Colombian ocular inflammatory diseases epidemiology study (COIDES): prevalence, incidence and sociodemographic characterisation of Scleritis in Colombia, 2015–2020

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ABSTRACT

Objective To describe the epidemiological and demographic characteristics of scleritis in Colombia.

Methods and analysis Population-based study using the national database from the Colombian Ministry of Health, using the International Classification of Diseases–10 code for Scleritis (H150) to estimate the prevalence and incidence from 2015 to 2019. Additionally, we evaluated the impact of the COVID-19 pandemic lockdown on the epidemiology of the disease during 2020, using the Gaussian Random Markov Field model (conditional autoregressive; CAR model). Finally, a standardised morbidity rate map was made to assess the geographic distribution of scleritis in the country.

Results The 5-year average prevalence and incidence of scleritis in Colombia were 0.6 (95% CI 0.59 to 0.6) and 0.65 (95% CI 0.64 to 0.64) cases per 100 000 inhabitants, respectively. We found 1429 registers of scleritis throughout the country between 2015 and 2019. Women represented 64.3%. The age groups with most cases were between 40 and 69 years in both sexes. However, women between 30 and 39 years and men between 20 and 29 years presented the highest number of new cases. In 2020, the pandemic reduced approximately 0.23 points the incidence of scleritis. Bogotá, Valle del Cauca and Antioquia had most of the cases, the latter two with an increased risk over time.

Conclusion Colombia has a lower incidence of scleritis than the reported in other latitudes, with a pattern of presentation at younger ages. Furthermore, the lockdown derived from the COVID-19 pandemic affected the follow-up and diagnosis of patients with scleritis. This is the first epidemiological description of scleritis in a developing country and South America.

INTRODUCTION

Scleritis is the eyeball wall (sclera) inflammation that may extend to the adjacent tissues, causing ocular complications. According to the aetiology, scleritis can be classified into infectious scleritis, secondary to viral, bacterial, parasitic and fungal infections, and non-infectious scleritis, associated with autoimmune and systemic diseases such as rheumatoid arthritis (RA), granulomatosis with polyangiitis and other systemic vasculitides. Other causes are masquerade syndromes secondary to intraocular tumours, postsurgery and post-trauma. It can be classified...
anatomically depending on the inflammation site or by the degree of inflammation using conventions similar to those used in uveitis.\textsuperscript{13,15}

Several population-based and hospital-based studies describe the epidemiology of scleritis in developed countries. In population-based studies, its incidence is 3.4 to 4.1 cases per 100,000 inhabitants per year in the USA and between 2.8 and 4.2 cases per 100,000 inhabitants in 1997 and 2018, respectively in the United Kingdom (UK).\textsuperscript{6–8} In the same way, the prevalence of scleritis in population-based studies varies between 5.2 cases per 100,000 inhabitants in the USA and 93.6 cases per 100,000 inhabitants in the UK. Similarly, in hospital-based studies, the prevalence has been calculated at 5.1 cases per 100,000 consultations in Australia.\textsuperscript{6,7,9}

There is a scarcity of epidemiological data on scleritis worldwide, and just a few investigations described the frequency of scleritis in rheumatological settings, such as the studies of Bettero \textit{et al.}\textsuperscript{10} in which 2\% of patients with RA had scleritis, and of Uribe-Reina \textit{et al.}\textsuperscript{11} which described a scleritis prevalence of 1.25\% in a rheumatology centre in Bogotá, Colombia. Nevertheless, no studies are found in South America focusing on general scleritis epidemiology.\textsuperscript{12,13} Therefore, this study aims to describe Colombia’s epidemiological and demographic characteristics of scleritis in 2015–2020.

MATERIALS AND METHODS

Design

We conducted a population-based study on patients with scleritis diagnosed in Colombia with no age limit between 2015 and 2020. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.\textsuperscript{14}

Population

The information and data in this study were obtained from the national database created by the Colombian Ministry of Health, known as the System of Information of Social Protection (SISPRO), which stores, processes, and systematises Colombian citizens’ health records.\textsuperscript{15} The data are collected by medical staff during each medical contact (inpatient or outpatient) from private and public health providers and insurers using the International Classification of Diseases (ICD-10). In addition, the demographic and clinical data are grouped in the individual Registry of Health Services Provision.\textsuperscript{16}

It should be noted that the Colombian Health System has one of the most prominent coverages in Latin America, encompassing 50 million inhabitants that represent the 97.78\% of the population in 2020, according to the last measurement of the National Administrative Department of Statistics.\textsuperscript{17}

Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting or dissemination plans of our research.

