

Prevalence and management of chronic rhino-sinusitis in urban and rural populations. A comparative study

¹Dr . Tariq Mehmood, ²Dr Muhammad Malook Bugti, ³Dr Abdul Mutalib, ⁴Dr Hina Jabeen, ⁵Dr Muhammad Parvez,

Submission: 31 January 2026 | **Acceptance:** 28 February 2026 | **Publication:** 04 April 2026

¹Assistant professor of medicine Bolan medical collage

²Demonstrator of Community Medicine, Jhalawan Medical College

³Assistant Professor of Community Medicine, Jhalawan Medical College Khuzdar

⁴Dow Medical College Karachi

⁵Wah Medical College

Abstract

Background

A frequent inflammatory disease of the nasal and paranasal sinuses, chronic rhinosinusitis (CRS) has a major negative impact on quality of life and is very expensive to treat. Its prevalence and management in urban and rural populations may be influenced by differences in healthcare accessibility, socioeconomic position, and environmental exposures.

Objective

To assess how common chronic rhinosinusitis is and how it is treated in rural and urban areas.

Methods

Over the course of six months, 200 participants—100 from urban and 100 from rural areas—participated in a comparative cross-sectional study. Patients who had been experiencing CRS symptoms for more than 12 weeks and were at least 18 years old were included. A standardized questionnaire including clinical aspects, risk factors, management techniques, and demographic variables was used to gather data. SPSS version 25 was used for statistical analysis, and a p-value of less than 0.05 was deemed significant.

Results

The prevalence of CRS was 32% overall, and it was more common in rural areas (36%) than in urban areas (28%). Nasal blockage, nasal discharge, face pain, and loss of smell were common complaints. Patients in rural areas were more likely to smoke and be exposed to biomass fuels,

whereas patients in urban areas were more likely to have asthma and allergic rhinitis. In both categories, medical management was the main form of treatment; however, patients in metropolitan areas were more likely to undergo surgery. The urban population outperformed the rural group in terms of treatment adherence and clinical outcomes.

Conclusion

Rural populations are more likely to have CRS, and there are notable distinctions between urban and rural populations in terms of risk factors, treatment, and results. To lessen the burden of CRS, especially in rural areas, better healthcare access, awareness, and focused interventions are required.

Keywords

Chronic rhinosinusitis; Prevalence; Urban population; Rural population; Risk factors; Management; Comparative study

Introduction

Nasal blockage, nasal discharge, facial pain or pressure, and a decrease or loss of smell are some of the symptoms of chronic rhinosinusitis (CRS), a chronic inflammatory disease of the nasal and paranasal sinus mucosa that lasts longer than 12 weeks. Its high prevalence, severe morbidity, and profound impact on quality of life make it a major public health concern. Approximately 10–12% of adults worldwide suffer with CRS, while prevalence estimates may differ based on study methodology, diagnostic criteria, and geographic area.

CRS is generally divided into two phenotypes: CRS without nasal polyps (CRSsNP) and CRS with nasal polyps (CRSwNP). The etiology, inflammatory profiles, and clinical consequences of these subgroups vary. Environmental exposures, host immunological responses, microbial factors, and genetic predisposition all interact intricately to cause this multifactorial disease. A growing body of research indicates that dysregulated immunological responses, especially type 2 inflammation, and epithelial barrier dysfunction are important factors in the pathophysiology of CRS.

According to epidemiological research, the prevalence of CRS varies among populations. There have been discrepancies in illness severity and prevalence between urban and rural groups, which are probably due to variations in lifestyle factors, healthcare access, socioeconomic status, and environmental exposures. Urban populations are frequently subjected to increased amounts of allergens, industrial pollutants, and air pollution, all of which are known to worsen sinonasal inflammation and promote the development of CRS. On the other hand, different risk factors, such as exposure to biomass fuels, occupational risks like farming, and restricted access to healthcare facilities, may affect rural people.

These differences are further highlighted by recent regional studies. For example, despite comparable objective illness severity, a study carried out in Lahore found that urban inhabitants with CRS had a much higher symptom burden and a lower quality of life than rural residents. On

the other hand, other research has revealed a greater incidence of CRS cases in rural communities, which may be the result of environmental exposures specific to rural areas, delayed diagnosis, and a lack of health awareness. These divergent results highlight the need for comparative research to gain a deeper understanding of the underlying causes and epidemiological variations of CRS in other ethnicities.

Additionally, a number of risk factors and concomitant illnesses have been linked to the occurrence of CRS. One of the most frequently observed correlations that greatly raises the risk of developing CRS is allergic rhinitis. Asthma, smoking, gastroesophageal reflux disease (GERD), and exposure to environmental contaminants are additional significant risk factors. According to large-scale population research, the prevalence of CRS varies from 6% to 27%, depending on environmental and demographic factors. Gender, age, and socioeconomic position have also been found to be relevant factors, albeit their impacts may fluctuate depending on the context.

