Sinusitis

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ABSTRACT:

Objective: This study aims to provide a comprehensive understanding of sinusitis with its risk factors and clinical presentation.

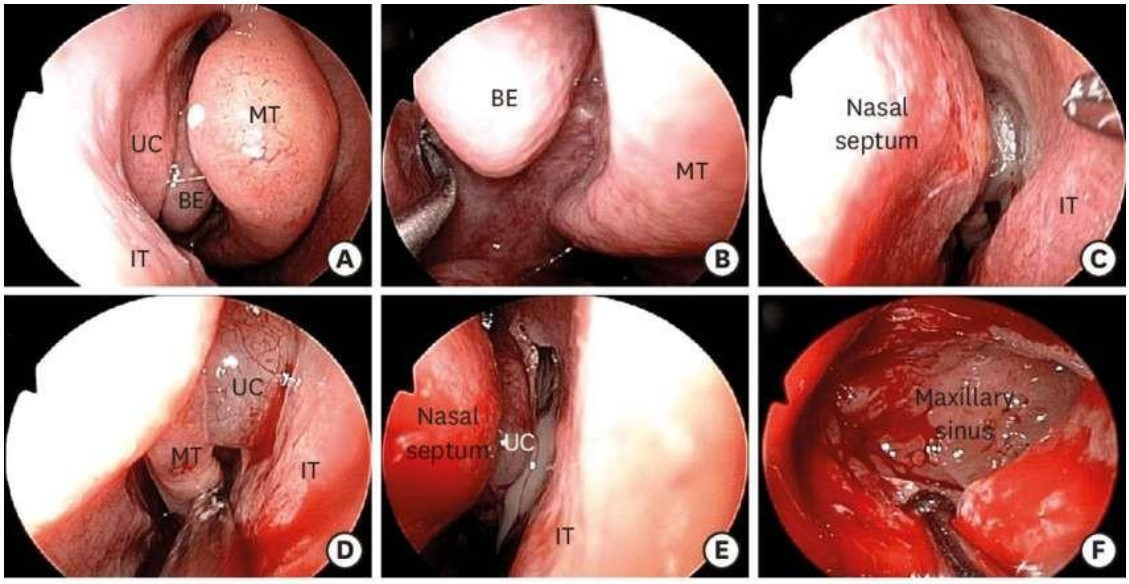
Material and Methods: a cross-sectional study advocated in Ba'qubah General Teaching Hospital we evaluated 72 from September 2023 to February 2024 Who had Acute, subacute, chronic and recurrent sinusitis

Results: 33males (45.833%) and 39 females (54.167%) the age group of 12-30 y most common, 67%, facial pressure (82.353%) is the common presenting sympyoms, 84.722% had positive radiological results The majority (80.556%%) of patients were students. And 88.732% had reported that their symptoms lasted for 20 days

Conclusion: The study showed typical expected results for age and symptoms and various results for the other parameters

1. INTRODUCTION

Sinusitis , commonly known as Rhinosinusitis, is a prevalent inflammatory condition that affects millions of individuals worldwide. It occurs when the paranasal sinuses, which are air-filled spaces in the skull, become inflamed and congested with mucus. This can lead to a range of bothersome symptoms, including facial pain, headaches, nasal congestion, and breathing difficulties [1, 2]. There is poor correlation between symptoms and imaging findings of chronic sinusitis and that endoscopically diagnosed chronic sinusitis may lack imaging correlation as the mucosa is best appreciated on endoscopy [36] . An important findings on CT sinuses is sclerotic thickened bone (hyperostosis) could cause a prolonged mucoperiosteal reaction [33,37] . Intrasinus calcification may be present. The presence of opacification is not good discriminator from an acute sinus infection.



Picture 4[36] showed A case of functional endoscopic sinus surgery in a patient with left maxillary sinusitis. The normal endoscopic findings of the right nasal cavity (A) and the natural ostium of the right maxillary sinus probed with a maxillary ostium seeker (B). The left nasal cavity exhibits a nasal septal deviation to the left side (C), and the polypoid uncinate process of the ethmoid is shown blocking the natural ostium of the left maxillary sinus (D). The endoscopic finding after cutting the lateral side of the uncinate process of the ethmoid; a purulent discharge was observed (E). The endoscopic finding after widening of the left maxillary sinus (F). A 0° endoscope was used in Figure 2A-E. A 70° endoscope was used in Figure 2F. IT: inferior turbinate, UC: uncinate process of the ethmoid, BE: bulla ethmoidalis, MT: middle turbinate.

