

Prevalence and clinical presentation of sinusitis in pediatric age group in Aseer, Saudi Arabia

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ABSTRACT

Background: Paediatric rhinosinusitis is mostly different than that in adults. More frequently, children presented with cough, bad breath, crankiness, low energy, and swelling around the eyes, besides a thick yellow-green nasal or post-nasal discharge. About 5-13% of childhood viral upper respiratory tract infections may advance to acute rhinosinusitis, with some of them developing a chronic condition. **Aim:** To assess prevalence and clinical presentation of sinusitis in the paediatric age group in Aseer, Saudi Arabia. **Methodology:** A retrospective record-based study was conducted in Abha Maternity and Children Hospital in Abha city, Saudi Arabia between January 2015 and January 2018. All medical records during the study period for children whose from to 15 years old attended the hospital and diagnosed as having sinusitis were included. **Results:** The study included 100 children with complete files whose ages ranged from less than 1 year to up to 13 years old with a mean age of 5.3 4.2 years. Nearly 51% of the children aged 4 years or less and male were 53 (53%). Past history for chronic rhinosinusitis (CRS) was positive among 30 children. Regarding clinical presentations of rhinosinusitis (RS) as reported by the children caregivers, fever was the most reported complaint (50%) followed by red eye (44%), ringing nose (42%), cough (41%) and headache (36%). Mucous culture was positive among 58 cases. The most isolated pathogens were streptococcus pneumoniae (45.6%), Haemophilis influenza (24.6%). **Conclusions:** In conclusion, the study revealed that CRS is a common disease in children at different ages, especially, maxillary and frontal sinuses. In most of the cases, medical treatment is highly appreciated; though, surgical intervention may be needed in a small percentage.

Keywords: Children, clinical, manifestations, paediatric, prevalence, rhinosinusitis, sinusitis

Background

RS is an inflammation of the nasal and paranasal sinuses. RS is a more accurate term than “sinusitis” as it is mostly associated with symptoms of rhinitis.^[1,2] According to the duration of clinical symptoms, RS is classified into acute (up to 1 month), subacute (1-3 months) or chronic (more than 3 months).^[3]

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Paediatric RS is mostly different than that in adults. More frequently, children presented with cough, bad breath, crankiness, low energy, and swelling around the eyes, besides a thick yellow-green nasal or post-nasal discharge.^[4-6] About 5-13% of childhood viral upper respiratory tract infections may advance to acute rhinosinusitis, with some of them developing a chronic condition.^[7,8] The reliability of the ostiomeatal complex is most important for sinus health. Usually, sinusitis starts after ostial obstruction. This obstruction causes a negative pressure in the sinus, resulting in fluid seepage into the sinus. This fluid is a favourite culture media which is easily infected. With injury of

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the lining cilia, mucus production is increased with infection of one or more sinuses.^[9,10] Anterior rhinoscopy usually shows hypertrophied, red, and inflamed inferior turbinate, nasal polyp, or pus at middle meatus. Nasal endoscopy may, however, be difficult in younger and uncooperative patients for nasal visualisation. Adenoidal hypertrophy, foreign bodies, and other obstructions can also be reported.^[11] CRS can lead to eye or meningeal/brain infections. These mixed infections have high morbidity and require urgent surgical interventions.^[12,13]

In most cases, children develop viral sinusitis (or a viral upper respiratory infection) that may improve by symptomatic treatment, but antibiotics can be recommended in severe cases of bacterial sinusitis.^[14] In a rare child where medical therapy fails, surgery can be used as a safe and effective method of treating sinus disease in children.^[15] The current study aimed to assess the epidemiological pattern, clinical presentations, and types of sinusitis among paediatric age group, Aseer region, Saudi Arabia.

Methodology

A retrospective record-based study was conducted in Abha Maternity and Children Hospital in Abha city, Saudi Arabia between January 2015 and January 2018. All medical records during the study period for children whose age one month to 15 years old attended the hospital and diagnosed as having sinusitis were included. Data were extracted from files using pre-structured data extraction sheet for standardisation to avoid errors in data extraction by reducing interrater bias. Personal information about detailed complain, such as fever, headache, pain, nose obstructions and mucous discharge and investigation like the result of mucous culture, will be taken from the patient's files by using data sheet.

Data analysis

After data were extracted, it was revised, coded, and fed to statistical software IBM SPSS version 22(SPSS, Inc., Chicago, IL). All statistical analysis was done using two-tailed tests. *P* value less than 0.05 was statistically significant. Descriptive analysis based on frequency and percent distribution was done for all variables including demographic data, clinical presentation, and sinus related infection. Cross-tabulation was used to assess distribution of sinus infection site with the children's personal and medical data. Relations were tested using the exact probability test (due to small frequencies in cross-tabs).

