively small sample size and the limited statistical power of the study. Furthermore, the heterogeneity of the underlying rheumatic diseases and treatments may have diluted potential associations.

Finally, several limitations should be considered when interpreting our findings. The relatively small number of patients with certain conditions, such as systemic lupus erythematosus, primary Sjögren's syndrome, and systemic sclerosis, may have introduced selection bias. This limited representation could have influenced both the estimated frequency and the identification of associated factors for ocular involvement.

## 5. Conclusion

Ocular involvement was frequent among patients followed for chronic inflammatory rheumatism in our rheumatology department. Dry eye syndrome represented the most common ocular manifestation. These findings underscore the importance of systematic ophthalmological screening in patients with chronic inflammatory rheumatic diseases, in order to ensure early detection and management and to prevent potentially irreversible ocular complications.

**Conflict of interest :** None of the authors have a conflict of interest to disclose.

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