

Conjunctivitis epidemiological profile in an ophthalmological service in the metropolitan region of Fortaleza - Ceará – Brazil

Perfil epidemiológico da conjuntivite em um serviço oftalmológico na região metropolitana de Fortaleza - Ceará – Brasil

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Abstract

Objective: to evaluate the seasonal and endemic characteristics of conjunctivitis at the ophthalmology service of the Leiria de Andrade Foundation (FLA) in the last ten years to trace the epidemiological profile of conjunctivitis in Fortaleza - CE. **Methods:** this was a descriptive and epidemiological study based on quantitative and qualitative analysis, retrospectively, from January to December 2012 to 2019, with a projection for the years 2020 and 2021. **Results:** 107,778 medical records were analysed, with endemic and seasonal fluctuation, being the months of October to December more frequent in the intervals of the highest incidence of the disease. Two peaks were notorious, one with epidemic characteristics, from July 2013 to November 2014, and the other with outbreak characteristics, probably due to a national-level epidemic, between January and April 2018. The most affected age group was between 19 and 59 years, covering about 72% of cases, with no statistical difference between genders. **Conclusion:** according to the study data, it was possible to infer that the epidemiological scenario of Fortaleza - CE is in line with the literature regarding age range and sex. The endemicity of the disease reinforces its relevance in the scenario of the Unified Health System (SUS) of the region.

Keywords: Conjunctivitis; Epidemiology; Age Group; Endemicity; Peak.

Resumo

Objetivo: avaliar as características sazonais e endêmicas da conjuntivite no serviço de oftalmologia da Fundação Leiria de Andrade (FLA) nos últimos 10 anos, a fim de traçar o perfil epidemiológico da conjuntivite em Fortaleza - CE. **Métodos:** estudo descritivo e epidemiológico, com base em análise quantitativa e qualitativa, retrospectivamente, de janeiro a dezembro de 2012 a 2019, com projeção para os anos de 2020 e 2021. **Resultados:** foram analisados 107.778 prontuários, com variação endêmica e sazonal, estando os meses de outubro a dezembro com maior frequência dentro dos intervalos de maior incidência da doença. Notaram-se dois picos, um com características epidêmicas, de julho de 2013 a novembro de 2014, e outro com características de surto, provavelmente decorrente de uma epidemia de nível nacional entre janeiro e abril de 2018. A faixa etária mais afetada foi entre 19 e 59 anos, compreendendo cerca de 72% dos casos, sem diferença estatística entre os gêneros. **Conclusão:** de acordo com os dados do estudo, foi possível inferir que o cenário epidemiológico de Fortaleza - CE está de acordo com a literatura quanto à faixa etária e ao sexo. A endemicidade da doença reforça sua pesquisa no cenário do Sistema Único de Saúde (SUS) da região.

Palavras-chave: Conjuntivite; Epidemiologia; Faixa Etária; Endemicidade; Pico.

INTRODUCTION

Conjunctivitis is a disease with varied clinical aspects, classified mainly as viral, bacterial, and allergic. It is prevalent in several places in the world, having impacts on socioeconomic conditions, so that, in Brazil, it represents a challenge to public health, and the cause most related to ocular hyperemia in primary care, presenting initially unilaterally and may evolve with the involvement of both eyes^{1,2,3}.

In the United States, about six million people are affected each year, and the cost of the disease annually ranges from \$377 to \$857 million. Already in Reunion Island, between January and

March 2015, when an outbreak of conjunctivitis occurred, three million and 300 thousand euros were spent on medical care and medications³.

The prevalence of conjunctivitis depends on the etiology, varying according to the season, patient age, and immunocompetence status². Furthermore, it can be classified according to its presentation into hyperacute, acute, and chronic, and according to its etiology into infectious and non-infectious, the infectious causes being commonly represented by viral and bacterial infections, and the non-infectious causes represented by

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Conflict of interest: The authors declare that there is no conflict of interest.

Received: 2022 Nov 23; Revised: 2022 Nov 28; Accepted: 2022 Dec 1

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allergic reactions^{5,6}.

In an epidemiological study in the city of Recife, in which 26,358 patients were evaluated in an ophthalmological emergency service in the metropolitan region from January to June 2013, conjunctivitis represented the highest rate of attendance, with 35.17% of cases, demonstrating that the disease can be quite prevalent⁴.

Therefore, given the impact that conjunctivitis can cause in the social and economic spheres, and the lack of similar studies in the state of Ceará, Brazil, the main purpose of this study was to understand the epidemiological profile of conjunctivitis in this location, associating it with possible predisposing factors such as climate, gender, and age.

