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Management and Outcome of Rhinosinusitis in Nigeria

Olushola Abdulrahman Afolabi, FWACS[1], Biodun Sulyman Alabi, FWACS[1], Habeeb Kayodele Omokanye, FWACS[1], Samuel O. Ayodele, MBBS[1], Segun Segun-Busari, FWACS[1], Adekunle D. Dunmade, FWACS[1], and Foluwasayo Emmanuel Ologe, FWACS[1]

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Abstract

Objective. The aim of this study is to present the management and outcome of treatment of rhinosinusitis in Nigeria.

Study Design. A retrospective review of the case notes of patients with rhinosinusitis between January 2009 and December 2014.

Setting. Study at the University of Ilorin Teaching Hospital, Nigeria, using retrieved case notes after ethical approval was received.

Subjects and Methods. The information retrieved included sociodemographic data, clinical presentation, duration, endoscopic examination, and other clinical management protocols with follow-up. All information was entered into SPSS version 20 and analyzed descriptively, and results are presented in tables and figure.

Results. A total of 5618 patients were seen in the ear, nose, and throat clinic over the 6-year period. Of the patients, 445 had rhinosinusitis, and only 410 had complete data for analysis. Patient age ranged from 2 to 75 years (mean ± SD, 31.8 ± 1.2 years). The male to female ratio was 1.2:1. The duration of symptoms varied from 3 days to 10 years, with 78.7% having symptoms between 3 and 120 months. About 82.4% had nasal discharge, 51.3% had sneezing, 78.9% had alternating nasal obstruction, and 49.3% had nasal itch. Of the patients, 61.4% had a predisposition, of which 30.9% were allergic, 23.3% were infective, and 7.2% were vasomotor. Ethmoidal-maxillary sinuses were commonly affected radiologically. About 63% of patients had medical treatment, and only 28.7% had surgical intervention, of which 37% were scheduled for surgical treatment and 7.3% refused. Improved symptoms were noticed in 72.6% of patients, and 1.4% reported no improvement.

Conclusion. Rhinosinusitis is still common, affecting active males economically with more chronic cases and more allergic predisposition. Early medical management is still effective, and endoscopic sinus surgery is now a better surgical option with better outcome in 72.6%.

Keywords

rhinosinusitis, management, outcome, chronic, acute

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Rhinosinusitis (RS) is an inflammatory process involving the mucosa of the nose and paranasal sinuses.[1] The proximity between the sinus cavities and the nasal passages, as well as their common respiratory epithelium, leads to frequent simultaneous involvement of both structures.[1]

RS is one of the most frequent otorhinolaryngology diseases encountered in everyday practice worldwide that affect quality of life, productivity, and finances.[2] It is thus a common enough medical condition but one in which the diagnosis and prognosis depend on symptoms, signs, clinical diagnosis, and radiologic evaluation.[2] Western literature has reported RS to be more prevalent than arthritis or hypertension, affecting between 5% and 15% of studied populations.[3] Other data suggest that chronic RS (CRS) affects certain general health

[1]Department of Otorhinolaryngology, University of Ilorin/University of Ilorin Teaching Hospital, Ilorin, Nigeria

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Corresponding Author:
Afolabi Olushola Abdulrahman, FWACS, Department of Otorhinolaryngology, University of Ilorin/University of Ilorin Teaching Hospital, PMB 1515, Ilorin, Nigeria.
Email: droaafolabi@yahoo.com

domains (social functioning, bodily pain) more than angina, chronic heart failure, chronic obstructive pulmonary disease, or chronic back pain.[4] According to a recent analysis of US National Health Interview Survey data, RS affects approximately 1 in 7 adults.[5] The number of workdays missed annually because of RS was similar to that reported for acute asthma (5.67 days vs 5.79 days, respectively), and patients with RS were more likely to spend greater than $500 per year on health care than were people with chronic bronchitis, ulcer disease, asthma, and hay fever (all $P < .001$).[6]

