

An Epidemiological Study of Rosacea

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In a non-selected population of 809 office employees (454 women and 355 men) 81 persons were diagnosed as having rosacea, giving a prevalence of 10% (women 14%, men 5%). The rosacea group was compared with the rest of the study population. Most of the cases were rather mild. The rosacea was of an erythematotelangiectatic type in 81% of the cases and of a papulopustular type in 19%. Unilateral lesions were found in 11 subjects (14%). Only 17% of those with rosacea were impaired by sunlight, whereas 26% improved. In the rosacea group, 27% were found to suffer from migraine and 42% from a tendency to flush, compared with 13% ($p < 0.001$) and 16% ($p < 0.001$) respectively in the comparison group. Flushing and the regulatory mechanism of the blood vessels thus seem to be of importance in the pathogenesis of rosacea. Individuals with good pigmentation ability showed a tendency to a decreased occurrence of rosacea. The frequency of eye complaints was the same in the two groups. **Key words:** Flushing; Migraine; Office employees; Prevalence; Sunlight.

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Rosacea is a very common affection but so far there are no reliable figures for its true prevalence (1). In one hospital material, 2% of all patients who consulted a dermatologist were diagnosed as suffering from rosacea (2).

The disease is said to be more common among women aged 30-50 years (3), but it has been assumed that this is due to the fact that women may consult physicians more frequently for facial skin afflictions than men (4). It is also said to be more common among the fair-haired, blue-eyed 'Nordic type' (3). However, the affliction is not a distinct entity. It comprises the whole range from only telangiectases with persistent erythema, to papulopustular and hypertrophic lesions. It is often difficult to make a distinction between sick and healthy skin on the basis of symptoms of this kind (5). Rosacea preferentially affects the face (3), but it can also occur on other parts

of the body (6). It is most often symmetrically distributed, and it does not usually occur on a solitary site (3). Some affection of the eyes is considered to occur in approximately 50% of patients with rosacea (7).

A division of the disease into four stages has been proposed (4): 1) episodes of flushing, 2) persistent erythema and telangiectases, 3) papules and pustules, and 4) infiltrate. These stages might also represent different varieties of the disease (3).

The pathogenesis of this fairly common skin disease is unknown, but it is thought to stem from a lability of the regulatory mechanisms of the blood vessels (5). In addition, the increased frequency of migraine among rosacea patients (8) suggests that it might be part of a more generalized vascular disorder. Rosacea generally occurs on regions rich in sebaceous glands, but no increase in sebum secretion has been proved to exist among the patients (9). However, 13-*cis*-retinoic acid, which is a potent inhibitor of sebum secretion, has a good effect, at least on severe rosacea (10). *Demodex folliculorum* is often found in the rosacea region, and is therefore thought by some authors to be of pathogenetic significance (11). It has been claimed that the use of cleansing creams instead of soap and water on the face might result in an environment in which *Demodex* thrives, causing or aggravating rosacea (11). However, the significance of this mite in the pathogenesis of rosacea is controversial (12).

A variety of factors are said to be of etiological importance in rosacea: e.g. sunlight, hot beverages, alcohol, spices and stress. However, with a few exceptions (13-14), the significance of these factors has hardly been investigated at all. In recent years, work at visual display units (VDUs) has been discussed as a possible factor in provoking rosacea (15-17), but no proof of this has been presented. The population of the present study has been sampled from a large-scale epidemiologic study concerned with the question of whether employees working at VDUs suffer more facial skin problems than controls.

The purpose of the present work was to study clinical types, prevalence, etiology and pathogenesis of rosacea by applying epidemiological methods.