1.1 ETIOLOGY

Sinusitis, or rhinosinusitis, can have various causes [6, 13, 15, 22]

1. Viral Infections: The majority of acute sinusitis cases are caused by viral infections, such as the common cold or influenza. Viruses can inflame the sinus lining, cause congestion and mucus buildup.

2. Bacterial Infections: can occur secondary to viral infections or as primary infections. Bacteria cause sinusitis include Streptococcus pneumonia, Haemophilus influenzae, and Moraxella catarrhalis. Bacterial sinusitis is more likely to occur in individuals with weakened immune systems or in cases of prolonged sinus congestion.

3. Allergies: Allergic rhinitis, commonly known as hay fever, can contribute to the development of sinusitis. When a person with allergies is exposed to allergens such as pollen, dust mites, or pet dander, the body's immune response can cause inflammation and increased mucus production in the sinuses.

4. Structural Abnormalities: can obstruct proper drainage and ventilation, leading to recurrent or chronic sinusitis, eg: deviated nasal septum, nasal polyps, or narrow sinus openings.

5. Nasal Obstructions:This can include nasal tumors, foreign bodies lodged in the nose, or even excessive nasal congestion due to colds or allergies.

6. Dental Infections

7. Environmental Factors: like air pollution, exposure to irritants (e.g., cigarette smoke, chemical fumes), or dry air can irritate the sinus lining and increase the risk of sinusitis.

It's important to note that the causes of sinusitis can often overlap, and multiple factors may contribute to the development of the condition [2.12, 13]. The specific cause of sinusitis can help guide treatment approaches and management strategies. The condition can be categorized as acute, lasting for a short duration, or chronic, persisting for more than 12 weeks [3].

1.3 MANGEMENT

The management of sinusitis typically involves a combination of medication and lifestyle modifications. Over-the-counter pain relievers, nasal decongestants, and saline nasal sprays can provide symptomatic relief and help alleviate inflammation. Antibiotics may be prescribed if the sinusitis is caused by a bacterial infection [4, 6]. However, it is important to note that antibiotics are not always necessary, as most cases of sinusitis are viral or self-limiting in

nature [6]. Prior to initiating medication, there are several initial measures that can be employed to manage sinusitis effectively. These include maintaining adequate hydration, using a humidifier to moisten the air, avoiding irritants like cigarette smoke and strong odors, and practicing good nasal hygiene through regular saline nasal rinses [2,4,5].In more severe cases or when conservative treatments prove ineffective, further interventions may be required. These can involve procedures such as sinus irrigation, where a saline solution is utilized to flush out the sinuses and promote drainage, or surgical intervention to address underlying structural abnormalities [6, 7, 8]. Surgical procedures may include functional endoscopic sinus surgery (FESS), which involves the use of endoscopes to remove obstructions and improve sinus drainage, or balloon sinuplasty, a minimally invasive technique that widens the sinus openings [9,13]. Overall, the management of sinusitis aims to alleviate symptoms, reduce inflammation, and improve sinus drainage. It is essential to consult with a healthcare professional for an accurate diagnosis and appropriate treatment plan tailored to individual circumstances. FESS has revolutionised the approach and treatment of chronic rhinosinusitis. Certain anatomical variations are thought to be predisposing factors for the development of sinus disease and it is necessary for the surgeon to be aware of these variations, especially if the patient is a candidate for FESS. There are

five main patterns of chronic inflammatory disease that classify the disease into distinct anatomical/pathological groups and are dependant on the drainage pathways affected.This classification helps the surgeon to select the type of surgery needed 12:

1. OMC pattern: maxillary sinus, anterior ethmoid air cells, and frontal sinuses are affected due to obstruction of the ostiomeatal complex
2. Infundibular pattern: isolated obstruction to the ethmoid infundibulum and/or maxillary sinus ostium
3. Sphenoethmoidal recess pattern: inflammatory changes in the sphenoethmoidal recess obstruct the sphenoid sinus in isolation or in conjunction with the posterior ethmoidal air cells
4. Sinonasal polyposis pattern: extensive polyps are occupying the nasal cavity and the paranasal sinuses