METHODS

This was a descriptive and epidemiological study, whose clinical data were collected through quantitative and qualitative analysis, retrospectively and descriptively, from electronic medical records of patients diagnosed with conjunctivitis at the ophthalmology service of the Fundação Leiria de Andrade (FLA), a reference center with great demand in ophthalmologic urgency in the metropolitan region of Fortaleza - Ceará - Brazil. Inclusion criteria were patients who, through clinical and symptomatic analysis, were diagnosed with conjunctivitis.

To obtain the data under study, an investigation was carried out in the FLA database through the use of an internal program, whose information was based on a search for the term "CONJUNCTIVITIS" in the place referring to the patient's diagnosis.

The organization of the information was done by dividing the total number of cases, and distribution by month, sex, and age group, in the period from January to December, from 2012 to 2019. We also estimated the number of cases for 2020 and 2021, with a confidence interval for more - upper confidence level (UCL) - and less - lower confidence level (LCL). It is worth noting that the diagnosis of patients with conjunctivitis was based only on clinical criteria, with no specific tests to define the etiology of conjunctivitis.

The data analysis aimed to determine whether conjunctivitis had seasonal and endemic characteristics, to assess the occurrence of outbreaks and epidemics in the region covered by the FLA's ophthalmological care, to observe the prevalence concerning the age range and sex of the infected patients, and to associate any social factor determining the increase in cases. The age range chosen was that used by the Brazilian Institute of Geography and Statistics (IBGE), which qualifies as young people under 19 years old, adult patients between 20 and 59 years old, and elderly individuals who are 60 years old or older. The project was approved by the ethics committee through the protocol CAAE: 10668919.7.0000.5049.

Categorical quantitative results were presented as percentages

and counts, and numerical results as measures of central tendency. Kolmogorov-Smirnov normality tests were performed for the numerical variables. ARIMA models and control charts were used for the temporal variation analyses. P-values of less than 0.05 were considered significant. The data obtained were tabulated and analyzed using IBM SPSS Statistics for Windows®, Version 23.0. Armonk®, NY: IBM Corp. Released 2015.

RESULTS

A total of 107,778 records were analyzed for the years 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019, which covered the diagnosis of conjunctivitis in its general aspect, without separation into viral, allergic, or bacterial.

Concerning the number of cases, it was possible to observe that conjunctivitis, in the region covered by the FLA (Fortaleza - Ceará - Brazil), has demonstrated an endemic character, as it was also noted two peaks of increase in the number of infected people, the first being a more sustained peak, between August 2013 and November 2014, and the second more punctual, in the period from January to April 2018 (Graph 1).

The fluctuation in the number of cases over the ten years showed the difficulty in defining a seasonal pattern; however, the months from October to December showed a higher frequency within the intervals of higher incidence of the disease. Furthermore, there was an important peak from January to April 2018, with a stabilization of the number of cases until a new outbreak from October to December 2019, thus suggesting that the disease was active throughout the year, with periods of increases and decreases (Graph 2).

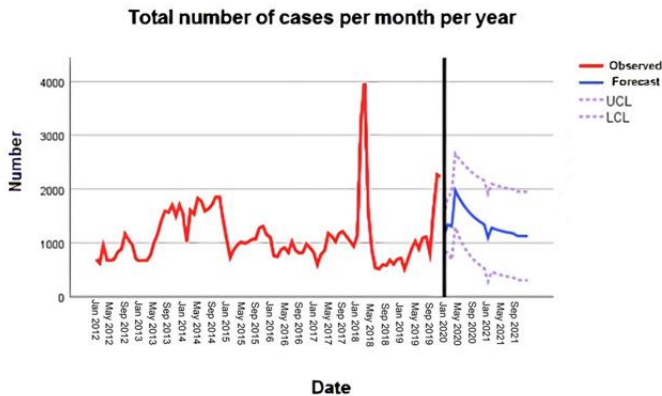
The analysis of the two increases observed during the study from a control chart detected that the first increase presented a more sustained pattern, being possible to observe a violation of the rule, with a six-point upward trend in the month of August 2013, besides sustainment of the average number of cases increased until the month of November 2014, which speaks in favor of an epidemic picture in the region. To the second increase, referring to January to April 2018 (with the peak in March), a more punctual character was evidenced, with characteristics indicative of an outbreak (Graph 3).

From the perspective of the difference between genders of patients with conjunctivitis, in absolute numbers, a greater predominance was observed in females, with 56,803 cases against 50,983 occurrences in males; however, no statistically significant difference was observed between the groups (Graph 4).