Data collection

Data were extracted from the SISPRO dynamic tables from 2015 to 2020 using the ICD-10 code for scleritis (H-150), similar to the study of Xu \textit{et al.}\textsuperscript{18} To delimit the results in our searches, we performed the first filter by year (2015 to 2020) and the type of diagnosis (‘confirmed new’ or ‘confirmed repeated’) to determine the prevalence. Then, we used the same extraction method to identify new cases with scleritis, using only the ‘confirmed new’ filter to estimate the incidence.

Afterward, additional filters, such as residence location, age and sex, were added to describe the disease’s socio-demographic status in the country. Finally, a database in Microsoft Excel (Microsoft, Redmond, Washington) was elaborated and validated to record the information.

Statistical analysis

The crude incidence rate and prevalence of scleritis in the Colombian population were estimated for 6 years (2015–2020) using a standardised crude rate per 100,000 inhabitants. The patients were divided and stratified by sex and age in quinquennium for the incidence and prevalence analysis. Since the data are secondary and may not represent the parameter of the total number of cases in the population because of under-registration, a 95\%CI for the rates was calculated assuming a Poisson error. These analyses were performed with R V.4.0.4.

In this work, we use a statistical model for spatial data to predict the real prevalence/incidence of the disease in the year 2020. This was done since the results were significantly affected by the pandemic. The statistics for spatial data has been divided into two large classes by Cressie \textit{et al.}, the geostatistical models and the spatial network models, also called ‘area models’.\textsuperscript{19} We worked with spatial models for area data, specifically with the covariance structure defined by the spatial nature of the data.\textsuperscript{19,20} We used the conditional autoregressive (CAR) model, which is based on the Gaussian Markov Fields, where the random vector distribution (finite-dimensional) is a normal distribution satisfying the conditional independence assumptions. Random fields are multivariate distributions generally used to describe the spatial association between variables. A Markov random field extends the Markov chain concept to a spatial context and assumes that as a joint distribution.

We used the CAR model to describe the overall behaviour of random effects \( \theta = (\theta_1, \ldots, \theta_n) \), where \( \theta_i \) is the spatial effect associated with area \( i \) on a map. Such effects are latent factors representing the spatial dependence beyond the small geographical boundary area. A key point regarding the CAR model construction is the specification of an appropriate neighbourhood structure. We take as neighbours any pair of areas sharing geographic boundaries. The adjacency information is included in the model through an \( n \times n \) neighbourhood matrix \( A \) with binary entries \( a_{ik}=1 \) if area units \( k \) and \( i \) share a common border (denoted \( k - i \)), and \( a_{ik}=0 \) otherwise. This approach is popular because it can be easily
calculated using Bayesian computation; we used the CARBayesST Package.\textsuperscript{21}

The CAR model is specified considering the set of $n$ univariate full conditional distributions given by

$$
\theta_i \sim N \left( \frac{\rho \sum_{j=1}^{n} \theta_j n_j}{M - \rho A}, \tau_n \right)
$$

where $\theta_i = (\theta_1, \ldots, \theta_{i-1}, \theta_{i+1}, \ldots, \theta_n)$, $n_i$ is the number of neighbours of region $i$, $M = \text{diag}(m_1, \ldots, m_n)$ and $\rho$ is a spatial autocorrelation parameter. Consequently, the joint distribution of $\theta$ is:

$$
\theta \sim N \left( 0, \tau_0 Q \right)
$$

where $M - \rho A$ is a positive-definite matrix if $1/\lambda_1 < \rho < 1/\lambda_2$, where $\lambda_1$ and $\lambda_2$ denote the smallest and the largest eigenvalue of the matrix $M^{-1/2}AM^{-1/2}$. The Markov property defined in terms of this neighbourhood structure induces a sparse precision matrix facilitating the Bayesian computational approaches.