However, there are no available statistics for RS in Nigeria. It can be acute or chronic based on duration of symptoms. RS has been classified in various forms by various guidelines, including the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS),[1] Clinical Practice Guideline: Adult Sinusitis (CPG:AS),[7] Rhinosinusitis Initiatives (RI),[8] Joint Task for Practice Parameters (JTFPP),[9] and British Society for Allergy and Clinical Immunology (BSACI).[10] However, of the various subclassifications of RS, the simplest differentiation is based on duration of symptoms. Acute RS is defined by 3 of the guidelines (RI, JTFPP, and CPG:AS)[7-9] as symptom duration of 4 weeks or less.[7-9] The EPOS[1] and BSACI[10] guidelines qualify acute RS (ARS) as lasting less than 12 weeks, with complete resolution of symptoms. The CPG:AS[7] includes a category of subacute RS, defined as symptom duration between 4 and 12 weeks,[9] whereas the JTFPP[9] definition specifies 4 to 8 weeks. Recurrent ARS is classified by the CPG:AS[7] guidelines as 4 or more episodes of ARS within 1 year, without persistent symptoms between episodes.[10] The JTFPP defines recurrent RS as 3 or more episodes per year.[9] Four of the 5 guidelines (EPOS,[1] RI,[8] CPG:AS,[7] and BSACI[10]) designate CRS as symptoms persisting 12 weeks or longer, whereas the JTFPP[9] indicates 8 weeks based on the classification by symptomatology. Three major signs or symptoms that are consistently cited across all the guidelines as being primary diagnostic indicators for ARS are nasal congestion, obstruction, or blockage; anterior and/or posterior purulent rhinorrhea (EPOS[3,4] and BSACI[8] do not specify ''purulent''); and facial pain or pressure.[11] ARS is most commonly viral in origin, as seen in the common cold. The incidence of acute viral RS (AVRS) is extremely high, estimated to occur from 2 to 5 times per year in an average adult.[1] Secondary bacterial infection is thought to complicate only a very small percentage of cases (0.5%-2.0%).[1] Typical presentations include, but are not limited to, nasal discharge, nasal obstruction, excessive sneezing, smell abnormalities, headache, and halitosis.[12,13]

The aim of this study is to present the clinic-epidemiologic findings among our patients with RS and the management and outcome of treatment at the University of Ilorin Teaching Hospital (UITH).

Methods

Study Design

This was a retrospective review of the case notes of patients with a clinical diagnosis of ARS and CRS that satisfy the clinical guidelines seen by the otolaryngologist over a 6-year period from January 2009 to December 2014.

Setting

The study was carried out at the otolaryngology clinic of UITH, Ilorin, Nigeria; those with RS who satisfy the clinical guidelines were selected and reviewed.

Subjects and Methods

The case notes of patients with a diagnosis of RS based on the clinical guidelines were retrieved from the medical records of the hospital after approval from the ethical and research committee of the hospital. The information retrieved from the case notes included the sociodemographic data of the patients, including patient age, sex, occupation, tribe, marital status, and address. Other information retrieved included the clinical presentation of the patients; duration of disease; symptoms of disease, including allergic symptoms; endoscopic examination findings; diagnosis; radiologic investigation; treatment; and outcome of treatment with a maximum follow-up of 12 months.

Based on the EPOS[1] and BSACI[10] guidelines using the simplest differentiation of various forms of RS, we qualify ARS as lasting less than 12 weeks with complete resolution of symptoms, whereas CRS is considered to be longer than 12 weeks.[7-9]

The clinical diagnosis is based on the major and minor criteria set by the EPOS,[1] RI,[8] CPG:AS,[7] BSACI,[10] and JTFPP[9] guidelines.

X-rays of the paranasal sinuses and computed tomographic (CT) scans were requested as part of the investigation for these patients, as the CT scan is the mandatory radiologic investigation before any endoscopic sinus surgery is done, based on the recommendation of RI.[8]

All patients were commenced on medical treatment, including the use of oral antibiotics, nasal steroid spray, oral decongestants, nasal decongestants, and analgesics at their first presentation; however, surgical treatment in the form of the traditional bilateral intranasal antrostomy or unilateral intranasal antrostomy with or without nasal polypectomy, Caldwell-Luc, and endoscopic sinus surgery was offered to patients when there was no improvement after medical treatment or in the presence of nasal polyps.