5. Sporadic pattern: no clear pattern could be identified with random mucosal thickening, polyps

Picture 1 showed Axial bone window , in patient with maxillary chronic sinusitis [33]

Picture 2 showed Sagittal bone window , in patient with maxillary chronic sinusitis [33]

Picture 2

Picture 3 showed Coronal bone window, in patient with maxillary chronic sinusitis [33]

Picture 3

According to 2020 study , 175 adult patients with clinical suspicion of acute maxillary sinusitis will have acute rhinosinusitis and acute bacterial rhinosinusitis diagnosed. CRP and erythrocyte sedimentation rate were assessed, and if computed tomography revealed mucosal thickness or fluid, sinus computed tomography was performed. The patient was diagnosed with acute bacterial rhinosinusitis if bacteria were discovered in antral fluid culture.

Bacteria cause acute rhinosinusitis in around one-third of patients [30,31]. In 2021, Hamza Elshafie Ahmed et al. discovered that in patients with CRSwNP, the MT did not share macroscopic changes with the ethmoid sinus. It is preferable to address the MT during the medicinal and surgical treatment of CRSwNP for optimal results [32]. In 2022, a study highlights the importance of informing patients about the risks connected with the use of steroids to treat CRS during the COVID-19 pandemic [31].

1.4 COMPLICATIONS

Complications are possible but they are relatively rare. Prompt diagnosis and appropriate treatment of sinusitis can help prevent the occurrence of complications. The potential complications associated with sinusitis [14, 15, 16, and 17]:

1. Orbital Complications: Infection can spread from the sinuses to the tissues surrounding the eye, leading to Orbital cellulitis. Pus accumulates within the orbital tissues or between the periosteal and the bones of the orbit, causing Orbital abscess and Sub periosteal abscess, proposes (bulging eye), pain, and limited eye movement.

2. Intracranial Complications:
- Meningitis: Sinusitis can lead to the spread of infection to the membranes surrounding the brain and spinal cord, resulting in

meningitis. This condition can cause severe headache, fever, neck stiffness, and neurological symptoms.

- Brain abscess: In rare cases, This is a serious and life-threatening condition that can cause neurological deficits, seizures.

- Epidural abscess:, leading to symptoms such as severe headache, fever, and neurological deficits.

3. Osteomyelitis: Prolonged or severe sinusitis can result in the spread of infection to the bones of the skull or face. This can lead to osteomyelitis, which causes bone pain, swelling, and may require surgical intervention.

4. Musicale: A mucocele is a mucus-filled cyst that can develop within the sinuses due to obstruction of the sinus openings. If untreated, it can gradually expand, causing pressure and erosion of adjacent structures.

5. Eye-related Complications:

- Optic neuritis: Inflammation of the optic nerve can occur due to the spread of infection from the sinuses, resulting in vision loss or blurred vision.

- Vision changes: Severe sinusitis can cause pressure on the optic nerve or affect the blood supply to the eyes, leading to visual disturbances.

6. Other Chronic Sinusitis-related Complications such as Asthma exacerbation and formation of Nasal polyps.

2 OBJECTIVE

Study provides valuable insights into the demographic characteristics, symptoms, radiological findings, and potential occupational factors associated with sinusitis and the contributing factors that are critical to the pathogenesis of rhinosinusitis is essential for caring for patients with this prevalent disease

3 DATA COLLECTION

This is a prospective case-control study carried out among diagnosed cases of sinusitis. General teaching hospital. The study was carried out between September 2023 and February 2024 and it included all patients with clinical features of sinusitis, Ethical clearance was given by our institution and informed consent was taken from the parents of all recruited patients. A complete ENT and physical examination were carried out for all patients.

The criteria for patient selection:

1. Patients with Acute, subacute, chronic and recurrent sinusitis.
2. Clinically suggest that sinuses are blocked and filled with fluid

The criteria for patients Exclusion:

1. Clinically doesn’t suggest that sinuses are blocked and filled with fluid
2. Patients with negative history of acute, subacute, chronic, recurrent sinusitis and allergic rhinitis.
3. Diagnosed case of sinusitis that confirmed by otolaryngologist.