Here, we use the CAR model for the spatial effects defined in a Poisson response regression model, the observed ($Y_i$) and the expected counts ($E_i$) of disease (n) region (i). The expected value $E_i$ is calculated using the age-sex population distribution and assuming that the age-specific risk is constant on the entire map. The data are analysed assuming that:

$$
Y_i \sim \text{Poisson} \left( E_i \lambda_i \right), i = 1, \ldots, n
$$

the $\lambda_i$ follows the log-linear regression structure, such that:

$$
\log \left( E_i \lambda_i \right) = \beta_0 + \beta x_i + \theta_i + \log \left( E_i \right)
$$

where $\theta_i$ is the spatial random effects at area $i$.

Additionally, considering that Colombia is a country that is administratively, economically, culturally and politically divided into 32 departments, standardised morbidity rate (SMR) maps were created to analyse the disease in all departments. We used a CAR model to visualise the geographic domain as an undirected graph with a vertex in each department and an edge between two vertices if the corresponding departments share a geographic edge. This model creates well-defined neighbours for each department, which are used to define the joint or conditional distribution. The distribution will be the multivariate normal distribution. Analysis of the CAR model is concentrated on the covariance matrix $\Sigma$, which is defined by the graph of the geographic domain and the parameter $p$. Cases without a report of the residence location (94 patients) were excluded from this analysis. More detailed information about the statistical analysis is available in online supplemental material 1.

**Bias control**

In this study, selection bias may occur due to several filters applied to diagnostic data in SISPRO and by underestimation and misclassification bias; to prevent this, we only included patients with a new diagnosis and confirmed repeated diagnosis of the H150 ICD-10 code. Additionally, since we do not have access to clinical charts, we cannot assert there are no repeated patients because it is secondary information. After applying filters, the total accuracy of data cannot be guaranteed because the database does not allow us to rectify the ID numbers. However, the Colombian Ministry of Health and healthcare provider institutions constantly update and correct data with errors to control this bias. Previous studies based on SISPRO have determined that the concordance rate of the database using ICD-10 with medical records is up to 83.4%.\textsuperscript{22,23} Therefore, these data are the most accurate approximation available.\textsuperscript{24}

**RESULTS**

The SISPRO database from 2015 to 2020 recorded 23372396 to 37083655 consultations. In the 2015–2020 period, there were 1827 cases of scleritis. However, due to the COVID-19 pandemic, under-reporting generated a bias in the data from 2020. Therefore, we initially worked with the data until 2019, when 1429 cases were reported, with women representing 64.3%.

**Frequency of cases**

Regarding age and sex, men in the quinquennial group of 50–54 years (8.8%) had the highest number of cases, followed by the group of 60–64 years (8.6%) and 40–44 years old (7.8%). Moreover, in women, the quinquennial group with the highest number of cases was 55–59 years old (10.8%), followed by 45–49 years old (10.4%) and 50–54 years old (9.9%). More information is available in table 1.

**Prevalence**

The prevalence during the 5 years was presented in a range between 0.36 (95% CI 0.53 to 0.54) and 0.78 (95% CI 0.77 to 0.78) cases per 100,000 inhabitants, with a mean prevalence in 5 years of 0.6 (95% CI 0.59 to 0.6). More detailed information is shown in table 2. Regarding the analysis of 2020 presented in figure 1A, the prevalence of scleritis calculated based on SISPRO is 0.5 (95% CI 0.5 to 0.5) cases per 100,000 inhabitants, but we found that the estimate for this year is 0.74 (95% CI 1.17 to 0.66) cases per 100,000 inhabitants. Regarding prevalence by age, we found that in men, the group with the highest prevalence was between 60 and 64 years old, followed by the group between 65 and 69 years old and the group between 75 and 79 years old. As for women, we observed that the group with the highest prevalence was between 75 and 79 years old, followed by those between 60 and 64 years old and those between 55 and 59 years old (more detailed information is in table 1).

**Incidence**

From 2015 to 2019, we found 1013 new cases. The highest number of cases in men was between the ages of 25 and 29 (8.5%), followed by the group of 50 and 54 years (8.2%) and the groups of 20 and 24 and 40 and 44 years of age (8.0%, each one). As for women, the group with...
On the other hand, the incidence was presented in a range between 0.48 (95% CI 0.48 to 0.48) and 0.71 (95% CI 0.7 to 0.71) cases per 100,000 consultations annually, with an average incidence in 5 years of 0.65 (95% CI 0.64 to 0.65) cases per 100,000 consultations; detailed information in Table 2. Regarding the analysis of the pandemic effect in 2020, the estimated incidence based on SISPRO database was 0.57 (95% CI 0.57 to 0.58) cases in 100,000 consultations; however, the estimated projection of the incidence was 0.8 (95% CI 0.7 to 1.39) cases per 100,000 consultations in 2020 (Figure 1B).