Follow-up was initially every 2 weeks for the first 4 weeks, every 4 weeks for the next 2 months, every 2 months for the next 6 months, and then every 3 months for the next year. Patients were followed up at the outpatient clinic for nasal clearance, sometimes aided by hypertonic saline irrigation until the site of surgery was completely clear of nasal crusts. At each visit, documentation on the overall well-being of the patients was assessed subjectively. Upon resolution of symptoms, patients were discharged from follow-up and asked to call back whenever there was a recurrence of symptoms.

All of this information was entered into SPSS version 20 for analysis, and the results are presented in tables and figures.

Table 1. Demographic Data.

Age, y	Frequency (%)
1-10	16 (3.9)
11-20	69 (16.9)
21-30	128 (31.3)
31-40	104 (25.3)
41-50	54 (13.2)
51-60	27 (6.5)
61-70	08 (1.9)
71-80	04 (0.9)
Total	410 (100)

Table 2. Clinical Presentation and Findings.

Clinical Presentation	Frequency (%)
Nasal discharge	338 (82.4)
Nasal obstruction	324 (78.9)
Sneezing	210 (51.3)
Nasal itching	202 (49.3)
Postnasal drip	120 (29.4)
Headache	120 (29.4)
Loss of smell	100 (24.4)
Ear itch	31 (7.6)
Throat itch	80 (19.4)

Results

A total of 5618 patients were seen at the otolaryngology clinic of the hospital over the study period, and 445 patients were diagnosed with RS during the period under review, which constituted about 7.92% over a 6-year period (January 2009–December 2014) at UITH. However, only 410 of the 445 (92.1%) patients had complete data for analysis. The age range of the patients was 2 to 75 years, with a mean age of 31.8 years (SD, 13.4 ± 0.85 years). Young adults were mostly affected: 31.3% of those aged 21 to 30 years and 25.3% of those aged 31 to 40 years (**Table 1**). Males constituted 54.5%, while females constituted 45.5%, with a male to female ratio of 1.2:1. About 43.9% were single, 53.7% were married, 1.6% were widowed, and 0.8% were unreported. The clinical presentation was analyzed based on the symptoms with which the patients presented and the duration needed to classify whether the case was acute or chronic.

A symptoms-based diagnosis of RS was made if the patients had 2 major symptoms or 1 major and 2 minor symptoms. The 4 major symptoms were nasal obstruction/blockage/congestion, nasal discharge (anterior/posterior or postnasal drip, which may be purulent), facial pain/pressure (forehead/nasal/eye), and reduction or loss of smell, whereas the minor symptoms were headaches, fever (other than ARS), halitosis, fatigue, dental pain, cough, and ear pain/pressure/fullness, besides nasal endoscopy and/or CT scan.[6] Thus, 82.4% of the patients presented with nasal discharge, 51.3% had sneezing as part of their presenting complaints, postnasal drip was found in 29.4%, about 78.9% had recurrent nasal obstruction alternating from 1 nostril to the other, 49.3% had nasal itch as part of the presentation, and other allergic symptoms such as eye itch, throat itch, skin itch or allergic skin rashes, hacking, and ear itch were part of the presentation of 19% and, specifically, only 7.6% of the patients during the study period (**Table 2**). The duration of the symptoms varied from 3 days to about 10 years, and about 87 (21.3%) had the symptoms between 3 days and less than 12 weeks, while 323 (78.7%) patients had the symptoms from 3 months to 10 years.

The acute cases were about 21.3% of the cases reviewed, while chronic cases were about 78.7% based on the duration given above. The prevalence of acute cases was 1.6%, while that of CRS was 5.7%.

Table 3. Frequency table for Radiological Investigations and Findings.