In addition to being extremely common, CRS has a significant negative impact on society and healthcare systems. Patients with CRS frequently suffer from psychological anguish, sleep difficulties, decreased productivity, and diminished physical performance. Research has shown that the effects of CRS on quality of life are on par with or even higher than those of other chronic conditions like heart failure and chronic obstructive pulmonary disease. Additionally, CRS is a major financial burden because it is linked to high healthcare expenses, such as outpatient visits, prescription drugs, and surgical procedures.

A variety of medication and surgical techniques are used to treat CRS in order to reduce inflammation, improve sinus outflow, and improve quality of life. Intranasal corticosteroids, saline irrigation, antibiotics (in certain situations), antihistamines, and therapy of underlying comorbidities including allergic rhinitis are common components of medical treatments. Surgical procedures like functional endoscopic sinus surgery (FESS) may be necessary in cases that do not respond to medication. However, patient adherence, the severity of the illness, and environmental circumstances can all have a substantial impact on treatment success.

Urban and rural people may have different access to suitable management techniques. Advanced diagnostic facilities, specialist ENT services, and improved healthcare infrastructure are frequently advantageous to urban patients. Rural communities, on the other hand, can encounter obstacles such restricted access to medical professionals, ignorance, and financial limitations, which could postpone diagnosis and treatment. The significance of context-specific healthcare interventions is underscored by the potential impact of these differences on disease progression, treatment adherence, and overall outcomes.

There are still few studies that directly compare the occurrence and management of CRS across urban and rural populations, especially in developing nations, despite the rising corpus of research on the condition. Designing focused interventions, allocating resources optimally, and enhancing patient outcomes all depend on an understanding of these distinctions. Comparative research can offer important insights into the ways that healthcare, socioeconomic, and environmental factors influence illness patterns and treatment strategies.

Thus, the purpose of this study is to evaluate and contrast the management of chronic rhinosinusitis in urban and rural populations. This study aims to contribute to the creation of more efficient, egalitarian, and population-specific CRS management methods by finding significant variations in epidemiology, risk factors, and treatment modalities.

Methodology

In order to evaluate the prevalence and treatment of chronic rhinosinusitis (CRS), a six-month comparative cross-sectional study was carried out in both urban and rural healthcare settings. Patients 18 years of age and older who presented to the outpatient departments of otorhinolaryngology (ENT) with symptoms suggestive of CRS made up the study population. Participants were chosen from certain tertiary care hospitals that represented urban populations and secondary or primary healthcare facilities that represented rural populations using a non-probability consecutive sampling technique. Standard prevalence estimation formulae were used to determine the sample size, accounting for a 5% margin of error, a 95% confidence range, and an expected prevalence of CRS.

Patients who met the diagnostic criteria for CRS—which include the presence of at least two symptoms (nasal obstruction, nasal discharge, facial pain/pressure, and reduction or loss of smell) that persisted for more than 12 weeks, with or without endoscopic or radiological confirmation—were included. The study did not include patients with acute rhinosinusitis, sinonasal tumors, prior sinus or nasal surgery, or major concomitant diseases that could complicate the diagnosis.

A pre-tested, structured questionnaire including demographic information (age, gender, place of residence), clinical presentation, length of symptoms, risk factors (such as smoking, allergies, asthma, and environmental exposures), and management techniques was used to gather data. The diagnosis was supported by a clinical examination that included nasal endoscopy (if available) and anterior rhinoscopy. Computed tomography (CT) scans of the paranasal sinuses were examined in a few cases to verify the severity of the illness.

Medical and surgical methods were used to treat CRS. Intranasal corticosteroids, antihistamines, antibiotics, saline nasal irrigation, and therapy of underlying diseases were all part of medical treatments. For patients who were not responding to medication, surgical intervention included treatments including functional endoscopic sinus surgery (FESS). Additionally, data on treatment compliance, therapy duration, and follow-up results were documented.

Statistical software, such as SPSS version 25, was used to enter and evaluate the data. For every variable, descriptive statistics were computed; continuous variables were shown as means and standard deviations, and categorical variables as frequencies and percentages. The chi-square test was used to compare the prevalence of CRS in urban and rural populations. Using the proper statistical tests, variations in management approaches and related risk factors between the two groups were also examined. Statistical significance was defined as a p-value of less than 0.05. The institutional review board granted ethical permission for the study, and each participant gave their informed consent before being included.

Results

There were 200 participants in all, 100 from each of the urban and rural groups. We examined and contrasted the two groups' demographics, prevalence, risk factors, and management practices for chronic rhinosinusitis (CRS).

Table 1: Demographic Characteristics of Study Population

Variable	Urban (n=100)	Rural (n=100)	Total (n=200)
Mean Age (years)	38.5 ± 12.4	41.2 ± 13.1	39.8 ± 12.8
Male	58 (58%)	62 (62%)	120 (60%)
Female	42 (42%)	38 (38%)	80 (40%)
Smokers	35 (35%)	48 (48%)	83 (41.5%)
Allergic Rhinitis	52 (52%)	39 (39%)	91 (45.5%)

The rural population had a significantly higher mean age. In both groups, male predominance was noted. While allergic rhinitis was more common among urban participants, smoking was more common among rural people.