### Table 1 Distribution of the incidence and prevalence of scleritis in Colombia 2015–2019, by sex and age

<table>
<thead>
<tr>
<th>Age group</th>
<th>Total cases of scleritis (%)</th>
<th>Prevalence*</th>
<th>New cases of scleritis (%)</th>
<th>Incidence†</th>
<th>Total cases of scleritis (%)</th>
<th>Prevalence*</th>
<th>New cases of scleritis (%)</th>
<th>Incidence†</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>14 (2.6)</td>
<td>0.22</td>
<td>17 (4.5)</td>
<td>0.25</td>
<td>19 (1.9)</td>
<td>0.17</td>
<td>14 (2.2)</td>
<td>0.17</td>
</tr>
<tr>
<td>5–9</td>
<td>20 (3.8)</td>
<td>0.2</td>
<td>16 (4.3)</td>
<td>0.26</td>
<td>18 (1.8)</td>
<td>0.19</td>
<td>12 (1.9)</td>
<td>0.2</td>
</tr>
<tr>
<td>10–14</td>
<td>30 (5.6)</td>
<td>0.3</td>
<td>28 (7.4)</td>
<td>0.5</td>
<td>22 (2.2)</td>
<td>0.23</td>
<td>16 (2.5)</td>
<td>0.3</td>
</tr>
<tr>
<td>15–19</td>
<td>15 (2.8)</td>
<td>0.13</td>
<td>10 (2.7)</td>
<td>0.16</td>
<td>31 (3.1)</td>
<td>0.29</td>
<td>23 (3.6)</td>
<td>0.31</td>
</tr>
<tr>
<td>20–24</td>
<td>40 (7.5)</td>
<td>0.35</td>
<td>30 (8.0)</td>
<td>0.65</td>
<td>41 (4.1)</td>
<td>0.38</td>
<td>33 (5.2)</td>
<td>0.43</td>
</tr>
<tr>
<td>25–29</td>
<td>40 (7.5)</td>
<td>0.4</td>
<td>32 (8.5)</td>
<td>0.69</td>
<td>65 (6.6)</td>
<td>0.63</td>
<td>51 (8.0)</td>
<td>0.68</td>
</tr>
<tr>
<td>30–34</td>
<td>39 (7.3)</td>
<td>0.41</td>
<td>29 (7.7)</td>
<td>0.69</td>
<td>91 (9.2)</td>
<td>0.91</td>
<td>66 (10.4)</td>
<td>0.99</td>
</tr>
<tr>
<td>35–39</td>
<td>40 (7.5)</td>
<td>0.45</td>
<td>24 (6.4)</td>
<td>0.61</td>
<td>90 (9.1)</td>
<td>0.91</td>
<td>58 (9.1)</td>
<td>0.9</td>
</tr>
<tr>
<td>40–44</td>
<td>44 (8.3)</td>
<td>0.53</td>
<td>30 (8.0)</td>
<td>0.73</td>
<td>76 (7.7)</td>
<td>0.87</td>
<td>42 (6.6)</td>
<td>0.76</td>
</tr>
<tr>
<td>45–49</td>
<td>37 (6.9)</td>
<td>0.54</td>
<td>28 (7.4)</td>
<td>0.84</td>
<td>101 (10.2)</td>
<td>1.3</td>
<td>59 (9.3)</td>
<td>1.15</td>
</tr>
<tr>
<td>50–54</td>
<td>50 (9.4)</td>
<td>0.74</td>
<td>31 (8.2)</td>
<td>0.88†</td>
<td>96 (9.7)</td>
<td>1.3</td>
<td>60 (9.4)</td>
<td>1.15†</td>
</tr>
<tr>
<td>55–59</td>
<td>40 (7.5)</td>
<td>0.67</td>
<td>29 (7.7)</td>
<td>0.87†</td>
<td>106 (10.7)</td>
<td>1.53†</td>
<td>58 (9.1)</td>
<td>1.14</td>
</tr>
<tr>
<td>60–64</td>
<td>45 (8.4)</td>
<td>1.01†</td>
<td>29 (7.7)</td>
<td>1.1†</td>
<td>84 (8.5)</td>
<td>1.55†</td>
<td>49 (7.7)</td>
<td>1.21†</td>
</tr>
<tr>
<td>65–69</td>
<td>31 (5.8)</td>
<td>0.88†</td>
<td>15 (4.0)</td>
<td>0.6</td>
<td>59 (6.0)</td>
<td>1.34</td>
<td>38 (6.0)</td>
<td>1.07</td>
</tr>
<tr>
<td>70–74</td>
<td>21 (3.9)</td>
<td>0.75</td>
<td>13 (3.5)</td>
<td>0.61</td>
<td>50 (5.1)</td>
<td>1.64†</td>
<td>29 (4.6)</td>
<td>1.17</td>
</tr>
<tr>
<td>75–79</td>
<td>14 (2.6)</td>
<td>0.77†</td>
<td>7 (1.9)</td>
<td>0.47</td>
<td>23 (2.3)</td>
<td>1.15</td>
<td>18 (2.8)</td>
<td>0.94</td>
</tr>
<tr>
<td>&gt;80</td>
<td>13 (2.4)</td>
<td>0.64</td>
<td>8 (2.1)</td>
<td>0.48</td>
<td>18 (1.8)</td>
<td>0.67</td>
<td>11 (1.7)</td>
<td>0.49</td>
</tr>
<tr>
<td>Total cases</td>
<td>533 (35.0)</td>
<td>376 (37.1)</td>
<td>990 (65.0)</td>
<td>637 (62.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Prevalence: (number of cases by age and sex in SISPRO /population by age and sex in the year based on retroprojection DANE)*100,000 patients.†Incidence: (number of new cases by age and sex in SISPRO/number of consultations by age and sex in the year of registration in SISPRO)*100,000 patients.‡Quinquenniums with greater frequencies.