Radiographic Investigation	Frequency (%)
Plain radiograph (x-ray)	49.7
Computed tomography (CT) scan	28.9
No evidence of radiologic investigation	21.4
Total	100
Radiologic Findings From X-rays/CT Scan	**Frequency (%)**
Ethmoidal-maxillary	173 (42.2)
Maxillary	85 (20.8)
Fronto-ethmoidal-maxillary	66 (16.1)
Appears normal	43 (10.5)
Fronto-ethmoidal	41 (10.0)

On the predisposing factor to the disease, 158 (38.6%) did not have a suspected predisposition, which is one of the deficiencies of the retrospective study. Only 61.4% had suspected predisposition documented, of which about 30.9% were of allergic origin based on nasal smear and associated dermatologic presentation such as skin itches. Of the cases, 23.3% were of infective origin from acute bacterial RS based on purulent nasal discharge, and 7.2% were of vasomotor origin based on the documented history and endoscopic examination of the patients from the case notes.

All of the patients had a radiologic request, which included x-rays and CT scan; however, only 78.6% had this done, while 21.4% did not do the investigation. Of the 78.6% who did the radiologic investigation, 28.9% were CT scan, while 49.7% were plain radiograph (x-ray) radiologic investigation (**Table 3**).

The pathology found on the radiologic investigations for both x-rays and CT revealed ethmoidal-maxillary opacification or density in 42.2% followed by maxillary density or

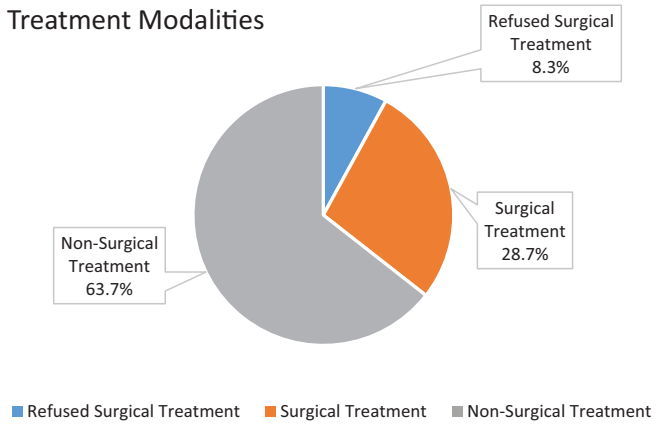

Figure 1. Treatment modalities.

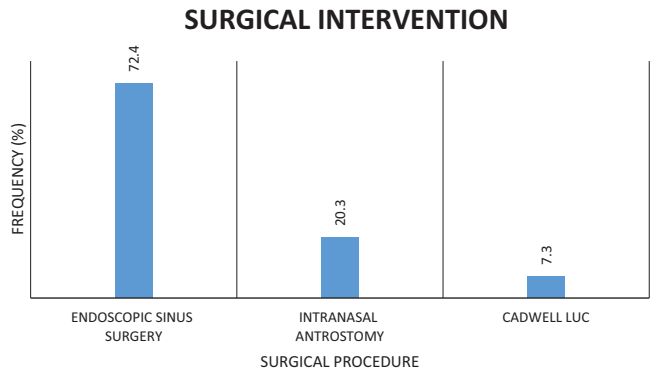

Figure 2. Surgical intervention.

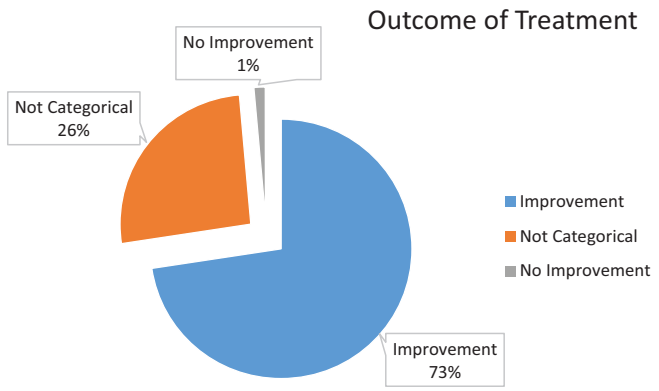

Figure 3. Treatment outcome among patients.

