

Occupational exposure and the risk of new-onset chronic rhinosinusitis



-a prospective study 2013-2018



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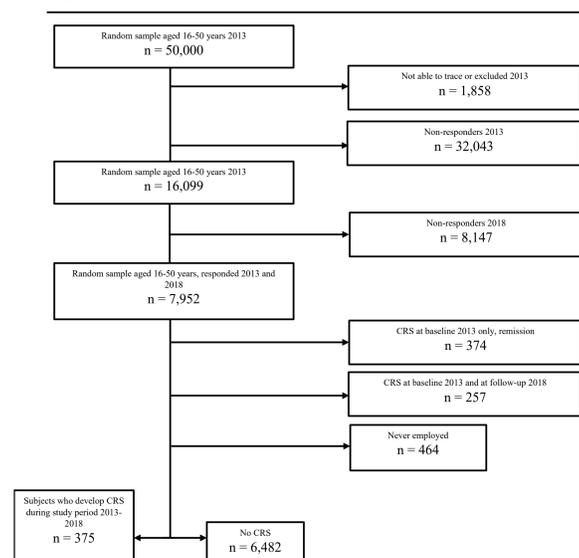
Background

Chronic rhinosinusitis (CRS) includes both allergic and non-allergic phenotypes, but the aetiology behind CRS remains unknown in many patients. Occupational exposure has been associated with CRS, but it has not been thoroughly investigated. We have previously reported cross-sectional data from a random population of 16,099 from the County of Telemark in Norway from 2013. The prevalence of CRS was 9% and occupational exposure to paper dust and cleaning agents was independently associated with an increased risk of having CRS. Since the baseline inclusion in 2013, the Telemark cohort has been followed up after five years. This is a prospective study to investigate the association between new-onset CRS and several common occupational exposures over time.

Aim

To study which airborne exposures in the working environment are associated with the development of CRS?

Figure 1. Flow chart of the study population



Methods

This is a random population of 50,000 from the County of Telemark in Norway. A total of 16,099 subjects (33%) answered a questionnaire in 2013. Of the 16,099 subjects who answered the questionnaire in 2013, 7,952 (49%) answered the same questionnaire in 2018. CRS was defined according to the European position paper on rhinosinusitis and nasal polyposis (EPOS). Self-reported occupational exposure to airborne irritants and sensitizers was assessed by a set of questions.

Table 2. Description of study population (n=6857) with regard to age, gender, smoking habits, asthma and atopy

	CRS (n=375)	Non-CRS (n=6,482)	Total	P*
Age				0.0012
16-30 years, n (%)	106 (7)	1321 (93)	1427	
31-40 years, n (%)	89 (5)	1749 (95)	1838	
41-50 years, n (%)	180 (5)	3412 (95)	3592	
Gender				0.55
Female gender, n (%)	215 (5)	3828 (95)	4043	
Male gender, n (%)	160 (6)	2654 (94)	2814	
Smoking [†]				0.0048
Never, n (%)	187 (5)	3651 (95)	3838	
Past, n (%)	85 (5)	1497 (95)	1582	
Current, n (%)	103 (7)	1334 (93)	1437	
Asthma				<0.001
No, n (%)	310 (5)	5924 (95)	6234	
Yes, n (%)	65 (10)	558 (90)	623	
Atopy				<0.001
No, n (%)	205 (4)	4703 (96)	4908	
Yes, n (%)	170 (9)	1779 (91)	1949	

* Fisher's exact test and chi-square test
† Occasionally is set to current



Results

In the multiple logistic regression analysis (stepwise forward), hair-care products, super glue, strong acids, cooking fumes, wood dust, atopy, asthma and current smoking were statistically significantly associated with the risk of developing CRS. New-onset CRS in females was associated with animals, cleaning agents and strong acids. New-onset CRS in males was associated with metal dust and stone dust.

In the multiple logistic regression analysis of the six main groups of occupational exposure, metals/gases, damp/mould, cleaning/cooking, organic dust and hair-products/animals were independently related to new-onset CRS

Table 4. OR_{adj} (odds ratio, forward multiple logistic regression analysis of risk of CRS and different types of occupational exposure for the whole cohort and stratified by gender adjusted for the other occupational exposures in this table and age, atopy, asthma and smoking). Variables with p<0.05 in the univariable analysis (Table 3) were included in the forward multiple logistic regression analysis. The remaining variables were not statistically significantly associated with CRS (p>0.05, not shown) when adjusted for the variables in the table below.

Only ever employed (n=6857)	OR (95% CI)	Two-sided p-value
Hair-care products	1.67 (1.09, 2.56)	0.019
Super glue	1.44 (1.06, 1.95)	0.019
Strong acids	1.42 (1.07, 1.89)	0.015
Cooking fumes	1.38 (1.07, 1.77)	0.014
Wood dust	1.36 (1.02, 1.82)	0.039
Female		
Animals	1.60 (1.05, 2.45)	0.030
Cleaning agent	1.57 (1.16, 2.11)	0.0032
Strong acids	1.57 (1.05, 2.34)	0.027
Male		
Metal dust	1.57 (1.11, 2.23)	0.012
Stone dust	1.49 (1.05, 2.11)	0.024

Table 5. OR_{adj} (multiple logistic regression analysis of CRS and the six main exposure groups, adjusted for age, gender, smoking, asthma, atopy, the other exposure groups included in the model) and stratified by gender.

	OR _{adj} (95% CI) Two-sided p-value		
	Only ever employed n=6,857	Male n=2,814	Female n=4,043
Metal and gases (OR per SD)	1.27 (1.13, 1.42)	1.33 (1.16, 1.53)	1.12 (0.86, 1.47)
Damp and mould (OR per SD)	1.13 (1.02, 1.25)	1.08 (0.94, 1.24)	1.16 (0.99, 1.36)
Exercise and cold (OR per SD)	1.10 (0.97, 1.24)	1.14 (0.95, 1.36)	0.99 (0.82, 1.19)
Cleaning and cooking (OR per SD)	1.15 (1.03, 1.29)	0.98 (0.80, 1.20)	1.28 (1.11, 1.48)
Organic dust (OR per SD)	1.10 (1.008, 1.2142)	1.15 (0.98, 1.34)	1.06 (0.93, 1.21)
Hair products and animals (OR per SD)	1.14 (1.03, 1.26)	1.03 (0.84, 1.25)	1.18 (1.06, 1.33)

Conclusion

The observed association between the development of CRS and occupational exposures indicates the need for greater focus on the identification and reduction of occupational exposure when making clinical assessments of patients with CRS.