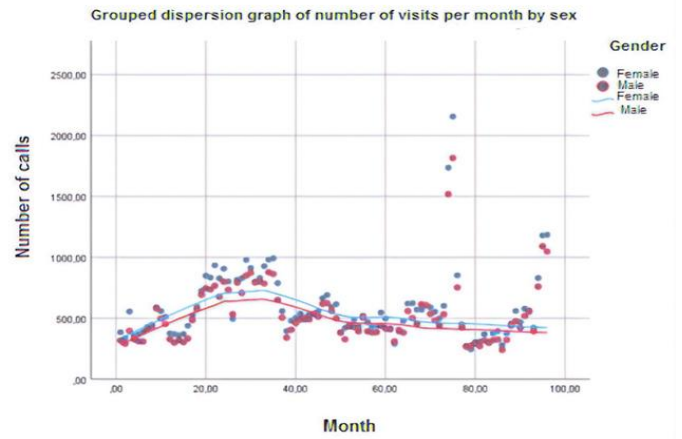
From the perspective of age group, it was observed that the majority of patients, about 72% of them, were between 19 and 59 years old, presenting a percentile value of less than 0.001 through the analysis of the linear regressive model, generalized with Bonferroni adjustment (Graph 5)

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Graph 1. Number of cases from 2012 to 2019, showing endemic pattern and occurrence of two significant increases in the total number, and estimate for the years 2020 and 2021, with their confidence interval. (UPC – Upper Confidence Level and LCL – Lower Confidence Level).

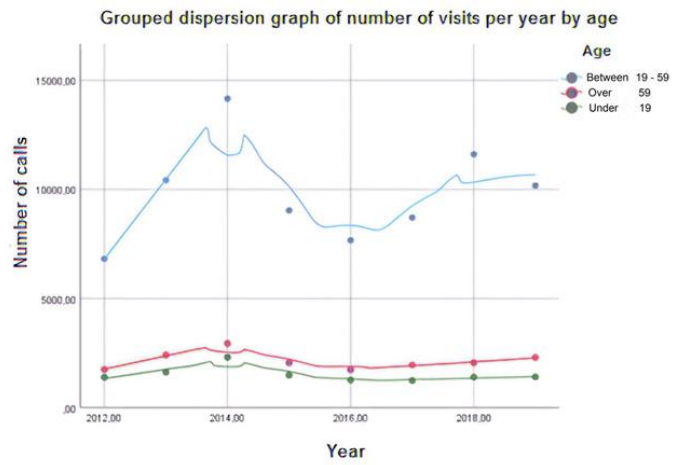
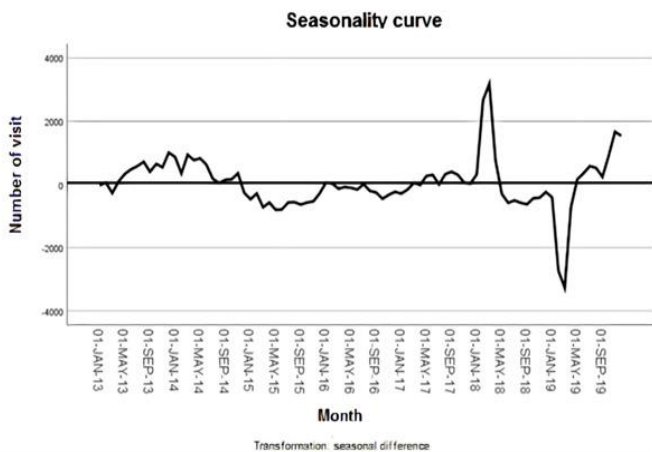


Graph 4. No statistically significant difference was observed between the groups.

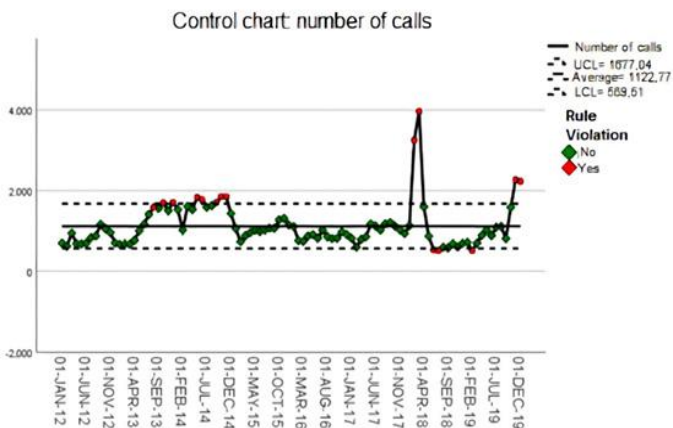


Graph 5. The main group affected by conjunctivitis was composed of patients aged between 19 and 59 years ($P < 0.001$).

Graph 2. Demonstration of the endemic and seasonal fluctuation of conjunctivitis from 2012 to 2019.



Graph 3. Control graph with the presentation of two peaks, the first being more sustained, characteristic of an epidemic, and the second more punctual, characteristic of the occurrence of an outbreak.