opacity in 20.8% of others, as shown in **Table 3**. The treatment modality for RS involves both medical and surgical treatment. All of our patients had medical treatment with the use of oral antibiotics, nasal steroid spray, oral decongestants, nasal decongestants, and analgesics; however, those who failed medical treatment and those with RS with nasal polyps had surgical intervention. About 63% had nonsurgical treatment alone, while 37% were scheduled to have surgical treatment modality; however, only 28.7% (118) had eventual surgical intervention, and 8.3% did not turn up for surgical treatment based on anecdotal evidence that they may have been satisfied with the medical treatment received (**Figure 1**). Of the 28.7% who turned up for surgery, only 85 (72.4%) had endoscopic surgery, 24 (20.3%) had traditional bilateral intranasal antrostomy, and only 9 (7.3%) had a Caldwell-Luc procedure for their disease (**Figure 2**).

Of the 63.1% who had nonsurgical treatment for resolution of their symptoms, all had antihistamine, systemic decongestant, and nasal decongestants with steam inhalation using eucalyptus oil and antibiotics combinations as part of their medications, while 15.1% had steroid nasal topical spray in addition to their medication. Most of the antibiotics were prescribed for 1 week and the other combination for between 3 and 4 weeks.

About 72.6% of the patients (both with surgical and nonsurgical intervention) reported improvement in their symptoms after the treatment, while about 26% were not categorical about their feelings as there was no documentation on the outcome of treatment during follow-up, and 1.4% said there was no improvement in their symptoms during the first and second clinic visit, which were at intervals of 4 to 6 weeks (**Figure 3**). About 27.2% were lost to follow-up after 4 to 6 months, after the third visit.

Discussion

CRS is a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses of at least 12 consecutive weeks or more[14] according to 4 of the 5 guidelines (EPOS, RI, CPG:AS, and BSACI),[7-10] which was the duration used in our study. It is one of the most common otorhinolaryngology diseases encountered in otorhinolaryngology practice worldwide, Nigeria inclusive, as it constituted about 7.92% of all cases seen over the study period. This figure is higher compared with that of another study conducted by Iseh and Makusidi[15] in northwestern Nigeria, who found a prevalence of 7.3%, slightly lower than our finding. However, our value falls within the range estimated by Hopkins et al[3] in 2007, who reported RS to be more prevalent than arthritis or hypertension, affecting between 5% and 15% of studied populations. The prevalence value found in our study is also lower when compared with the findings from the Global Allergy and Asthma European Network project (GA2LEN), which found 10.9% (6.9%-27.1%) for CRS based on the European Position Paper on Rhinosinusitis and Nasal Polyps (EPOS 2007 and 2012) criteria.[1,16] However, a comparative study by Ahsan et al[17] in 2004 among the populations of the north of Scotland and the Caribbean with RS reported a higher prevalence of 9.6% and 9.3% of CRS, respectively.

In our study, the modal age group for RS was found to be between 21 and 30 years, which is an active, productive age, and the lowest prevalence was at the extreme of ages, which may be due to nonpresentation to the facility. Our study found males to be more affected than females in the ratio of 1.2:1.0, which was similar to findings from a previous report by Iseh and Makusidi[15] in Sokoto, northwestern Nigeria.

Based on the set guideline, the chronic variety of RS was found to be more common in our study than the acute variety, with a prevalence of about 5.7% compared with a prevalence of 14.6% for ARS. There may be a progression of improperly treated acute cases that become chronic cases, as the total number of acute cases was about 21.3% compared with the chronic cases, which was 78.6%.

Our study revealed that the most common symptom at presentation was nasal discharge (82.4%) followed by nasal blockage (78.9%), as seen in **Table 2**. This was in contrast to an earlier report that found nasal congestion to be the most common symptom.[18]

From our study, the most commonly reported symptoms in CRS were nasal discharge in 82.4%, followed by nasal congestion/obstruction in 78.9%. These symptoms were accompanied by reduction or loss of olfaction and headaches in a small percentage of patients, while Soler et al[17] reported these minor symptoms as the most disabling.

The clinical diagnosis is based on the major and minor criteria set by the EPOS,[1] RI,[8] CPG:AS,[7] BSACI,[10] and JTFPP[9] guidelines as stated above.

