DETERMINATION OF PREVALENCE AND CAUSES OF SINUSITIS IN PEOPLE EXAMINED AT THE EAR NOSE THROAT HOSPITAL OF THE CENTRAL REGION, 2022

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Abstract: The study was conducted to determine the prevalence of sinusitis and the rate of bacterial, fungal and allergic sinusitis among the people examined at the Ear Nose Throat Hospital of the Central Region in 2022.The study was designed using descriptive research method.The prevalence of sinusitis in people who came for examination was 25.27% (379/1500), including 47.50% (180/379) with bacterial sinusitis, 18.20% (69/379) with fungal sinusitis, and 34.30% (130/379) with allergic sinusitis. The rate of sinusitis in males and females was 42.28% (183/379) and 57.72% respectively. Those people aged from 18 to 60 were the most infected, accounting for 83.90%, followed by those doing freelance jobs (70.98%). Some risk factors included chronic nasopharyngitis (OR = 7.99: 3.36 – 9.32), history of otitis media (OR = = 3.51: 1.76 – 5.35). No association between allergy and sinusitis was found (OR = 0.23: 0.16 -1.53). The rate of sinusitis in women was higher than that in men, in which bacterial sinusitis accounted for the largest proportion and commonly seen in the age group of 18 to 60. Related factors included chronic nasopharyngitis and history of otitis media.

Keywords: Sinusitis, bacteria, fungi, allergy

1. Introduction[1]

Sinusitis is a very common disease in Vietnam, the highest incidence in the age group 31-60, the rate of sinusitis in men is higher than in women, the cause can be caused by bacteria, fungi, and allergies. [first]. Typical clinical manifestations such as runny nose, nasal discharge followed by pus or purulent discharge change color, patients often have nasal congestion and may lose their sense of smell, face pain, and multi-eyes. Some other symptoms may be such as headache, toothache, cough, fever..The cause of sinusitis may be due to obstruction of the sinus opening, dysfunction of the cilia, thickened sinus secretions, possibly due to sinusitis. Cystic fibrosis. Diagnosis of sinusitis is based on the above clinical symptoms on physical examination and on laboratory tests such as: Increased number of bacteria in sinus fluid > 10 CFU/ml, fresh microscopy in KOH20% medium to identify bacteria. fungus in the sinus fluid; Elevated CRP levels > 60 µg /ml can be based on blood tests . Today, CT scan techniques give positive results in diagnosis, showing the degree of air fluid, inflammatory opacity, and thickness of the sinus mucosa > 5 mm. Some medical facilities have widely applied the MRI technique to provide more detailed images of the extent of sinusitis [1], [2].

In the North Central provinces in recent years, the incidence of sinusitis tends to increase and there has not been any research on the cause of sinusitis. Therefore, the

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study to determine the cause of sinusitis is necessary, we carried out the topic: *Study the rate, determine the causative agent of sinusitis in patients at the Central Hospital of Otolaryngology (ENT) 2022*), aims to: Determine the rate of sinusitis, the rate of bacterial, fungal and allergic sinusitis in humans at the Central Hospital of Otolaryngology 2022.

2 Research Methods

2.2.1. Subjects, place and time of the study

- *Subjects of the study:* Patients who came to the examination and treated for sinusitis, agreed to participate in the study.

- *Research location:* At the Central Hospital of Ear, Nose and Throat.

- *Research period:* From January 1, 2022 to December 31, 2022.

2.2.2. Research Methods

- Research design: The study was designed by descriptive and analytical research.

- *Research sample size:*

- *Study sample size:* Apply the formula to calculate the minimum sample size for a prevalence [3]:

$$n = Z^2_{1-\alpha/2} \frac{1-p}{p\varepsilon^2}$$

In there:

p: Is the rate of sinusitis in people who come to the sinus clinic, because there is no statistical study on the rate of sinusitis/ people who come to the sinus examination, we choose p = 0.50.

$Z_{1-\ a/2}$: Reliability coefficient, corresponding to 95% confidence, then $Z_{1-a/2} = 1.96$;

ε: Desired relative error choose ε = 0.11, plus 15% dropped out of the study, the calculated sample size was 366, actually doing the study in 379 patients.

- *Sampling method :* Select 379 people who meet the criteria for diagnosis of sinusitis in 2022. The diagnostic criteria include:

+ Have a history of sinusitis;

+ Physical examination with clinical symptoms of sinusitis;

+ There are microbiological test results to identify bacteria, fungi and CT scan results.