Investigations: Evaluation included history, otolaryngological examination, Nasal and sinus samples, Nasal endoscopy, Imaging tests like CT or MRI scans or evern, allergy test.

Statistical analysis:

The data was collected in a Performa and analyzed manually using Kruskal Wallis test, Chi-square analysis was done for statistical confirmation of the data.

4 RESULTS

The study consisted of 33males (45.833%) and 39 females (54.167%) Ages ranging from 12 to 56 years. The range duration of symptoms was 2 w and 12 weeks . The occupations of the patients varied, including students, office workers, teachers, nurses, salespersons, doctors, we were able to determine the prevalence of sinusitis in each the following

Table1: The Number of patients for each age group

Age/ **Years**	**Number of patients**	**Percentage**
12-30	48	66.667%
30-40	21	29.167%
40-50	1	1.389%
50-60	2	2.778%

Figure 1 : Number of patients and thier age groups

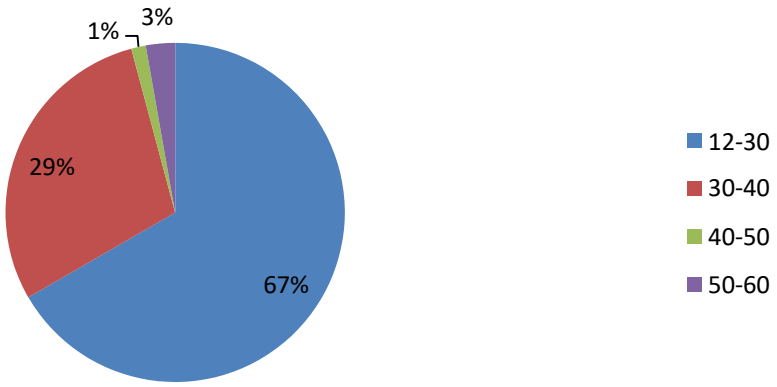


Table 2: The Number of patients for each clinical presentation

Clinical presentation	Number of patients	Percentage
Facial Pain\Pressure\ Congestion	84	82.353%
Nasal Obstruction	31	43.055%
Nasal or Postnasal Purulence	17	23.611%
Hyposmia	11	15.277%
Allergy	21	29.167%

In 63 (88.732%) the symptoms lasts for 12 weeks

In 5(6.944%) the symptoms lasts for 6 week

In 2(2.778%) the symptoms lasts for 2 months

In 2(2.778%) the symptoms lasts for 2weeks

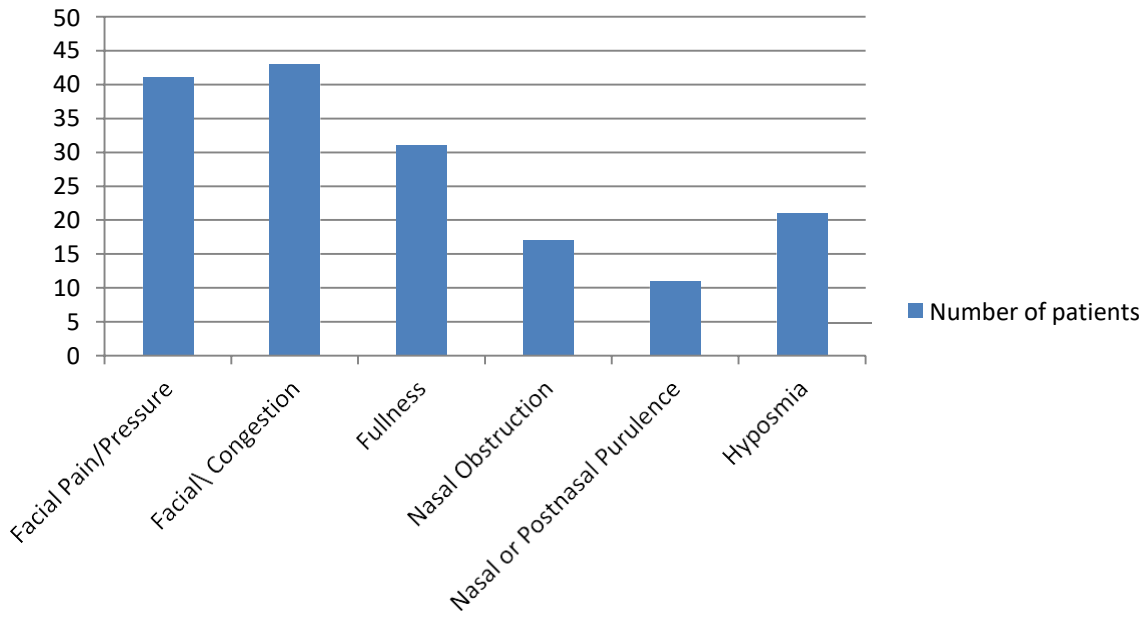
Table 3: Percentage of Frequency of how they get diagnosis