DISCUSSION

The present study found an endemic, rather than a seasonal, pattern of conjunctivitis in the Ceará (Brazil) region; however, a higher incidence of cases was observed in the second semester (October to December), which could be related to the lack of well- defined seasons in this region of Brazil under study⁷.

In an article published in 2019 evaluating the characteristics of ophthalmologic emergencies in the Emergency Room of the Eye Institute of Goiânia - Brazil, it was observed that conjunctivitis was the main diagnosis obtained in the evaluation of the etiologies in attendance, thus demonstrating the relevance of this pathology⁸.

In 2009, a study on the prevalence of conjunctivitis from 2004 to 2008 in the university hospital of the Universidade Federal de Santa Catarina, Brazil, observed that, of the 424 cases, the majority were between 20 and 29 years of age, 34% of the cases, corroborating the data obtained in the present study⁹.

According to Ryder and Benson (2020), the prevalence of conjunctivitis is variable, considering sex, age group, and seasonality, so the highest rates follow a pattern of higher incidence in adult women, although it is not a rule⁵; such data is in line with the results of this study, which showed the prevalence of adulthood and somewhat higher in females.

In the study produced by Azari et al. (2013), conjunctivitis, in its epidemiological aspect, varied according to age and seasonal period, being viral conjunctivitis, by adenovirus, the most common type of conjunctivitis, affecting mainly adults and having its prevalence higher in summer². Although seasonal periods are not well defined in this region of Ceará - Brazil, the climate with higher temperatures could predispose to the transmission of adenovirus^{7,10}, corroborating the data obtained. However, in the present study, there was no separation of conjunctivitis according to the causative agent.

According to the study by Ferreira et al. (2018), aggravating factors for allergic conjunctivitis are male gender, having a family history of allergic conjunctivitis, using ocular lubricants and topical immunosuppressants, and being sensitized to house dust mites¹¹. However, regarding seasonal conjunctivitis, according to Marback et al. (2007), it is uncommon in Brazil due to the lack of susceptibility of the population, low pollen density in the seasons, very short pollen season, or pollens with low antigenic power, unlike countries in Europe and North America¹². However, it is worth noting the seasonal aspect of cashew flowering in northeastern Brazil, which occurs in the period from June to November, and may serve as a source of allergic conjunctivitis peaks in this region of Ceará - Brazil, especially in the younger population^{13,14}; thus, it may influence the number of cases.

The Secretariat of Health of the State of Mato Grosso - Brazil registered, in December 2017, an intense increase in suspected cases of conjunctivitis compared to the previous month. This scenario spread across the country and reached the northeastern region of Brazil, in which the Altino Ventura Foundation, an important ophthalmological center in Pernambuco - Brazil, attended 12 thousand cases of conjunctivitis from January to March, while in the same period of the previous year, there

were only two thousand cases¹⁵. This fact could justify the increase in cases obtained in our research in 2018.

The literature points out that the heat would facilitate the proliferation of bacteria and that closed environments during rainfall would create favorable conditions for the dissemination of viruses^{16,17}. The present study, however, diverged from the literature concerning seasonality since it identified an atypical pattern of sustained increase in the number of cases from May to January, with a momentary decrease in the months of February, March, and April. This fact would be related to the lack of well-defined seasons in the north and northeast of the country. The seasons are often divided into rainy and non-rainy seasons, in which the rainy season corresponds to summer in the state of Ceará – Brazil^{18,19}.

Therefore, it was possible to observe that the involvement of sex and age range, described in the literature^{2,7}, was similar to the results of the present study, including the variation of occurrence in young people and adults. Seasonality, however, was quite variable.

CONCLUSION

The present study surveyed 107,778 records of care with a diagnosis of conjunctivitis in the ophthalmology service of the FLA from 2012 to 2019, with an estimated number of cases for the years 2020 and 2021. Data analysis showed a greater predominance of females, although not statistically significant. The involvement was greater in the adult age group (19 to 59 years). Regarding seasonality, we observed different fluctuations in the number of cases throughout the seasons in the years studied, although there is no exact pattern.

Data analysis and the study of literature allowed us to infer that, in general terms, the epidemiological scenario of Fortaleza - Ceará - Brazil was comparable to that of other places, especially regarding age range and gender. Moreover, it was confirmed that the disease in question presents itself in an endemic manner, being a constant challenge within the Unified Health System (SUS), which reinforces and justifies the importance of measures that reduce the risk of contagion.

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Como citar este artigo/ How to cite this article:

Cavalcanti LWLS, Vasconcelos AF, Florêncio MCP, Costa SR, Barroso IL Neto, Ferreira JLM. Conjunctivitis epidemiological profile in an ophthalmological service in the metropolitan region of Fortaleza - Ceará – Brazil. *J Health Biol Sci.* 2022; 10(1):1-5