MATERIAL AND METHODS

A questionnaire was sent to about 3 700 non-selected clerical workers in four Swedish cities (Stockholm, Gothenburg, Sundsvall and Södertälje). From this population, 879 employees were randomized for a personal examination and interviewed at their offices. Ninety-two per cent (809 persons) of the sample participated in the study, of whom 475 individuals worked at a VDU for more than 2 h a week and 334 for less than that. The results presented in this article are not influenced by the amount of VDU work. All interviews were conducted by the same dermatologist (M. B.). A special form was used comprising questions about heredity, previous skin diseases, present skin complaints, drugs, creams, sun-bathing habits, working environment, etc. Each interview lasted for about 20 min. Before the interview the examiner noted the status of the facial skin without knowing more about the person than age and name. The mean age of those interviewed was 44 ± 10 years, range 20–65. There were 454 (56%) women and 355 (44%) men.

The data from the interviews were then computerized and analysed. Those individuals with typical signs of rosacea (papules and/or pustules, erythema, telangiectases and swelling) or an anamnesis of rosacea (differing from a history of e.g. atopic or seborrheic dermatitis) within the last 2 years were defined as the 'rosacea group'. Individuals with telangiectases alone (which are relatively stable lesions with no short-term fluctuations) and with no history of rosacea, were not classified in this group. Rosacea is divided here into two groups: the erythematotelangiectatic (ET) type with mainly redness and telangiectases on the face and not so many papules or pustules, and the papulopustular (PP) type with mainly papules and pustules. These two groups of individuals were compared with the rest of the study population (called the comparison group) with particular regard to sun-reactive skin type, sun habits, migraine, eye complaints, tendency to facial flushing, seasonal fluctuations, and the use of and reaction to soaps, creams, hot beverages, coffee, food and tobacco.

The sun-reactive skin type was determined on the basis of the subject's response to the first moderate exposure (without protection) to the sun in the sunny season (18): skin type I, always burns—never tans; type II, always burns—minimal tan; type III, sometimes burns—always tans; type IV, never burns—always tans. A tendency to flush is defined here as a tendency to reddening of the face as an adult from, e.g., stress, exposure to the sun, hot beverages, alcohol, spices. Migraine is defined as a history of intense unilateral paroxysmal headache, often accompanied by nausea and visual symptoms (19). The condition was distinguished from ordinary tension headache. Sun-bathing habits were classified as: A, avoids the sun and would rather be in the shadow; B, likes to be in the sun but principally in the summer; C, travels regularly to sunnier countries once or twice a year or uses sun lamps about 50 times a year at least.

When noting the skin status of the face, telangiectases were classified as follows. Mild: telangiectases only on the nose; moderate: relatively mild but both on the nose and the cheeks; severe: marked telangiectases on the cheeks and/or other sites. When noting whether the skin lesions were unilateral or bilateral, no account was taken of such lesions as are usually considered to be unilateral, e.g. tumours, or of isolated papules or pustules.

The statistical methods used were the χ^2 -test and the Mantel-Haenszel test (with stratifications on sex and age) for comparing the rosacea group with either the rest of the population ($n=728$) or with the 253 persons who had facial skin diseases other than rosacea. The 95% confidence interval is used to describe the distribution of the odds ratio.

RESULTS

The examiner diagnosed 81 persons (10.0%) as suffering from rosacea: 66 (82%) had an ET rosacea and the remaining 15 (18%) had the PP type. There were as many VDU-users as non-users. The age and sex distributions are shown in Table I. The average age was 46 years, range 29–64. The subjects had had their skin complaints on average for 9 years, range 3 months–31 years. However, 10 of them (6 women and 4 men) with typical rosacea lesions were not aware of having any skin problems at all, and were therefore of course unable to say when their skin symptoms started.

Another 9 individuals (1.1%) stated that they had previously had a rosacea-like dermatitis, but that it had healed at least 2 years previously. These people were not included in the rosacea group.

The majority of the 81 individuals had a rather mild type of rosacea and many of them, mainly men, had not consulted a physician about it.