Ways to diagnose chronic sinusitis	Frequency	Percentage
Nasal endoscopy	31	43.055%
CT	5	6.944%
allergy test	21	29.167%
Nasal and sinus samples,	11	15.277%
MRI	2	2.778%

18 of them were passive smoker with one active smoker. 61 were students, (84.722%), three Office Worker (4.1667%),four housewife

(5.556%) , two Salesperson (2.778%) and one Nurse(1.389%),one Lawyer

Figure 2: Number of patients and their Clinical presentation



In 61 (84.722%) there were radiological findings

Table 4: Number of patients and their Occupations

Occupation	Number of patients	Percentage
Secondary student	58	80.556%
College student	3	4.1667%
Office Worker	3	4.1667%
Nurse	1	1.389%
Salesperson	2	2.778%
Lawyer	1	1.389%
housewife	4	5.556%

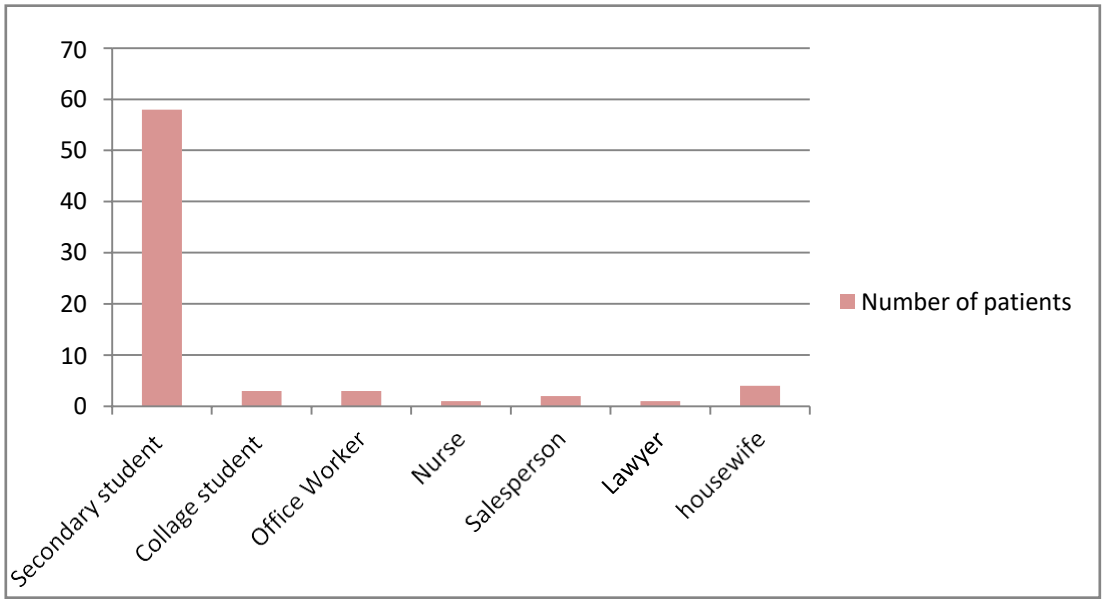
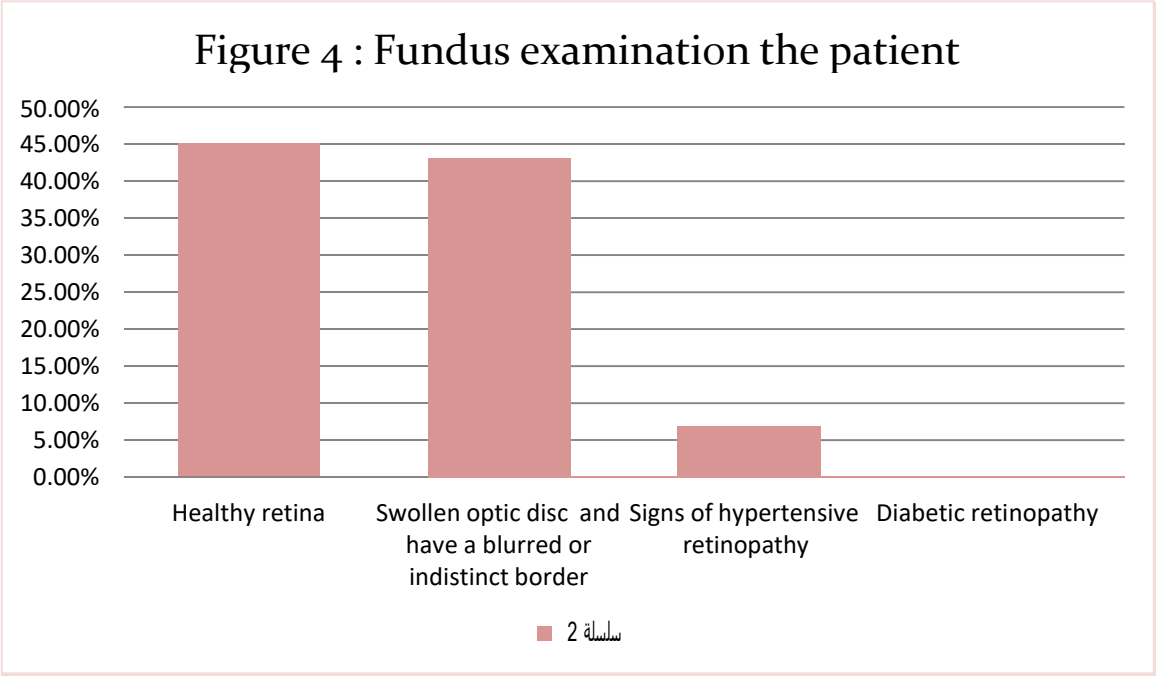