In our study, we found the inflammatory response to be secondary to allergy in about one-third (30.9%) of the patients, followed by infection, which may be bacterial, as seen in a previous study from our center in which *Staphylococcus aureus* was found.[19] The least was the vasomotor type; this is similar to a study in southwestern Nigeria that found allergy as the leading predisposition,[20] in contrast to south-south Nigeria, in which about 72.7% were of infective origin,[21] while a similar study by Iseh and Makusiki[15] in Sokoto in northwest Nigeria also revealed two-thirds (67.1%) are of infective origin. However, there were no cases due to trauma.[1] The JTFPP document recommends that patients with recurrent RS or CRS should be evaluated for underlying allergy.[11] The EPOS[1] guidelines recommend questioning patients with regard to allergies and doing further testing in patients with a history of allergy. From previous literature, as many as 60% of patients with CRS have substantial allergic sensitivities, primarily to perennial allergens, such as house dust mites, cockroaches, pet dander, and fungi. The BSACI guidelines recommend skin prick testing in all cases of RS; however, it is noted that results should be interpreted in light of clinical history, which was used in our study.

Maxillary sinus was found to be the most commonly affected sinus in our study based on radiologic evidence, as seen in **Table 3**, and this is not different from previous studies done both within and outside Nigeria.[22-25]

The principles of management of CRS include removal of the obstructive pathology with restoration of ventilation of the paranasal sinuses.[26] In this study, medical treatment alone with the use of steam inhalation, systemic antibiotics, nasal steroid spray, systemic decongestant (antihistamine), nasal decongestants, and analgesics was successfully used to treat 63.1% of cases. Some of those patients with allergy and allergic nasal polyposis also had steroid therapy, while a few had endoscopic sinus surgery. The use of steroids in the treatment of nasal polyps has been reported.[26-28] All patients in our study had initial medical treatment with the above regimen before surgical intervention. Surgical management of CRS was indicated when there was failure of medical treatment and when there was an obvious growth seen endoscopically or anatomical abnormalities within the nasal cavity preventing drainage and aeration of the sinuses.[29] In our study, of the 37% (152 patients) scheduled to have surgical intervention, only 28.7% (118 patients) presented for surgery, as seen in **Figure 1**. About 72% (85 patients) of those scheduled for surgery had endoscopic sinus surgery, as seen in **Figure 2**. The goal of this procedure is to reestablish the patency of the paranasal sinuses natural ostia for aeration and drainage, thus bringing about a reversal of the damaged sinonasal mucosa to a normal state.[30,31] About 20% (24.0) of those who had surgery had bilateral intranasal inferior meatal antrostomy. This surgical procedure is usually performed with the intention of providing dependent drainage for the maxillary sinus, which is believed to be the site commonly affected by the disease, although this has been disproved. This procedure is justified as about 70% to 80% of the pathology radiologically was found in maxillary and ethmoids sinuses, which were the anterior groups of the paranasal sinuses.

About 27.2% of the patients were lost to follow-up, and of the 73% who had follow-up for at least 12 months, about 72.6% reported a significant improvement in their symptoms; the majority are from among those who had endoscopic surgery (29.7%), while about 26% of them were not categorical based on the documentation and 1.4% said their symptoms worsened, as documented in **Figure 3**.

Conclusion

The clinical presentation of RS is similar to what previous researchers have presented; however, allergy still constitutes the highest predisposition in our environment. Medical treatment has had a significant impact on treatment, and the current surgical treatment of endoscopic sinus surgery based on anatomical understanding is an improvement on the outcome. The need for improved surgical intervention is needed.

Author Contributions

Olushola Abdulrahman Afolabi, substantial contributions to the conception or design of the work, drafting of the work, data analysis, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved, final approval of the version to be published; **Biodun Sulyman Alabi**, final approval of the version to be published data analysis, drafting of the work, agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; **Habeeb Kayodele Omokanye**, drafting the work, revising the work critically for important intellectual content, agreement to be accountable for all aspects of the work, data analysis, final approval of the version to be published; **Samuel O. Ayodele**, data acquisition, design of the work, data analysis or interpretation of

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