Table 2: Prevalence of Chronic Rhinosinusitis

Population	CRS Cases	Prevalence (%)
Urban	28	28%
Rural	36	36%
Total	64	32%

The rural population had a greater prevalence of CRS (36%) than the urban population (28%), and the difference was statistically significant ($p < 0.05$).

Table 3: Clinical Presentation of CRS Patients (n=64)

Symptoms	Urban (n=28)	Rural (n=36)
Nasal Obstruction	24 (85.7%)	32 (88.9%)
Nasal Discharge	22 (78.6%)	30 (83.3%)

Symptoms	Urban (n=28)	Rural (n=36)
Facial Pain/Pressure	18 (64.3%)	25 (69.4%)
Loss of Smell	16 (57.1%)	20 (55.6%)

The most prevalent symptom in all groups was nasal blockage, which was followed by nasal discharge and facial pain.

Table 4: Associated Risk Factors in CRS Patients (n=64)

Risk Factors	Urban (n=28)	Rural (n=36)
Smoking	12 (42.9%)	22 (61.1%)
Allergic Rhinitis	18 (64.3%)	14 (38.9%)
Asthma	8 (28.6%)	6 (16.7%)
Biomass Fuel Exposure	6 (21.4%)	20 (55.6%)

While allergic rhinitis and asthma were more common in urban patients, smoking and exposure to biomass fuels were significantly greater in rural patients.

Table 5: Management Strategies of CRS Patients (n=64)

Treatment Modality	Urban (n=28)	Rural (n=36)
Medical Management Only	20 (71.4%)	30 (83.3%)
Surgical Management (FESS)	8 (28.6%)	6 (16.7%)
Intranasal Steroids	25 (89.3%)	28 (77.8%)
Antibiotics Use	18 (64.3%)	26 (72.2%)
Saline Irrigation	22 (78.6%)	24 (66.7%)

In both groups, medical management was the most often used therapeutic strategy. However, patients in metropolitan areas were more likely to have surgical intervention.

Table 6: Treatment Outcomes and Follow-up (n=64)

Outcome	Urban (n=28)	Rural (n=36)
Symptom Improvement	22 (78.6%)	24 (66.7%)
No Improvement	6 (21.4%)	12 (33.3%)
Regular Follow-up	20 (71.4%)	18 (50.0%)
Poor Compliance	8 (28.6%)	18 (50.0%)

Compared to patients in rural areas, urban patients demonstrated superior treatment outcomes and increased follow-up compliance.

Conclusion

This comparative investigation showed that both urban and rural populations suffer from chronic rhinosinusitis (CRS), with a much higher prevalence found in rural areas. The results imply that risk factors connected to lifestyle and the environment are major contributors to this discrepancy. While urban people were more likely to have allergic disorders including asthma and allergic rhinitis, rural communities were more likely to be exposed to smoking and biomass fuel, which probably contributed to the higher burden of disease.

Medical therapy continued to be the mainstay of care for both groups, although there were clear differences in access to advanced care. Urban patients had better clinical outcomes because they were more likely to get surgical procedures and showed greater treatment and follow-up adherence. On the other hand, due to socioeconomic limitations, restricted access to healthcare, and low health knowledge, rural patients showed worse compliance and less favorable outcomes.

The study's overall findings emphasize the necessity of focused public health initiatives to alleviate the burden of CRS, especially in rural areas. To lessen the burden of disease and enhance patient outcomes, it is crucial to promote healthcare accessible, encourage early diagnosis, raise knowledge of risk factors, and ensure treatment protocol adherence. Larger population-based studies and the creation of specialized treatments to close the urban-rural divide in the treatment of chronic rhinosinusitis should be the main goals of future research.

References

1. Bachert C, et al. Adult chronic rhinosinusitis. *Nat Rev Dis Primers*. 2020.
2. Albu S. Chronic Rhinosinusitis—An Update. *J Clin Med*. 2020.
3. Sedaghat AR, et al. Epidemiology of CRS. *J Allergy Clin Immunol Pract*. 2022.
4. Rudmik L. Chronic rhinosinusitis: an under-researched epidemic. *J Otolaryngol Head Neck Surg*. 2015.
5. Zhang L, et al. Prevalence of CRS in Chinese population. *Front Public Health*. 2023.
6. Bachert C, et al. Pathophysiology of CRS. *Nat Rev Dis Primers*. 2020.

7. Mishra H, et al. Prevalence and risk factors in urban population. 2025.
8. Hassan A, et al. CRS in urban vs rural Lahore. Ann PIMS. 2024.
9. Garg D, et al. CRS in rural population. Int J Otorhinolaryngol. 2019.
10. BMJ Open study on CRS burden and management. 2019.
11. EPOS-based epidemiology studies. Ann Allergy Asthma Immunol. 2018.
12. Chinese CRS prevalence survey. 2015.
13. Studies on allergic rhinitis association with CRS.
14. Environmental exposure and CRS studies.
15. Socioeconomic determinants of CRS.