

Prevalence of non-allergic nasal complaints in an urban and a rural population in Sweden

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By questionnaire, 1469 randomly selected persons between 16 and 82 years of age were asked whether they had suffered from such nasal complaints as obstruction, sneezing and discharge, at least during the previous 6 months. Seventy-five per cent answered the questionnaire, two thirds of whom were city dwellers and one third lived in a rural district. No difference was found between the urban and the rural populations regarding the prevalence of symptoms. Twenty-one per cent suffered from non-allergic nasal complaints, and 5% from allergic nasal complaints. The prevalence of non-allergic nasal complaints was highest in the 20-30-year age group, and lowest in the 50-60-year age group. Contributory factors were of greater importance among the younger individuals than among the more elderly.

Key words: nasal obstruction; non-allergic nasal complaints; prevalence.

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Many patients consult ENT specialists because of troublesome nasal obstruction, discharge and sneezings. In judging the severity of symptoms, it is of value to know how common and distressing they are in a general population.

The epidemiology of allergic rhinitis, a well-defined disease, has been described in many reports (13, 15). Its prevalence varies with sex and age (13) and, among other factors, has been related to air pollution, and exposure to smoking (21, 22). The epidemiology of such non-allergic nasal complaints as obstruction, sneezing and discharge, is poorly understood (12).

The aims of this study are:

- 1) to determine the age- and sex-specific prevalence of non-allergic nasal complaints;
- 2) to compare their prevalence in one rural and one urban population;
- 3) to study the relationship between non-allergic nasal complaints and smoking and previous surgery for nasal disorders;

- 4) to identify contributory factors.

MATERIAL AND METHODS

The series consisted of 1469 men and women between the ages of 16 and 82 years, randomly selected from regional census records. The lower age limit of 16 years was adopted to ensure that respondents would be able to answer the questionnaire unaided. The same number of individuals was selected from the different age groups (e.g. 21-30, 31-40 years). Nine hundred and seventy-six persons (494 women, 482 men, mean age 46 years) lived in the city of Malmö, and 493 persons (234 women, 259 men, mean age 47 years) in the rural parish of Emmaboda.

The 976 persons from Malmö represent 0.4% of the population. Malmö is a seaport in southern Sweden, about 25 km (15.5 miles) across the Sound from the Danish capital, Copenhagen. Most people in Malmö are em-

ployed in the public and commercial sectors, 15% work in industry, but only about 4% in heavy industry such as shipbuilding.

The rural parish of Emmaboda lies inland, about 250 km north of the city of Malmö. The 493 persons selected represent 4.5% of the Emmaboda population, which is mainly employed in the public and commercial sectors, light industry, forestry or agriculture.

A modified version of Kern's questionnaire (9) was sent to the 1469 persons, together with an explanatory letter. Persons who had suffered from nasal obstruction, discharge or sneezing at least during the previous 6 months were asked to answer all the questions. Those who failed to respond were sent one or two reminders. The questionnaire consisted of questions concerning nasal obstruction (Table 1), discharge, sneezing, contributory factors, smoking habits, previous nose surgery, migraine and medical treatment. Respondents were also asked whether they suffered from allergy (e.g., hay fever), whether pollen, dander or any agent provoked nasal complaints, and whether there was a history of allergy in the family.

A control group comprised 70 randomly selected Emmaboda residents, all without nasal

obstruction, sneezing or discharge. Subjects and controls were matched for sex and age.

Definition of non-allergic nasal complaints: 1) one or more of the following symptoms: nasal obstruction, sneezing and discharge; 2) duration of the nasal symptoms to have been at least the previous 6 months; 3) subjects should not consider themselves to be suffering from allergic rhinitis.

Definition of allergic rhinitis: The subject should have had experienced hay fever or similar complaints.

Statistics

The chi-square test was used in comparing the answers from the three groups (control group, people with non-allergic nasal complaints in the city and in the country).

RESULTS

The questionnaire was answered by 74% of the city population approached (mean age 46 ± 19 years, 51% women, 49% men), and by 76% of the rural population (mean age 47 ± 18 years, 48% women, 52% men).