- *Research content:* Rate of sinusitis patients/total number of patients visiting the hospital; Rate of sinusitis by gender, age, and occupation; The rate of sinusitis by bacterial and fungal etiology, the rate of allergic sinusitis; Prevalence of sinusitis according to geographical distribution ...

Techniques used in the study:

Gram staining technique to determine bacterial etiology; Fresh scanning technique in KOH20% medium to identify fungal infections; CT scan, magnetic resonance imaging ...

2.3. Data analysis and processing methods

Statistical analyzes were performed using SPSS software version 16.0. For continuous variables, t-Student test or Pearson correlation, determine the odds ratio OR analyze the relationship between risk factors and sinusitis [4].

2.4. Error and error limit

Ensure sufficient minimum sample size in the study; The research standards are clear. Perform well in screening, selecting patients into the research sample [4] .

2.5. Ethics in research

Have a complete ethical record in research; Ensure commitment to the obligations and responsibilities of the researcher and the rights of research participants. Study in volunteers only.

3. Research results

3.1. The incidence of sinusitis

In 2022, 1500 people came to check for sinusitis, through microbiological tests to determine the cause of bacteria, fungi, allergies and tomography, 379 people with sinusitis were identified as eligible for surgery combined with medical treatment. , the rate of general sinusitis and sinusitis according to the following factors:

3.1.1. Sinusitis incidence/total number of people who come to the clinic

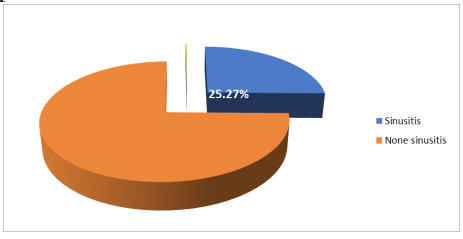

Figure 3.1. Overall incidence of sinusitis

A total of people came to clinical examination and were tested for bacteria, fungi and tomography. As a result, there were 379 people (+) out of 1500 people who examined the sinuses, accounting for 25.27%.

3.1.2. The incidence of sinusitis

379 is the number of patients with identified causes of sinusitis caused by bacteria, fungi and allergies. For patients with allergic sinusitis, including sinusitis patients with allergic aetiology and septal deviation, in this study we collectively call them allergic sinusitis. All 379 patients with sinusitis were indicated for sinus surgery in 2022, the results were as follows:

Table 3.1. Rate of sinusitis by bacteria, fungi, allergies (n = 379)

Causes of sinusitis	Test results determine the cause of sinusitis fracture		
	Quantity	Ratio (%)	p . value
Bacterial (1)	180	47.50	(1, 2: 3) < 0.05
Caused by fungi (2)	69	18.20	
Due to allergies (3)	130	34.30	
Total	379	100.00	

Sinusitis caused by bacteria and allergies accounts for a higher rate than sinusitis caused by fungi. There was a statistically significant difference in the rate of bacterial and allergic sinusitis compared with the rate of fungal sinusitis: 47.50% versus 18.20% and 34.30, $p < 0.05$.

Table 3.2. Rate of sinusitis by sex (n = 379)

Sex	Sinusitis		
	Quantity	Percentage (%)	p . value
Male (1)	183	42.28	(1: 2) < 0.05
Female (2)	196	57.72	
Total	379	100.00	

The rate of sinusitis in women is higher than in men, this difference is statistically significant, 42.78% compared with 57.22%, $p < 0.05$.

Table 3.3. Rate of sinusitis by age group (n = 379)

Age group	Sinusitis		
	Quantity	Ratio (%)	p . value

< 18 (1)	7	1.84	(2: 1, 3) < 0.05
18 – 60 (2)	318	83.90	
> 60 (3)	54	14.26	
Total	379	100.00	

The highest prevalence of sinusitis was in the age group of 18-60, accounting for 83.90%. Statistically significant difference in the rate of sinusitis in the age group 18-60 compared with the rate of sinusitis in the age group <18 and >60, with values of 83.90% versus 1.84% and 14, respectively. 26%, with $p < 0.05$.