Figure 3: Number of patients and their Occupation



5 DISSCUSSION

In this study, we examined the demographic characteristics, symptoms, and radiological findings of 72 patients diagnosed with sinusitis. The study population consisted of 33males (45.833%) and 39 females (54.167%), with ages ranging from 12 to 56 years. the age group of 12-30 years had the highest number of patients, accounting for 67% of the total sample. This finding aligns with the notion that sinusitis can be frequently seen in adolescents and young adults. This could be attributed to factors such as hormonal changes, increased exposure to allergens, and lifestyle habits that may contribute to the development of sinusitis. Surprisingly, no patients in our study fell into the 30-40 years age group. This could be due to various factors, including a smaller sample size or a lower incidence of sinusitis in this particular age range. The age groups of 40-50 years and 50-60 years accounted for 1.389% and 2.778% of the sample, respectively. These findings suggest that sinusitis can affect individuals in middle adulthood and beyond, albeit with a lower prevalence compared to younger age groups. Overall, the results highlight the varying prevalence of sinusitis across different age groups, with higher rates observed in children and adolescents. The most prevalent symptom reported by the patients in our study was facial pain/pressure, with 84 patients (82.353%) experiencing this symptom which represent the typical presentation of sinusitis, as in

previous studies also, counting purulent rhinorrhea, face pressure and discomfort [37] , inflammation and congestion in the sinuses can lead to discomfort and pressure in the facial area. nasal congestion and blockage, hyposmia, halitosis, and persistent cough (particularly at night). Acute sinusitis frequently results in more severe pain. Tender, edema, and redness may occur around the affected sinus area. Maxillary sinusitis is a disorder that manifests as maxillary pain, toothache, and a frontal headache. Anterior sinusitis include aches and headaches in the anterior region. Ethmoid sinusitis characterized by aches backward between the eyes, frontal headache, periorbital cellulitis, and crying. Sphenoid sinusitis is accompanied by less discomfort localized in the frontal or occipital region. The nasal mucosa is red and variegated. A purulent, runny nose of yellow or green color may be current. The majority of patients, 63 individuals (88.732%), reported that their symptoms lasted for one week. This finding suggests that for most individuals, sinusitis symptoms tend to be acute and resolve within a relatively short period. A smaller proportion of patients, 5 individuals (6.944%), reported that their symptoms lasted for three weeks. This indicates a longer duration of symptoms compared to the majority, suggesting a more persistent or chronic form of sinusitis in these cases. Two patients (2.778%) reported symptoms lasting for five days, while another two patients (2.778%) reported

