



## Characteristics of chronic rhinosinusitis patients at Ibnu Sina Hospital Makassar

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### ARTICLE INFO

#### Article history:

Received Aug 6, 2025

Revised Aug 16, 2025

Accepted Aug 21, 2025

#### Keywords:

Molecular Rapid Test (TCM);  
Thoracic Photo;  
Tuberculosis.

### ABSTRACT

Background: Chronic rhinosinusitis is an inflammation of the nasal mucosa and paranasal sinuses that lasts for  $\geq 12$  weeks, involving sinusitis and rhinitis simultaneously. In Indonesia, the incidence data is uncertain, but a study in Palembang in 2019 showed the proportion of chronic rhinosinusitis in adults was 33.3%. Given the limited data, high prevalence, and impact of this disease, a study was conducted to analyze the characteristics of chronic rhinosinusitis patients at Ibnu Sina Hospital Makassar. Methods: This study used an analytic observational design with a cross-sectional approach, involving 83 subjects selected by consecutive sampling. Data taken from medical records included age, gender, clinical manifestations, antibiotic treatment, and sinus location. Univariate analysis was performed using Microsoft Excel. Results: The results of univariate analysis showed that most chronic rhinosinusitis patients were aged 17-25 years (41.27%), followed by patients aged 26-35 years (26.98%). Male patients slightly outnumbered females, with 50.79% male and 49.21% female. The most common clinical manifestations were facial pain (63.49%), nasal congestion (53.97%), and headache (63.49%), while less common symptoms included cough (11.11%) and bad breath (4.76%). In terms of antibiotic treatment, cefadroxil was the most commonly administered (33.3%), followed by ceftriaxone (31.7%) and cefixime (24.2%). Regarding the site of sinus involvement, multi-sinusitis was the most common (60.5%), followed by unilateral sinusitis (34.2%) and pansinusitis (5.26%). Conclusion: Chronic rhinosinusitis at Ibnu Sina Hospital Makassar was most common in males aged 17-25 years, with facial pain as the main symptom, multi-sinusitis as the most common location, and cefadroxyl and ceftriaxone as the main antibiotics used.

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### 1. Introduction

Rhinosinusitis refers to inflammation of the nose and paranasal sinuses characterized by two or more symptoms, one of which includes nasal obstruction, congestion, or discharge, facial pain, and endoscopic findings such as nasal polyps or mucopurulent secretions, particularly from the middle meatus. Rhinosinusitis is currently classified into two main types: acute rhinosinusitis (ARS) and chronic rhinosinusitis (CRS).<sup>1</sup> Chronic rhinosinusitis is a prevalent health issue affecting 5–12% of the global

population, significantly influencing quality of life across various aspects, including economic costs for treatment and social challenges, and affecting nearly all age groups. Its prevalence is estimated at 12.3% in the United States, 10.9% in Europe, and 13% in China. In Indonesia, no definitive data is available on the incidence of chronic rhinosinusitis; however, cases are frequently encountered, predominantly in individuals aged 46–55 years and more commonly in men. Data from hospitals in Indonesia show that the prevalence of chronic rhinosinusitis patients is 83.8% in RSUP M. Djamil Padang, 83.5% in RSUP Dr. Kariadi Semarang, 85.9% in RSUD Dr. Saiful Anwar Malang, 65.5% in RSUD Dr. Soetomo Surabaya, and 28.9% in RSUP Sanglah Bali (Mirsaeidi and Baughman 2022).

Chronic rhinosinusitis is most often caused by bacteria, viruses, fungi, or other factors such as genetic and environmental influences, and is characterized by inflammatory symptoms of the nasal and paranasal sinus mucosa, including nasal obstruction, mucopurulent nasal discharge, facial pain, olfactory disturbances, or cough lasting more than 12 weeks (Tan et al. 2013). Diagnosis of chronic rhinosinusitis remains challenging due to its similarity with other nasal inflammatory conditions like allergic rhinitis, which can affect patients' quality of life (Bai and Tan 2023). Diagnosis is typically made using a CT scan, which shows mucosal changes associated with the ostiomeatal complex (OMC) and paranasal sinuses, and may involve two sinus walls (multisinusitis) or all paranasal sinuses (pansinusitis), as well as the sinus ostium area (Chin, Scott, and Lee 2025).