Results

The study included 100 children with complete files whose ages ranged from less than 1 year up to 13 years old with a mean age of ± 5.3 4.2 years. Nearly 51% of the children were aged 4 years or less and male children were 53 (53%). Past history for CRS was positive among 30 children (30%) and 38 (38%) had a positive family history [Table 1].

Regarding clinical presentations of RS as reported by the children's caregivers, Figure 1 illustrates that fever was the most

reported complaint (50%) followed by red eye (44%), ringing nose (42%), cough (41%), headache (36%), and fatigue (30%). Nasal discharge and difficulty in breathing were the least recorded presentations.

Table 2 demonstrates clinical findings of sinusitis among the paediatric age. Mucous culture was positive among 58 cases. The most isolated pathogens were streptococcus pneumoniae (45.6%), Haemophilus influenza (24.6%), Moraxella Catarrhalis (15.8%), and Group A streptococcus (8.8%) and Group B streptococcus (5.3%). As for site of sinusitis, maxillary sinus was affected among 66% of the children and frontal sinus among 34%.

Table 3 shows the distribution of personal bio-clinical factors according to the affected child sinus. Exactly 34.8% of children aged 1-4 years had maxillary sinusitis followed by 27.3% of those aged less than 1 year. On the other hand, 41.2% of children aged 10-13 years had frontal sinusitis followed by 29.4% of those who aged 5-9 years. These differences were found to be statistically significant (*P* = 0.019). With regard to clinical presentation, 59.1% of those with maxillary sinusitis had fever followed by 45.5% of

Table 1: Personal data of children with sinusitis, Aseer, Saudi Arabia

Personal data	No	%
Age in years		
<1	23	23.0%
1-4	28	28.0%
5-9	22	22.0%
10-13	27	27.0%
Gender		
Male	53	53.0%
Female	47	47.0%
History of sinusitis		
Yes	30	30.0%
No	70	70.0%
Family history of sinusitis		
Yes	38	38.0%
No	62	62.0%

Table 2: Clinical findings of sinusitis among paediatric age, Aseer, Saudi Arabia

Clinical findings	No	%
Mucous culture results		
Positive	58	58.0%
Negative	42	42.0%
Pathogen		
Group A streptococcus	5	8.8%
Group B streptococcus	3	5.3%
Haemophilus influenza	14	24.6%
Moraxella Catarrhalis	9	15.8%
Streptococcus pneumoniae	26	45.6%
Site of sinusitis		
Frontal sinusitis	34	34.0%
Maxillary sinusitis	66	66.0%

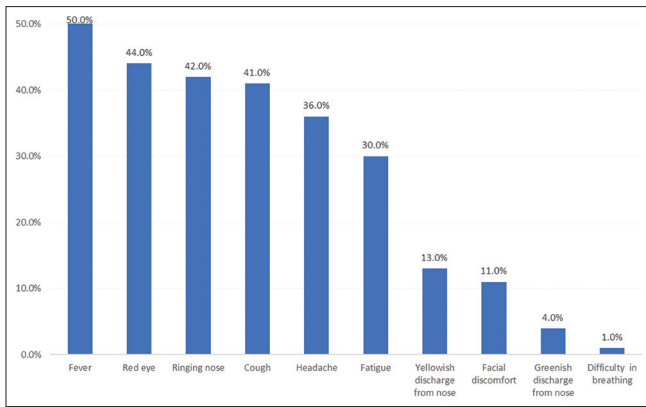


Figure 1: Clinical presentation of sinusitis among paediatric age in Aseer, Saudi Arabia

cough, and red eye (42.4%). On the other site, 55.9% of children with frontal sinusitis and headache followed by red eye (50%), and ringing nose (41.2%) recorded statistical significance ($P = 0.011$).

Discussion

Rhinosinusitis in paediatric age may coexist and/or be worsened by other common disorders such as allergic rhinitis and adenoid disease.^[16-18] Some evidence regarding the incidence of Pediatric Chronic Rhino sinusitis may be rising.^[19] Besides, CRS has a significant impact on quality of life^[20] with its associated adverse effects possibly higher than those of chronic respiratory and arthritis diseases.^[21] CRS also has the potential to exacerbate asthma,^[22] a condition that negatively affects 2- 20% of children.^[23,24]