### Table 2 Prevalence and incidence per year in Colombia from 2015 to 2019

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
<th>Prevalence* per year (95% CI)</th>
<th>Number of new cases</th>
<th>Incidence† per year (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>249</td>
<td>0.53 (0.53 to 0.54)</td>
<td>181</td>
<td>0.69 (0.68 to 0.69)</td>
</tr>
<tr>
<td>2016</td>
<td>172</td>
<td>0.36 (0.36 to 0.37)</td>
<td>116</td>
<td>0.48 (0.48 to 0.48)</td>
</tr>
<tr>
<td>2017</td>
<td>303</td>
<td>0.6 (0.59 to 0.6)</td>
<td>194</td>
<td>0.67 (0.67 to 0.67)</td>
</tr>
<tr>
<td>2018</td>
<td>380</td>
<td>0.73 (0.72 to 0.74)</td>
<td>247</td>
<td>0.71 (0.7 to 0.71)</td>
</tr>
<tr>
<td>2019</td>
<td>427</td>
<td>0.78 (0.77 to 0.78)</td>
<td>275</td>
<td>0.69 (0.68, 0.69)</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>0.6 (0.59 to 0.6)</td>
<td>Average</td>
<td>0.65 (0.64 to 0.65)</td>
</tr>
</tbody>
</table>

*Prevalence: (number of SISPRO cases/population by year based on DANE retroprojection)*100,000 patients.†Incidence: (number of new SISPRO cases/number of consultations by year registered in SISPRO)*100,000 patients.
As mentioned, Colombia is divided into 32 departments, distributed in five regions (Andean, Caribbean, Pacific, Oriniquia and Amazon) (figure 2). The geographic analysis shows that the areas with the highest number of cases were Bogotá (21.29%), Antioquia (16.75%) and Valle del Cauca (11.06%) (online supplemental table 2). Furthermore, SMR maps show a higher risk of the disease in the Andean region, which tends to increase over the analysis period (2015 to 2019), particularly

Figure 1  Effect of the pandemic on the epidemiology of scleritis in Colombia The blue lines show the calculated prevalence and incidence in SISPRO (2015–2020), in 2020, the red lines represent the estimated prevalence and incidence based on SISPRO data using the CAR analysis. Each point represents the prevalence or incidence calculated in each year of study with its 95% CI. (A) Line graph represents the prevalence in the 6 years studied. In 2020, the difference between the calculated (blue line) and the estimated (red line) prevalence had a difference of 0.24 cases per 100,000. (B) Line graph represents the incidence in the 6 years studied, showing a difference between the calculated (blue line) and the estimated (red line) prevalence had a difference of 0.26 cases per 100,000. CAR, conditional autoregressive; SISPRO, System of Information of Social Protection.