Antibiotics are essential in treating chronic rhinosinusitis based on the European Position on Rhinosinusitis and Nasal Polyps (EPOS) 2020 guidelines (Hagedorn et al. 2024). In Europe, antibiotics such as amoxicillin or penicillin are used, while in Asia, particularly China, antibiotics like amoxicillin, ciprofloxacin, and doxycycline are administered. In Indonesia, penicillin-class antibiotics, specifically amoxicillin, are the preferred treatment. Therapy typically lasts for 10–14 days, with clindamycin or moxifloxacin given for one week in cases of penicillin allergy (Hansen, Megan J; Carson, Paul J; Leedahl, DD; Leedahl 2018). The limited data on chronic rhinosinusitis in Indonesia, coupled with its high prevalence and impact, has prompted researchers to investigate the characteristics of age, gender, clinical manifestations, management, and sinus locations in patients with chronic rhinosinusitis (Bai, Tan, and Kato 2024).

The high prevalence of rhinosinusitis in adolescents and young adults in a region is generally influenced by a combination of environmental and lifestyle factors. Environments with high levels of air pollution from vehicle exhaust, dust, or industrial activity can irritate the nasal and sinus mucosa, while humid climates encourage the growth of fungi and dust mites, which trigger respiratory allergies. Poor ventilation in homes, schools, or dormitories also facilitates the spread of viruses that cause recurrent respiratory infections. Furthermore, modern lifestyles contribute significantly: staying up late, academic stress, a poor diet, and smoking or e-cigarette use at a young age can weaken the immune system and exacerbate mucosal inflammation. Lack of outdoor physical activity and infrequent nasal hygiene after exposure to pollution or dirty water further increase the risk. This combination of factors creates ideal conditions for the development of rhinosinusitis in adolescents and young adults (Bai, Tan, and Kato 2024).

## 2. Methods

This study uses a descriptive method with a cross-sectional approach to analyze medical records data of chronic rhinosinusitis patients at Ibnu Sina Hospital, Makassar, in 2024. The study subjects include all patients diagnosed with chronic rhinosinusitis based on the inclusion criteria, namely patients with complete medical records covering age, gender, clinical manifestations, antibiotic management, and sinus location. The sample size was determined using Slovin's formula with a 10% margin of error, resulting in a sample size of 63 patients. Data were obtained through the collection of verified medical records and processed according to the research protocol after receiving approval from the hospital authorities. The research was conducted at Ibnu Sina Hospital, Makassar, South Sulawesi, during the designated period in 2024.

### 3. Results and Discussion

#### 3.1. Results

This study was conducted by collecting secondary data from the medical records of chronic rhinosinusitis patients registered at Ibnu Sina Hospital, Makassar, from January 2019 to August 2024, who met the inclusion and exclusion criteria. The results of the study are presented in tables accompanied by the following explanations.

#### Characteristics of Patients

Tabel 1.  
Research Characteristic

Variable	Frequency (n)	Percentage (%)
Age		
Toddlers (0-5 years)	0,00	0,00
Children (5-11 years)	0,00	0,00
Teenager (12-16 years)	5	7,94
Adolescence (17-25 years)	26	41,27
Early adulthood (26-35 tahun)	17	26,98
Late adults (36-45 tahun)	6	9,52
Early elderly (45-55 tahun)	8	17,70
Late elderly (56-65 tahun)	0	0,00
Elderly (65 keatas)	1	1,59
Gender		
Male	32	50,79
Female	31	49,21
Clinical Manifestation		
Facial pain	40	63,49
Nasal congestion	57	90,48

Table 2.

Characteristics of Chronic Rhinosinusitis Patients Based on Antibiotic Management

Antibiotic	Types of Antibiotics	Frequency (n)	Percentage (%)
Penicillin Generation I	Ampicillin	1	1,6
	Cefadroxil	21	33,3
Cephalosporins Generation I	Cefalexim	0	0,00
	Cefixime	16	24,2
Cephalosporins	Ceftriaxone	20	31,7
	Erythromycin	0	0,00
	Clindamycin	0	0,00
Macrolides	Azithromycin	0	0,00
	Levofloxacin	0	0,00
Fluoroquinolone	Ciprofloxacin	5	7,9
	Total	63	100

The study revealed that the majority of participants were adolescents aged 17–25 years, comprising 41.27% of the total, followed by early adults aged 26–35 years at 26.98%, and early elderly individuals aged 45–55 years at 17.70%. Male and female participants were almost equally distributed, with males making up 50.79% and females 49.21% of the study population (Fokkens et al. 2019).

Regarding clinical manifestations, nasal congestion was the most commonly reported symptom, affecting 90.48% of participants. This was followed by facial pain and head pain, both observed in 63.49% of cases, while slimy throat was present in 49.21% (Ouellette et al. 2024). Less common symptoms included cough, reported by 11.11% of participants, and colored snot and odorous pain, each

observed in only 4.76% of cases (Kuo et al. 2022). In terms of sinus location, multisinusitis was the most prevalent condition, accounting for 60.5% of cases, while 34.2% of participants experienced unilateral sinusitis. Pansinusitis was the least common condition, reported in only 5.26% of cases, while 39.68% of sinus locations were categorized as unknown (Cho et al. 2020).