The current study aimed to assess the pattern, clinical presentation, and factors associated with rhinosinusitis among paediatric age group in Aseer region, Saudi Arabia. The study revealed that more than half of the children with rhinosinusitis were males (53%), aging 4 years or less with positive family history for rhinosinusitis among one-third of them. Regarding clinical manifestations, fever was the most reported symptom followed by red eye, ringing nose, cough, and headache with fatigue. These are consistent with most literature-reported clinical manifestations of CRS.^[25-27] Clinical manifestations were different according to the affected sinus. In the case of frontal rhinosinusitis, the most reported clinical manifestations were headache, red eye, ringing nose, and fever. In case of maxillary rhinosinusitis, the most reported clinical manifestations were fever, cough, red eye, and fatigue. Also, clinical presentation was different according to the child's age. Considering clinical findings, mucous culture was positive among more than half of the children (58%). This was consistent with the reports of Gwaltney Jr *et al.*^[28] and Wald ER. *et al.*^[29] The most isolated pathogens were streptococcus pneumonia, Hemophilus influenza, Moraxella Catarrhalis, Group A streptococcus, and Group B streptococcus. These are the most identified causes of bacterial rhinosinusitis among children and adults.^[30-32] The most affected sinuses were maxillary sinus (among two-thirds of the children) and frontal sinus (the other third). Frontal sinusitis was

Table 3: Distribution of personal bio-clinical factors according to affected child sinus

Factors	Site of sinusitis				P
	Frontal sinusitis		Maxillary sinusitis		
	No	%	No	%	
Gender					0.201
Male	15	44.1%	38	57.6%	
Female	19	55.9%	28	42.4%	
Age in years					0.019*
<1	5	14.7%	18	27.3%	
1-4	5	14.7%	23	34.8%	
5-9	10	29.4%	12	18.2%	
10-13	14	41.2%	13	19.7%	
Pathogen					0.166
Group A streptococcus	1	5.9%	4	10.0%	
Group B streptococcus	1	5.9%	2	5.0%	
Haemophilus influenza	7	41.2%	7	17.5%	
Moraxella Catarrhalis	4	23.5%	5	12.5%	
Streptococcus pneumoniae	4	23.5%	22	55.0%	
Clinical presentation					0.011*
Cough	11	32.4%	30	45.5%	
Headache	19	55.9%	17	25.8%	
Ringing nose	14	41.2%	28	42.4%	
Red eye	17	50.0%	27	40.9%	
Difficulty in breathing	0	0.0%	1	1.5%	
Fever	11	32.4%	39	59.1%	
Yellowish discharge from nose	5	14.7%	8	12.1%	
Greenish discharge from nose	0	0.0%	4	6.1%	
Facial discomfort	6	17.6%	5	7.6%	
Fatigue	9	26.5%	21	31.8%	

P: Exact probability test. * $P < 0.05$ (significant)

mainly among female children while maxillary was among males with no statistical significance. Also, frontal sinusitis was reported more among old children while maxillary was more among young children (4 years or less). Streptococcus pneumoniae was the most isolated pathogen among maxillary sinusitis cases while Haemophilus influenza was the most isolated among frontal sinusitis cases.

Even though the acute form of RS is mainly caused by a single microbe, multiple microorganisms feature in the chronic form.^[33,34] The latter microbes usually reveal antimicrobial resistance and create a therapeutic difficulty for the practising physician.^[35] The clinical presentation of acute bacterial rhinosinusitis and prolonged viral upper respiratory infection are similar, which can lead to a misdiagnosis of acute bacterial rhinosinusitis. So, the primary care physicians may be advised to use antibiotics in patients with presentation of acute rhinosinusitis which do not get well within 7 days or which worsen in severity of pain or a body temperature of 38.3°C or more and in immunocompromised patients.^[36] Fungi often coinhabit chronically infected sinuses with extreme difficulty to eradicate.^[37] Utmost medical therapy frequently fails, and surgical interventions are required.^[38,39] This increases

healthcare costs. Hence, early detection and prompt and appropriate treatment of rhinosinusitis could possibly avert CRS and its individual and societal burden.

In summary, all people with risk factors will get chronic sinusitis, but they can lower the risk of chronic sinusitis by many procedures including avoiding known allergens, avoiding touching eyes, nose and mouth, which can transmit bacteria, viruses and fungi from contaminated hands, especially, children's hands, into nose and sinuses, causing acute sinusitis, seeking regular medical care and treatment for asthma, hay fever, and allergic rhinitis. Asthmatic children showed higher rates of rhinosinusitis but also showed proper response to medical treatment.

Conclusions and Recommendations

In conclusion, the study revealed that CRS is a common disease in children at different ages especially maxillary and frontal sinuses. In most of the cases, medical treatment is highly appreciated; though, in a small percentage, surgical treatment may be needed, specifically, in children with asthma. Proper patient selection, counselling, and follow-up care is essential for a favourable outcome and minimising social and economic burden.

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Conflicts of interest

There are no conflicts of interest.

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