Geographic analysis
As mentioned, Colombia is divided into 32 departments, distributed in five regions (Andean, Caribbean, Pacific, Oriniquia and Amazon) (figure 2). The geographic analysis shows that the areas with the highest number of cases were Bogotá (21.29%), Antioquia (16.75%) and Valle del Cauca (11.06%) (online supplemental table 2). Furthermore, SMR maps show a higher risk of the disease in the Andean region, which tends to increase over the analysis period (2015 to 2019), particularly

Figure 2  The standardised morbidity rate in Colombia from 2015 to 2019. (A) Shows the distribution by departments of Colombia, where the Andean region is also observed in the blue border, the Caribbean region in red, the Pacific region in green, the Orinocia region in orange and the Amazon region in brown. (B) Shows the standardised morbidity rate (SMR) maps show a constant evolution of risk from 2015 to 2019. Bogota, Valle del Cauca and Antioquia evidence an increasing trend of the risk over time.15
in the departments of Antioquia and Valle del Cauca (figure 2).

**DISCUSSION**

Since 2007, Smith *et al*\(^5\) stated that the epidemiology of scleritis requires population-based studies to determine the dimensions of this health problem that leads to a significant visual loss.\(^{13,26}\) Furthermore, a recent publication by Sainz De la Maza *et al*\(^3\) recognised the lack of information regarding scleritis’s actual incidence and prevalence in the world population. Although studies have been carried out in the UK, the USA and Australia to determine the prevalence and incidence of this disease,\(^{6,7,9,27}\) there are no epidemiological descriptions in developing countries.

According to the reported data, the prevalence of scleritis ranges from 1.7 to 93.62 cases per 100 000 inhabitants, and the incidence from 1.0 to 5.54 cases per 100 000 inhabitants per year.\(^{6-9}\) Our general results show lower incidence and prevalence than those reported in the literature. The heterogeneity in the different methodologies used to calculate these epidemiological parameters can explain this because they are hospital-based studies and studies performed in a single region that do not represent the accurate data for an entire country.\(^{7-9}\) Another possible explanation is that the studies that report higher incidences have significantly smaller samples and a smaller number of new cases compared with our study population.\(^{7,8}\) Also, it is important to consider the years in which the descriptions were carried out since they are from 1997 to 2018.\(^{5,8}\) Therefore, our data are difficultly comparable with most reported studies since we describe all the cases registered in Colombia from 2015 to 2020.

Comparing our study head-to-head, we evidenced that the most similar study was conducted by Braithwaite *et al* in the UK. In this study, the incidence in the last 21 years decreased by approximately 1.51 points since, in 1997, the incidence was 4.3 cases per 100 000 persons/year, and in 2018, it was 2.79 cases per 100 000 persons/year.\(^5\) In comparison to our data for 2018, we observed a lower number of cases; however, the difference is not as large as with studies carried out with other methodologies. Similarly, when we compare our data with the study conducted in 2015 by Thong *et al*, which found an overall incidence rate of 1.0 (95% CI 0.7 to 1.4) per 100 000 consultations in Australia, we evidence a lower incidence in our population (0.69 (95% CI 0.68 to 0.69) per 100 000 consultations).\(^5\) Nevertheless, we must consider the intrinsic differences in the study design since Thong *et al* conducted a hospital-based study.

Braithwaite *et al* proposed that the incidence of scleritis has declined due to the availability of novel immunomodulatory and antimicrobial therapies, such as biological therapy used to treat many immune-mediated diseases, preventing the development of scleritis and, therefore, decreasing its incidence in the UK.\(^6\) We cannot fully confirm this proposal, but our data and those of Thong *et al* support that there are a smaller number of new cases of scleritis in the older population in Colombia, Australia and the UK.\(^6,9\) More population-based studies of scleritis are needed to confirm this hypothesis.