The study also examined the use of antibiotics among participants. Generation I cephalosporins were the most frequently prescribed, with Cefadroxil being used in 33.3% of cases and Ceftriaxone in 31.7%. Cefixime was also commonly prescribed, accounting for 24.2% of cases. Penicillin (Ampicillin) was used in only 1.6% of cases, while fluoroquinolones, specifically Ciprofloxacin, were prescribed in 7.9% (Shi et al. 2015). Notably, macrolides, such as Erythromycin, Clindamycin, and Azithromycin, as well as Levofloxacin, were not utilized in this study population (Cavaliere et al. 2024). These findings indicate that adolescents and early adults are the most affected age groups, with nasal congestion being the predominant symptom and multisinusitis the most common sinus condition. Generation I cephalosporins, particularly Cefadroxil and Ceftriaxone, were the antibiotics most frequently administered (Cavaliere et al. 2024).

### 3.2. Discussion

#### Characteristics of chronic Rhinosinusitis Patients

Based on research conducted at Ibnu Sina Hospital Makassar from January 2019 to August 2024, it was found that the age group most affected by chronic rhinosinusitis was late adolescence (17–25 years), accounting for 41.27%. This result aligns with the study conducted by Simanjuntak et al. (2022) regarding the characteristics of chronic rhinosinusitis, which showed that 20.14% of adults suffered from chronic rhinosinusitis, with the condition being more common in the 17–25 age group. On chronic rhinosinusitis characteristics found that the highest incidence of chronic rhinosinusitis occurred in adolescent (Cho et al. 2020).

Several factors may contribute to this, including adolescents being more susceptible to air pollution and other environmental exposures such as household dust or cigarette smoke (Habenbacher et al. 2024). These factors can lead to respiratory infections and allergic rhinitis, causing swelling of the nasal mucosa, disrupting mucus flow and ciliary function in the paranasal sinuses, and predisposing individuals to chronic rhinosinusitis (Zhang et al. 2023).

#### Characteristics of Chronic Rhinosinusitis Patients Based on Gender

Research conducted at Ibnu Sina Hospital Makassar from January 2019 to August 2024 found that 50.79% of chronic rhinosinusitis patients were male, while the remaining 49.21% were female. In other words, chronic rhinosinusitis was slightly more prevalent among males. This finding is consistent with the study by on chronic rhinosinusitis characteristics, which showed that 51.6% of patients were male. Research by (Habenbacher et al. 2024) also indicated that men are at higher risk than women due to habits such as smoking and spending more time outdoors, which increases exposure to environmental triggers.

#### Characteristics of Chronic Rhinosinusitis Patients Based on Clinical Manifestations

Research conducted at Ibnu Sina Hospital Makassar from January 2019 to August 2024 found that the most common clinical manifestation experienced by chronic rhinosinusitis patients was nasal congestion, reported by 57 patients (90.48%) (Fokkens et al. 2019). This aligns with the study by (Habenbacher et al. 2024) on the clinical features of chronic rhinosinusitis patients, which found that 32.1% of patients experienced nasal congestion.<sup>9</sup> Nasal congestion as a primary complaint can be explained by the pathophysiology of chronic rhinosinusitis, where sinus organ edema is caused by an initial inflammatory reaction. This edema leads to nasal obstruction and closure of the ostiomeatal complex (OMC), blocking mucus flow. The accumulation of mucus creates an environment conducive to the growth of pathogenic bacteria in the obstructed sinuses, resulting in secondary bacterial infections. Edema causing OMC closure serves as the initial trigger for chronic rhinosinusitis symptoms, particularly nasal congestion.<sup>10</sup> patients, which found that 32.1% of patients experienced nasal congestion.<sup>9</sup> Nasal congestion as a primary complaint can be explained by the pathophysiology of chronic rhinosinusitis, where sinus organ edema is caused by an initial inflammatory reaction. This edema leads to nasal

obstruction and closure of the ostiomeatal complex (OMC), blocking mucus flow. The accumulation of mucus creates an environment conducive to the growth of pathogenic bacteria in the obstructed sinuses, resulting in secondary bacterial infections. Edema causing OMC closure serves as the initial trigger for chronic rhinosinusitis symptoms, particularly nasal congestion (Lin Ji wang, 2024).

