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## RESEARCH ARTICLE

## THE EPIDEMIOLOGY OF ALLERGIC RHINITIS IN JORDANIAN PATIENTS WITH CHRONIC RHINOSINUSITIS AT KING HUSSEIN MEDICAL CENTER.

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### Abstract

**Background:-** Allergy is a leading factor to chronic rhinosinusitis with multiple causes. Chronic rhinosinusitis is correlated with various disorders as atopic disease, cystic fibrosis, immunologic disorders and ciliary dyskinesia.

**Objective:** To assess the epidemiology of allergic rhinitis in Jordanian patients with chronic rhinosinusitis.

**Methods:-** Our prospective study included 115 participants, of both sexes, aged 18-38 years and with clinical features of chronic rhinosinusitis diagnosed by endoscopic and radiologic criteria at King Hussein hospital, King Hussein medical center, Amman, Jordan, during the period Jan 2015-Feb 2016. Allergic rhinitis was diagnosed in terms of the patient's history including frequent inhalant allergens. After finishing the physical examination and recording the endoscopic detections, the data was analyzed and P value was recorded significant if  $< 0.05$ .

**Results:-** The mean age of participants was 32 years. Males were more affected than females, 57.4 % (66) and 42.6 % (49), respectively. The incidence of polypoid and none-polypoid rhinosinusitis was 54.8 % (63) and 45.2 % (52), respectively. The patient's most frequent clinical features were nasal discharge (93.04%) and blockage (90.4%). There were no significant discrepancies in allergic response between polypoid and non-polypoid chronic rhinosinusitis patients.

**Conclusion:-** Allergic responses in Jordanian chronic rhinosinusitis patients are more than in Jordanian general population in Amman with allergic rhinitis only.

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### Introduction:-

Chronic rhinosinusitis is the ultimate feature of different diseases processes which lead to sinonasal inflammation. In 1996, the American Academy of Otolaryngology-Head & Neck Surgery multidisciplinary Rhinosinusitis Task Force (RTF) defined adult rhinosinusitis diagnostic criteria. Major features included facial pain or pressure, nasal obstruction or blockage, nasal discharge or purulence or discolored postnasal discharge, hyposmia or anosmia, purulence in nasal cavity and fever. In 2003, the RTF's definition was changed to require confirmatory radiographic or nasal endoscopic or physical examination findings in addition to suggestive history. The sinuses are hollow air pockets in the bones of the face and head that protect the brain during trauma. The sinuses are lined with a thin layer of tissue that normally produces a small volume of mucus to maintain the sinuses lubricated and without germs. Rhinosinusitis is caused when the lining of the sinuses are infected or irritated, becoming swollen with more mucus. The swollen lining can also interfere with drainage of mucus. Chronic rhinosinusitis is different from the more frequent acute rhinosinusitis, which is a temporary infection of the sinuses. Chronic rhinosinusitis is a more persistent condition. The clinical features are more low grade and chronic.

Chronic rhinosinusitis leads to chronic inflammation of the mucosa of the nasal cavity and paranasal sinuses, with a duration of more than 3 months (1). Understanding of the underlying causes of sinonasal inflammation is on patient by patient basis. Chronic rhinosinusitis has a heterogenous nature, and for that clinical assessment is needed to uncover comorbidities. Cystic fibrosis, immunodeficiency and ciliary dyskinesia are disorders which cause the appearance and continuation of chronic rhinosinusitis symptoms. It affects 30% of the people and its pathophysiology is not clear (1). Viral, bacterial and fungal immunologic reactions with the formation of biofilm are causative of chronic rhinosinusitis. The leading factors for chronic rhinosinusitis appearance are: allergy, anatomic variability in the nasal cavity and paranasal sinuses (concha bullosa, paradoxical turbinate), congenital anomalies (immotile cilia syndrome, cystic fibrosis), neoplasm and tobacco. Allergy speeds up the development of chronic rhinosinusitis. Allergic responses chronic rhinosinusitis patients vary between 25-75% geographically, which is higher than the non-chronic rhinosinusitis population (2). There is a strong correlation (cause and effect relation) between allergic rhinitis and chronic rhinosinusitis. The linings of the nose and sinuses are comparable to the linings of the lungs. 20% of patients with chronic rhinosinusitis experience asthma. Patients liable to asthma are patients with chronic rhinosinusitis and nasal polyps. Intensifying clinical features includes abrupt nasal congestion, pain and pressure in the sinuses, wheezing, chest tightness and cough. The clinical features of chronic rhinosinusitis should include two or more of the following: Nasal congestion, nasal mucous rhinorea or mucus that drips into the back of the throat, facial pain, pressure, or "fullness" and a reduced sense of smell. Fatigue is an important finding of chronic rhinosinusitis. Chronic rhinosinusitis is diagnosed if two or more of the symptoms listed above clinical features persist for a minimum of three months plus sinus disease shown on a sinus computed tomography (CT) scan or with sinus endoscopy.