The reproducibility of the answers (as tested in 20 persons 2 months later) was 100% in people with daily nasal complaints, and 86% in persons suffering less frequently. The validity of the answers was about 90% (as tested in another 20 persons at personal interviews).

The proportion of people suffering from any type of nasal complaints was 26.7% in the city group (mean age 42 ± 19 years, 50% women, 50% men), and 24.1% in the rural group (mean age 47 ± 19 years, 48% women, 52% men).

Allergic rhinitis was found in 4.5% of the study population as a whole (rural and city) (24 women and 26 men, mean age 41 ± 15 years). The nasal complaints were provoked by pollen in 2.6%, by dander in 0.2% and by both pollen and dander in 1%. No information was given as to the contributory factors by 0.7%.

Of the whole study population (rural and city), 234 individuals (20.7%) - 127 men and

Table 1
Questionnaire items

1. Do you suffer from nasal stuffiness	
	daily
	several days a week
	several days a month
	infrequently or never
2. If you suffer from nasal stuffiness when does it trouble you most	
	daytime
	night
	morning
	evening
3. In which nasal cavity do you as a rule suffer from nasal stuffiness	
	right
	left
	both at the same time
	varying

The first two items (i.e., eight alternatives) were repeated both for nasal discharge and sneezing.

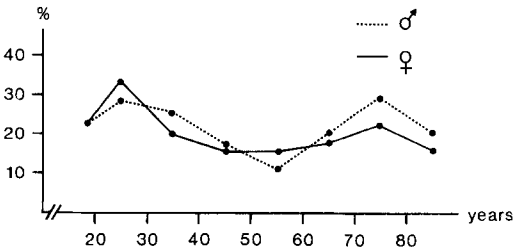


Fig. 1. Prevalence of non-allergic nasal complaints. Sex and age distribution.

107 women – fulfilled the criteria for non-allergic nasal complaints. With regard to the distribution of nasal complaints by age, there was no significant difference either between men and women (Fig. 1), or between city and rural populations (Fig. 2). The prevalence of non-allergic nasal complaints was highest in the 20–30-year age group in the city, and in the 70–80-year age group in the rural community.

Both in the city and rural populations, the occurrence of a history of heredity for allergy varied between age groups, being most common among 21–40-year-olds, of whom 33% had a family history of allergy, as compared with only 13.6% among 61–80-year-olds.

A comparison between people in the country with and without nasal complaints as to smoking habits, previous nasal surgery, migraine and heredity for allergy is shown in Table 2, where comparison is also made between city and rural populations. None of the respondents had been treated with antibiotics for these complaints.

Factors which according to questionnaire answers may contribute to nasal symptoms are

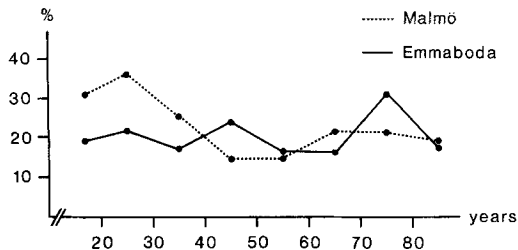


Fig. 2. Prevalence in city (Malmö) and rural (Emmaboda) populations.

Table 2
Characteristics of people with and without non-allergic nasal complaints

	Non-allergic nasal complaints		Control
	city (n = 164)	country n = 70	(country) n = 70
Mean age (years)±SD	42±20	48±19	48±20
Sex women %	48	46	46
Sex men %	52	54	54
Smoking habits %			
cigarettes	37.2	17.1	24.3
cigars	0.6	2.9	1.4
pipe	3.7	2.9	5.7
Previous surgery because of			
nasal injury %	4.3	1.4	0.0
nasal polyps %	1.2	1.4	2.9
veg. adenoids %	26.2	10.0	10.0
Migraine %	10.4	2.9	2.9
Heredity for allergy %	27.4	24.3*	11.4*

* χ^2 : 3.944.

listed in Table 3. No sex difference was found in this respect. Contributory factors were given greater importance by persons under 40 years of age (χ^2 :5.220, $P < 0.05$) (Table 4).