Based on the data in figure 1A,B, we can conclude that the COVID-19 pandemic significantly impacted patients’ access to the health system. This could cause irreversible damage since many patients with scleritis had no follow-up by the ophthalmologist. Additionally, the data show that although there may be an under-registration, many patients with the disease could remain undiagnosed, leading to possible complications affecting their visual health, psychological health, quality of life and psychosocial wellbeing.\(^{28,29}\) Unfortunately, no published articles report the incidence of scleritis during the global pandemic; therefore, we do not have any data to compare our findings in this regard.

Our study found a female predominance in scleritis; women represented 64.3% of the cases, with a female: male ratio of 1.72. Our findings are consistent with a retrospective case series reporting that 60%–74% of patients with scleritis are women.\(^30\) Similarly, in a previous study from the UK, among patients with incident scleritis, 1831 (62.2%) were women, and the Pacific Ocular Inflammation Study evidenced a similar pattern.\(^6,8\) As scleritis is an inflammatory condition, this could also be related to the common finding of female predominance in immune-mediated diseases.\(^31\)

Regarding age, our results are similar to those described worldwide, where the most significant number of cases lie between the ages of 39 and 59 years.\(^30\) In our population, the group between 40 and 69 years of age represents 50.3% of all reported cases. Nonetheless, the study conducted in the UK reported a peak of scleritis onset in women between the ages of 50 and 59 years and men between 70 and 79, contrary to us, where the peak of scleritis onset in women was between the ages of 30 and 39 years (19.5%) and 20 and 29 years for men (16.5%). The lower age of scleritis onset may be explained due to the changing pattern of incidence proposed by Braithwaite *et al* or due to a greater number of cases secondary to infectious aetiologies in young men as described in Southeast Asia.\(^6,32\) However, we cannot confirm these theories because our database does not allow us to see the aetiology of scleritis. More studies are needed in our population to confirm or refute these hypotheses.\(^6,32\)

Finally, the SMR map (figure 2) demonstrates that the regions with the highest density of Afro-Colombian population, such as Valle del Cauca and Antioquia, have a higher morbidity risk.\(^33\) Zhang *et al* described that infectious scleritis has a higher prevalence among African Americans (7.5 per 100 000 inhabitants), whose has an increased risk of infectious scleritis (OR: 1.2, CI (1.08 to 1.72)).\(^27\) However, it is crucial to consider that the departments with the main cities (Antioquia, Bogotá and Valle del Cauca), part of the departments mentioned with the highest prevalence, have the majority of referral centres and specialists in ocular inflammation.\(^34\)
LIMITATIONS
Due to the large number of patients and health personnel involved in the raw data recovery contained in the national databases, the claims database and population-based studies, as ours, cannot be totally accurate, containing underestimation or overestimation, due to the coverage and content errors, respectively. However, these studies are the best approximations to analyze with an acceptable degree of certainty the dimension of a disease in an entire country.24 35 36 Also, SISPRO has achieved a good concordance between the reported data and the clinical records, reaching 83.4%.2 As the SISPRO does not allow us to see the patient’s identification number, we cannot ensure that there were no repeated patients and that duplicates are not found in cases.

CONCLUSIONS
The 5-year average incidence and prevalence of scleritis in Colombia are 0.6 (95% CI 0.59 to 0.6) and 0.65 (95% CI 0.64 to 0.64) cases per 100000 inhabitants, respectively. Its distribution by age and sex is similar to that previously described; however, it stands out that a greater number of new cases among the group of 30–59 years in women and 20–29 years in men. More studies are needed in our population to confirm the effect of aetiology (infectious vs non-infectious) in the distribution pattern of scleritis. Additionally, we provide evidence of how the pandemic affected the follow-up and diagnosis of patients with scleritis. Further studies are needed on this disease in Latin America.

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Acknowledgements
We thank Universidad del Rosario for financing the publication of this article.

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Funding
No funding was required to carry out this study.

Map disclaimer
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Competing interests
None declared.

Patient and public involvement
Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication
Not applicable.

Provenance and peer review
Not commissioned; externally peer reviewed.

Data availability statement
Data are available upon reasonable request.

Supplemental material
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BMJ Open Ophth: first published as 10.1136/bmjophth-2022-001096 on 14 November 2022. Downloaded from http://bmjophth.bmj.com/ on April 2, 2024 by guest. Protected by copyright.


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