The aim of our investigation was to assess the epidemiology of allergic rhinitis in Jordanian patients with chronic rhinosinusitis.

**Methods:-** Our prospective investigation enrolled 115 participants, of both genders, aged 18-38 years with clinical features of chronic rhinosinusitis at King Hussein hospital, King Hussein medical center, Amman, Jordan, during the period Jan 2015-Feb 2016, after obtaining approval from our local Royal medical services ethical and research board review committee. Demographic data and concomitant diagnoses of allergic rhinitis were analyzed for relation with chronic rhinosinusitis. The participants were labeled with chronic rhinosinusitis in terms of the clinical, endoscopic and radiologic criteria. Nasal polyps were found by nasal endoscopy and categorized into grades 1, 2 and 3. Polyps of the middle meatus were graded 1 (mild), polyps extending beyond the middle turbinate were graded 2 (moderate) and polyps filling the nasal cavity or extended beyond the inferior turbinate were graded 3 (severe) (3). The epidemiological patterns included the distribution of age and gender, incidence of signs and symptoms, the frequency of allergy and frequent allergens and the incidence of asthma and smoking.

After finishing the physical examination and recording the endoscopic detections, the data was analyzed and P value was recorded significant if  $< 0.05$ . The clinical features of chronic rhinosinusitis can be classified into major and minor symptoms (1). Table 1.

**Table 1:-** Clinical features of chronic rhinosinusitis.

Major clinical features	Minor clinical features
Facial pain+/-pressure	Tooth ache
Nasal obstruction	Aural fullness+/-pain+/-pressure
Nasal discharge	Lethargy
Post nasal discharge	Fever
Hyposmia	halitosis
Anosmia	
Pus in nasal cavity in examination	

**Results:-** 57.4 % (66) were males and 42.6% (49) were females, with chronic rhinosinusitis in our investigation. The participants aged between 18 and 38 years, with a mean age of  $32 \pm 10$  years. Nasal polyposis was present in 60.6 % (40) of males and in 46.9% (23) of females labeled with chronic rhinosinusitis.

Non-polyposis and polyposis sinusitis were present in 45.2 % (52) and 54.8% (63) of patients, respectively. Most cases of polyposis were graded severe (Table 2). The patients experienced the following clinical features: rhinorrhea

93.04%(107), nasal blockage 90.4%(104), smell disorders 60%(69), cough 38.3%(44), halitosis 36.5%(42), lethargy 33.04%(38) and aural fullness 30.4%(35).

Total incidence of allergy in our patients was 60 %(69), 63.5%(40) and 57.7%(30) in patients with or without polyposis, respectively  $>0.5$ . There was no significant discrepancy in allergic reaction between males and females ( $P>0.5$ ) and between various age groups ( $P>0.5$ ). Allergy to one allergen was recorded in 68.7 %(79) of the chronic rhinosinusitis patients. Allergic rhinitis was more common as comorbidity combined with chronic rhinosinusitis and is correlated with asthma.

**Table 2:-** The incidence of polyposis and none polyposis chronic rhinosinusitis.

Chronic rhinosinusitis	Incidence (no, %)
None polyposis	52(45.2%)
Polyposis	63(54.8%)
Severe	42(66.7%)
Moderate	12(19.04%)
Mild	9(14.3%)