#### **Characteristics of Chronic Rhinosinusitis Patients Based on Antibiotic Management**

Research conducted at Ibnu Sina Hospital Makassar from January 2019 to August 2024 found that 33.3% of chronic rhinosinusitis patients were treated with cefadroxil, a first-generation cephalosporin. This finding is consistent with the study by (Habenbacher et al. 2024) on the clinical features of chronic rhinosinusitis patients, which showed that cefadroxil was the most commonly used antibiotic, prescribed in 37.5% of cases.<sup>11</sup> Cefadroxil can be an effective choice for treating chronic rhinosinusitis when bacterial infection is indicated. As a first-generation cephalosporin, it has broad-spectrum antibacterial activity, particularly against gram-positive bacteria and some gram-negative bacteria. Research has shown cefadroxil to be significantly effective in treating chronic rhinosinusitis. It is typically administered at a dosage of 1 gram every 12 hours (2 grams per day) for 10 days. The study demonstrated a cure rate of 90%, with good tolerability, making it a strong alternative for managing chronic rhinosinusitis (Zhang et al. 2023).

#### **Characteristics of Chronic Rhinosinusitis Patients Based on Sinus Location**

Research conducted at Ibnu Sina Hospital Makassar from January 2019 to August 2024 found that the most common sinus location in chronic rhinosinusitis patients was multisinusitis, observed in 23 patients (60.5%). This result aligns with the study by Fakhrudin, on chronic rhinosinusitis characteristics, which reported that multisinusitis accounted for 59.4% of cases.<sup>14</sup> Multisinusitis is more common in chronic rhinosinusitis patients due to various factors related to the disease's pathophysiology and characteristics. Risk factors such as upper respiratory tract infections (URTIs), allergies, and mucociliary dysfunction often occur in chronic rhinosinusitis patients. URTIs caused by bacteria or viruses can exacerbate chronic rhinosinusitis and increase the likelihood of multisinusitis. Chronic rhinosinusitis is characterized by inflammation of the nasal and paranasal sinus mucosa lasting more than 12 weeks. This prolonged inflammatory process can lead to structural and functional changes in the mucosa, increasing the risk of infections in multiple sinus locations. Main symptoms of chronic rhinosinusitis, such as nasal obstruction and facial pain, can also cause mucus buildup in the sinuses, creating an environment conducive to bacterial growth and increasing the risk of simultaneous infections in multiple sinuses (Zhang et al. 2023).

The prevalence of nasal congestion in up to 90.48% of Chronic Rhinosinusitis (CRS) patients suggests that this symptom can be an important early indicator for early disease detection, especially if it persists for more than 12 weeks or does not improve with simple treatment. However, although highly sensitive, this symptom is nonspecific as it is also frequently found in other conditions such as allergic rhinitis, deviated septum, or nasal polyps. Therefore, supporting examinations such as nasal endoscopy or CT scan are still needed to confirm the diagnosis of CRS. In management strategies, the focus of therapy is directed at reducing nasal obstruction through saline irrigation, corticosteroid sprays, or surgical intervention when necessary, with improving nasal patency being one indicator of therapeutic success. Furthermore, management of comorbidities such as allergic rhinitis also plays a role in reducing obstructive symptoms. Educating patients to seek immediate medical attention if they experience persistent nasal congestion is crucial to prevent disease progression and improve long-term therapeutic success.

#### **4. Conclusion**

Based on the research and discussion above, it can be concluded that the majority of chronic rhinosinusitis patients at Ibnu Sina Hospital Makassar were aged 17–25 years and predominantly male. Nasal congestion was the most commonly reported clinical manifestation among these patients. Most cases were treated with cefadroxil, a first-generation cephalosporin antibiotic, and multisinusitis was the most frequently identified sinus condition. Considering these findings, it is recommended that further preventive measures focus on addressing environmental and lifestyle factors contributing to

rhinosinusitis in adolescents and young adults. Additionally, awareness campaigns about the importance of early diagnosis and appropriate treatment should be prioritized, along with research into alternative therapeutic strategies to reduce recurrence and improve patient outcomes.

Environmental and lifestyle-based rhinosinusitis prevention recommendations can be translated into practical public health programs in Makassar using an integrated approach tailored to the local context. Air pollution from motor vehicles and the high humidity typical of coastal areas can be addressed through urban greening programs, emission monitoring, and improvements to public transportation to reduce exposure to dust and smoke. In schools, universities, and dormitories, ventilation should be improved, along with regular education on coughing and sneezing etiquette and the habit of rinsing the nose with a simple saline solution after exposure to pollution or swimming. A balanced nutrition campaign, which provides healthy meals in school and university canteens, can help boost the immune system of adolescents and young adults, while education on the dangers of conventional and e-cigarettes needs to be strengthened through collaboration with youth organizations. Furthermore, joint sports programs, outdoor activities, and stress management education can be designed by the health office and local communities to encourage healthy lifestyles. By combining education, supporting facilities, and environmental regulations, rhinosinusitis prevention becomes not only an individual responsibility but is integrated into the city's public health policy.

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