Table 3.4. Rate of sinusitis by occupation

Job	Sinusitis		
	Quantity	Ratio (%)	p . value
Freelance (1)	269	70.98	(1: 2, 3, 4) < 0.05
Teachers, students (2)	24	6.33	(2: 3, 4) > 0.05
Workers, the poor, the armed forces (3)	62	16.36	
Retirement (4)	24	6.33	
Total	379	100.00	

Statistically significant difference in the prevalence of sinusitis in the freelance community compared with the occupations of teachers, workers, pensioners 70.98% compared with 6.33%, 16.36% and 6.33%, with $p < 0.05$

3.2. Some factors associated with sinusitis

Through making 2x2 tables, calculating the odds ratio OR analyzing a number of factors related to sinusitis, the results are as follows:

Table 3.5. The relationship between frequent inflammation of the nose and throat with sinusitis

Inflammation of the nose and throat	**Inflammation of the nose and throat**		**Total**
	Have sinusitis	**No sinusitis**	
Have nasopharyngitis	205	144	349
No nasopharyngitis	174	977	1151
Total	379	1121	1500
OR value, 95%CI:	7.99: 3.36 – 9.32		

There is a relationship between frequent nasopharyngitis and sinusitis, (OR = 7.99: 3.36 – 9.32). People who often get nasopharyngitis have a 7.99 times higher risk of sinusitis than people who do not often get nasopharyngitis.

Table 3.6. Relationship between history of otitis media and sinusitis

History of otitis media	**Inflammation of the nose and throat**		**Total**
	Have sinusitis	**No sinusitis**	
Have otitis media	150	177	327

No otitis media	229	944	1173
Total	379	1121	1500
OR value, 95%CI:	3.51: 1.76 – 5.35		

There is a relationship between a history of otitis media with sinusitis (OR = 3.51:1.76 – 5.35). People with a history of otitis media have a 3.51 times higher risk of sinusitis than people without a history of otitis media.

Table 3.7. The relationship between allergies and sinusitis

Allergies	Inflammation of the nose and throat		Total
	Have sinusitis	No sinusitis	
Have allergies	130	120	250
No allergies	249	1001	1250
Total	379	1121	1500
OR value, 95%CI:	0.23: 0.16 – 1.53		

No association was found between atopy and sinusitis (OR = 0.23: 0.16 -1.53)

4. Discuss

4.1. The incidence of sinusitis

Vietnam is a country with a hot and humid climate, monsoons, lots of rain, seasonal variations in air humidity, and climate and weather factors are very favorable for bacteria and fungi to develop as well as to survive diseases. allergy. On the other hand, in the Central region, the socio-economic life and sanitary conditions of the people are still limited, so the rate of sinusitis in the community is relatively high. The results of our study showed that the rate of sinusitis (+)/total number of people who came to clinical examination and were tested for bacteria, fungi and tomography was 25.27% (379/1500). 18-60 years old accounted for 83.90%. This result is also consistent with the literature [1] and with many domestic authors such as Nguyen Nhu Dua (2021) aged 18 - 50 accounting for 93.53% [2], however the results of this study are low. than the results of Hoang Hai Son (2022) in a study on military subjects stationed on the islands of Quang Ninh province, the rate of sinusitis was 47.2% [5]. Our study found that the incidence in Females were higher than males (57.22% vs 42.78%$p < 0.05$), while the results of Nguyen Nhu Dua's study showed that the prevalence was higher in males than females (97.27% in males compared with males). with 0.73% in women, $p < 0.05$). This is completely consistent when our study is all people who come to the hospital, including all ages and occupations while Nguyen Nhu Dua only studies in coal mine workers, laborers in a hospital. particular environment [2].

4.2. Factors associated with sinusitis

Research results show that several factors associated with sinusitis including frequent nasopharyngitis with sinusitis, (OR = 7.99: 3.36 – 9.32), history of otitis media with sinusitis (OR = = 3.51:1.76 – 5.35). The relevant factors in our study have been identified that are also consistent with the medical literature and with some studies of the authors Pham Thuy Linh (2020) [6] but this result is different from the study. In the research of Nguyen Nhu Dua, the author has identified a number

of factors related to sinusitis such as the concentration of total dust, respiratory dust, containing CO_2, CO, SO_2, NO_2, exceeding the allowable standards and workers. Working in a hot and humid environment. The author has determined that there is a linear relationship between microclimate factors and sinusitis with $R^2 = 0.658$ [2] , this conclusion of Nguyen Nhu Dua is different from our study. No association was found between allergies and sinusitis (OR = 0.23: 0.16 -1.53).

5. Conclusions

The rate of sinusitis in women is higher than that in men, the age group from 18 to 60 accounts for the majority (83.90%), bacterial sinusitis accounts for the highest rate (47.50%), factors related to the condition Sinusitis includes frequent nasopharyngitis and a history of otitis media.

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