The 24-hour variation of the symptoms of non-allergic nasal complaints – nasal obstruction, discharge and sneezings – is shown in Fig. 3.

Most respondents reported a combination of the three main symptoms; nasal obstruction was reported by 66%, discharge by 59%, and sneezing by 65%.

The prevalence and severity of reported non-allergic nasal obstruction is given in Table 5.

Table 3
Factors (%) contributing to non-allergic nasal complaints in different age groups

Years	16–20	21–40	41–60	61–82
Cold air	37.5	25.3	24.5	26.2
Hot air	8.3	20.9	13.2	12.3
Bright light	16.7	13.2	13.2	3.0
Strenuous				
work	8.3	6.6	7.5	3.1
Stress	4.1	4.4	1.9	3.1

DISCUSSION

The proportion of those approached who failed to answer the questionnaire was about 25%, both in the city and rural populations. As no difference was found regarding mean age or sex between those who had answered and those who had not, the two groups may be considered to be essentially similar, though nothing is known, of course, about the prevalence of nasal complaints among the non-responders.

Both the reproducibility and the validity of the answers of the questionnaires were good. Not surprisingly, reproducibility was poorer among those only rarely suffering from nasal complaints than among daily sufferers.

Seventy randomly selected rural residents, of comparable age and sex distribution, who were without nasal complaints were used as a control group. The prevalence of nasal complaints was similar in the urban and rural populations.

Although questionnaires of the type used here are not ideal for evaluating all aspects of symptoms, the high degree of reproducibility and validity obtained in this study suggests the questionnaire method to be a feasible approach. A far better way would be for subjects to score any nasal complaints on daily self-rating scales over a period of months (19), though difficulties with motivation and compliance would be hard to resolve. According to the report by Wihl et al. (19), exact symptom recording in diary form demonstrates that patients answering symptom questionnaires retrospectively tend to exaggerate their symptoms.

As the borderline between the normal nasal function and non-allergic rhinitis is a hazy one, it is a question of definition whether the respondents in this study had had normal nasal function or non-allergic rhinitis. However, 21% did suffer more or less regularly from nasal complaints, and knew of no contributory allergic

Table 4

The proportion of respondents with non-allergic nasal complaints who cited one or more contributory factors

Age group (years)	16-20	21-40	41-60	61-82
Proportion (%)	50.0	53.8	43.4	33.8

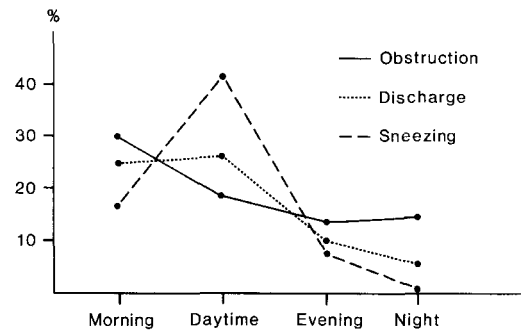


Fig. 3. Day and night variation in nasal stuffiness, discharge and sneezing.

factors; they were therefore considered to have had non-allergic rhinitis. Even if there is a risk of this procedure resulting in a somewhat over-estimated prevalence, it is clear that non-allergic rhinitis is more prevalent now than it was 20 years ago. In 1969, for instance, McAllen & Langman (11) suggested that only about 10% of the population in Britain had chronic perennial rhinitis, allergic or non-allergic.

Table 5
Non-allergic nasal obstruction

Nasal obstruction:	Daily	Several days a week	Several days a month	Total
Right or left sided %	0.8	0.9	0.6	2.3
Right and left sided %	2.2	1.4	1.5	5.1
Alternating sides %	1.0	1.5	2.7	5.2
Uncertain %	0.4	0.3	0.2	0.8
All patients %	4.3	4.1	5.1	13.4
Breathes as usually through the mouth at rest %	1.5 (35)*	1.8 (42)	-	-
Nasal obstruction > 1 year %	3.5 (81)	3.7 (91)	3.4 (68)	10.7 (79)
Most effective medical treatment:				
xylomethazoline %	0.5 (13)	1.0 (24)	1.1 (21)	2.6
steroid nose spray %	0.1 (2)	0.3 (7)	0.2 (4)	0.6
antihistamine %	-	0.6 (15)	0.3 (5)	0.9

*The figures in brackets represent percentages of respondents suffering from non-allergic nasal obstruction, the other figures percentages of the questionnaire respondents as a whole.