symptoms lasting for two weeks. These findings highlight the variability in the duration of symptoms experienced by individuals with sinusitis, with some cases resolving relatively quickly and others persisting for a longer period. The majority of patients were secondary students, accounting for 58 individuals (80.556%%). This could be attributed to factors such as increased exposure to respiratory infections in school settings or lifestyle factors among students., while college students and office workers each accounted for 3 individuals (4.1667%). Nurses, salespersons, lawyers, and housewives were represented in smaller numbers, with one or two individuals each. Occupational factors can contribute to the development or exacerbation of sinusitis symptoms such as poor ventilation, high humidity, or inadequate cleaning practices in the workplace can create an environment conducive to the growth of bacteria or fungi, which can contribute to sinusitis. In occupations where individuals share close quarters or have increased exposure to respiratory infections, such as schools or healthcare settings . Construction or manufacturing, may expose individuals to airborne irritants, pollutants, or allergens that can irritate the nasal passages and sinuses [18, 19, and 20]. Prolonged exposure to these substances can increase the risk of sinusitis, also chemicals, dust, fumes, or other irritants can potentially irritate the sinuses and lead to inflammation or infection [21, 22]. For example, people working in

hairdressing, farming, or healthcare settings may be exposed to chemicals or allergens that can contribute to sinusitis,[23,24]. In terms of radiological findings, 61 patients (84.722%) had positive results [25]. These findings support the diagnosis of sinusitis based on radiological evidence, such as sinus opacification, mucosal thickening, sinus polyps, and sinus inflammation [24, 28, 29], as Among those 72, 18 individuals were passive smokers, and there was one active smoker. This suggests a potential association between smoking and the development or exacerbation of sinusitis symptoms [30, 31]. Fundus Examination reveal normal fundus with healthy retina, optic disc, and blood vessels in 33 of patients (45.833%), a healthy retina, optic disc, and blood vessels. The retina would appear pinkish-orange in color

with a clear and well-defined optic disc. The blood vessels would be visible and branching out from the optic disc, and there would be no signs of abnormalities or pathologies. There a visible line or crease where the retinal detachment has occurred, the optic disc appear swollen and have a blurred or indistinct border in 31(43.055%). Signs of hypertensive retinopathy (hemorrhages) had seen in 5 individuals (6.944%). During a fundus examination, signs of

hypertensive retinopathy may include narrowing of the blood vessels, arteriovenous nicking (where veins cross arteries), and hemorrhages (small areas of bleeding) in the retina. Diabetic retinopathy (cotton wool spots) 1.389% in diabetic patient and it probably due to diabetes. During a fundus examination, findings may include microaneurysms (small bulges in the blood vessels), dot and blot hemorrhages, cotton wool spots (white patches), and neovascularization (abnormal blood vessel growth).

CONCLUSION

12-30 age group had a higher incidence of sinusitis. Adolescents and young adults also showed a relatively high prevalence of sinusitis, possibly due to hormonal changes, increased allergen exposure, and lifestyle habits. The most prevalent symptom reported by our patients was facial pain/pressure, which aligns with the typical presentation of sinusitis. Nasal endoscopy is the most common way to diagnose chronic sinusitis may be due comprehensive evaluation of the nasal cavities and sinuses. Also during nasal endoscopy, samples can be obtained from nasal and sinus tissues for laboratory analysis to detect infectious agents or evaluate other conditions. Most patients reported symptoms lasting for 12 week, Occupationally, the majority of patients were students, possibly due to increased exposure to respiratory infections in school settings. Radiological findings supported the diagnosis of sinusitis in the majority of cases.