## Discussion:-

Chronic rhinosinusitis has more causes than acute one. Infections may intensify chronic rhinosinusitis, but patients with chronic type commonly have longstanding inflammation not explained by infection only. Chronic rhinosinusitis is classified into three different types: Chronic rhinosinusitis with no nasal polyposis is the most frequent kind of rhinosinusitis. The swelling and irritation of the sinus lining may be induced by allergies to things in the air, irritation from things in the air and infections. Chronic rhinosinusitis with nasal polyposis patients have abnormal growths inside their nose or sinuses. The polyps may become big and multiple obstructing the sinuses leading to clinical features. Some patients with chronic rhinosinusitis have a strong allergic reaction to fungi inside their sinuses. It is usual for air to include small numbers of fungi (airborne spores) and most patients may breathe in air with fungal spores without symptoms. In some patients, the allergy to fungi induces the sinus lining to become thick with dense mucus filling the sinuses. Chronic rhinosinusitis is a heterogenous group of diseases which phenotypically converge regarding chronic mucosal inflammation of the paranasal sinuses. Cystic fibrosis, immune deficiency and primary ciliary dyskinesia are incriminated in the pathogenesis of chronic rhinosinusitis via various mechanisms. Allergic rhinitis causes inflammation of the mucosa of the sinonasal cavity.

Chronic sinusitis is one of the more common chronic disorders, affecting persons of all age groups. It is an inflammatory disease affecting the paranasal sinuses. Chronic sinusitis is usually associated with concurrent nasal airway inflammation and is preceded by rhinitis symptoms. Most chronic sinusitis patients are continuations of untreated acute sinusitis patients. Chronic rhinosinusitis is more frequent in the 6<sup>th</sup> decade of life (4). The mean age of our participants was 32 years. 54.8% of our patients with chronic rhinosinusitis experienced nasal polyposis while Deal RT, et al, showed it to be 70% (5). There was no statistically significant difference between polyposis and non-polyposis patients; this was similar to Staikūniene J, et al, investigation (6). Although chronic rhinosinusitis with or without nasal polyps is labeled as one disease (7), chronic rhinosinusitis and nasal polyposis are different disease entities among the group of chronic sinus diseases due to discrepancy in their inflammatory mediators (8). Response to one allergen within participants with chronic rhinosinusitis was significantly more than in general population (9). Incidence of allergy was not statistically different between males and females and within different age groups. Risk factors for chronic rhinosinusitis include: allergy, exposure to tobacco or airborne irritants, immune system disorders, viral infections and deviated septum. Allergies are more frequent in patients with chronic rhinosinusitis than in the general population, mainly allergies of dust mites, animal dander, molds and cockroaches. Exposure to tobacco smoke or formaldehyde, may rise the risk of chronic rhinosinusitis. Most patients with chronic rhinosinusitis have normal immune systems. Patients with immune system disorders are at higher risk of chronic rhinosinusitis. Some patients experience chronic rhinosinusitis after repeated viral infections as common cold. The septum is not completely straight in many patients. A deviated septum may cause one nostril to be obstructed, but it commonly does not lead to chronic rhinosinusitis. Allergic rhinitis, nonallergic rhinitis, anatomic obstruction in the ostiomeatal complex, and immunologic disorders are known risk factors for chronic sinusitis. Chronic sinusitis could be noninfectious and attributed to allergy, cystic fibrosis, gastroesophageal reflux or exposure to environmental pollutants.

The most frequent clinical feature within our study group was nasal discharge (93.04%). Asthma was the most frequent cause of co-morbidity. Asthma was recorded to be more frequent in polyposis group. Asthma in severe

chronic rhinosinusitis patients is attributed to eosinophilia of the nasal discharge. There is a significant correlation between intensity of chronic rhinosinusitis and incidence of asthma. Polyposis was significantly more frequent in smokers in our investigation. Salasola, tree mixture and grass were the most frequent allergens in a previous investigation (1), while mites were the most frequent allergens in other part of the world. In Bangladesh, Perennial airborne allergens are the important pathogens for nasal polyposis (10). The most important limitation in our investigation was that immunological testing, nasal mucosal biopsy and lung function tests were not done.

### **Conclusion:-**

Allergic reaction was frequent in patients with chronic rhinosinusitis in our investigation regardless of age or gender. Allergic rhinitis is more frequent within patients with chronic rhinosinusitis in comparison to general population. In the chronic rhinosinusitis patients indicates, there is importance of proper management of allergies while treatment planning for chronic rhinosinusitis. Allergy testing associated with clinical history and allergen sensitivity are strongly indicated in all patients with chronic rhinosinusitis especially patients with reactive airway disease.

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