The high prevalence of non-allergic nasal complaints we found among those between 20 and 30 years of age is in agreement with the findings of Viner & Jackman (20) concerning allergic and non-allergic perennial rhinitis. Viner & Jackman (20) also suggested that the disease had a tendency to "burn itself out" by the age of 50. In our study we also found the prevalence to be low between 50 and 60 years of age, though unlike the findings of Viner & Jackman (20), another peak occurred between 70 and 80 years of age, followed by a low prevalence among people over 80. The latter finding is in agreement with findings reported by Syabbalo et al. (16) from a study of nasal obstruction.

It is not possible to say whether the prevalence peaks between 20 and 30 and between 70 and 80 years of age represent a cohort effect or are age-related. It seems likely that the aetiology of non-allergic nasal complaints is different in younger and elderly individuals, perhaps because of hormonal factors, or because contributory factors were more frequent among younger than among elderly people. Heredity for allergy was also more common in the younger group than in the 61–80-year age group. This suggests that some individuals in the younger group in fact had an allergic rhinitis. On the other hand, in our study the diurnal variation of sneezing reached a maximum in daytime, which is contrary to the findings of Wihl et al. (19) who demonstrated a marked morning peak and a small peak in the evening. In an allergic rhinitis due to mites (e.g., *Dermatophagoides pteronyssinus*), one would expect day and night variations for sneezing as found by Wihl et al. (19).

No significant difference was found between the rural and urban populations regarding the prevalence of non-allergic nasal complaints, despite possible differences in ambient contributory factors. The predominant contributory factors reported both by city and rural populations were breathing cold or hot air. Takagi et al. (17) and Salman et al. (14) have demonstrated that breathing cold air increases nasal airway resistance, and Salman et al. (14) have reported the same tendency in conjunction with breathing hot air.

Smoking was more common in the urban population than in the rural population, a tendency also found by others (1, 6, 10). However, no correlation between non-allergic nasal complaints and smoking could be found in the present series.

Among city people with non-allergic nasal complaints, the frequency of migraine was higher than in the rural group with nose complaints and that without. In another study from Malmö, a high frequency of migraine was also found in patients with non-allergic rhinitis (7). Probably there are autonomic imbalance features in both diseases (3, 12).

In this investigation based on questionnaire answers, the diagnosis of an allergic rhinitis due to contact with pollen and/or dander would seem to be reliable, whereas diagnosis of allergic rhinitis due to moulds and mites would be less reliable in a questionnaire study.

Comparing figures for 1974 with those for 1979, Eaton (2) reported the incidence of allergic rhinitis to have increased from 4.6% to 5.7%, a tendency also reflected in reports from other studies: Schwartz (15) found an incidence of hayfever of 0.3%; Van Arsdel & Matulsky (18) 12%; Hagy & Settupane (5) found that among 16–20-year-old college students, 21.1% suffered from hayfever and 5.2% from perennial allergic rhinitis; and Haahtela (4) found a prevalence of 10% in 14–16-year-old girls. In the present investigation, however, 4.5% considered themselves to be suffering from allergic rhinitis, which seems a low figure. An explanation of the variation in these reported prevalence may be differences in diagnostic criteria, the composition of the populations, or geographical area. However, the most important cause of the low prevalence figure for allergic rhinitis in the present study is probably the high mean age of the participants.

The overall prevalence for non-allergic nasal obstruction was 13%, though it is possible that the 2% suffering from a unilateral nasal obstruction also had deviated nasal septa (8).

The findings of this study show that about one out of five men and women in their twenties and thirties has non-allergic nasal complaints. Although no specific contributory fac-

tors were identified, the higher prevalence among young people in the city than among young people in the rural population suggests the involvement of environmental factors. The present findings provide support for the hypothesis (20) that the prevalence of non-allergic nasal complaints is low in middle-aged people.

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