Eleven out of the 81 (14%), 10 ET and 1 PP, had unilateral lesions or most of the rash on one side of the face. In the comparison group of 728 persons, 522 (72%) had some type of facial skin lesion other than rosacea, and of these 70 (13%) were unilateral.

Of the rosacea group, 75% had facial telangiectases, 38% of the cases were mild, 25% moderate, and 12% severe. Of the rest of the study population, 55% had telangiectasis ($p=0.05$, odds ratio=1.7, 95% confidence interval 1.0–3.1), 31% mild, 20% moderate and 4% severe.

The frequency of rosacea was of the same order of magnitude in the different groups of sun-reactive skin types with 7, 10 and 11% in types I–III, respectively. Type IV seems to confer some protection (3%, $p=0.05$, odds ratio 3.3, 95% CI 1.0–11.3). Sun-bathing habits do not seem to be correlated with the disease and only 17% of the individuals with rosacea felt that they are harmed by exposure to sunlight. In fact more individuals with rosacea (26%) thought such exposure brought improvement, especially those having PP rosacea. Furthermore, it was more common for the condition to get worse in the winter than in the summer.

Table I. Age and sex distribution of the 81 individuals (out of 809) with either the erythematotelangiectatic (ET) or the papulopustular (PP) type of rosacea

Age (years)	ET		PP		Both types	
	Women <i>n</i> (%)	Men <i>n</i> (%)	Women <i>n</i> (%)	Men <i>n</i> (%)	Women <i>n</i> (%)	Men <i>n</i> (%)
-29	1 (3)	0	0	0	1 (3)	0
30-39	10 (9)	5 (5)	0	0	10 (9)	5 (5)
40-49	25 (15)	6 (5)	11 (7)	0	36 (22)	6 (5)
50-59	11 (9)	4 (5)	1 (1)	3 (3)	12 (10)	7 (8)
60-	3 (9)	1 (5)	0	0	3 (9)	1 (5)
total	50 (11)	16 (5)	12 (3)	3 (1)	62 (14)	19 (5)

Table II shows the associations between rosacea, flushing and migraine. Forty-two per cent of the rosacea group often flushed, compared with 16% of the comparison group ($p < 0.001$, odds ratio 3.7, confidence interval 2.1-6.1). Migraine occurred in 27% of the rosacea population, compared with 13% of the comparison group ($p < 0.001$, odds ratio = 2.6, 95% CI 1.5-4.5).

Thirty-six per cent (29/81) in the rosacea group often had eye complaints, compared with 35% (254/728) of the rest of the study population.

In Table III various other factors are compared for the rosacea group and the 253 persons who had some facial skin diagnosis (including anamnesis) other than rosacea. There was a tendency for more people with rosacea to use cleansing creams or liquids or water alone, instead of washing the face daily with an ordinary soap.

No difference could be discerned between the rosacea group and the rest of the study population as regards the use of tobacco, hot beverages, coffee, cosmetics, emollient creams, after-shave lotions, or internal drugs.

DISCUSSION

This study population was randomized and the participation rate was high. We therefore believe that the prevalence figures, 14% in women and 5% in men, have a general applicability—at least amongst clerical workers. The differences found between the sexes show that the rosacea pattern is in reality more common in women and is not a consequence of a tendency among women to consult physicians more frequently. The prevalence rate depends of course on the

examiner's classification, because rosacea, as mentioned above, is not a distinct entity.

As many as 14% of the individuals with rosacea had unilateral lesions. This is an unexpectedly high figure not previously reported, obviously because such mild symptoms as these were in most of the cases do not occasion medical consultation. However, such slight symptoms may become important in certain situations, e.g. when a harmful effect arising from a certain kind of work is suspected.

The average duration (9 years) and the fact that the symptoms had healed completely in only 9 individuals indicate that rosacea is at least a semi-chronic affection.

Sunlight is believed to provoke and modify the course of rosacea (1). Surprisingly we could find no support for this assumption. Individuals belonging to

Table II. Associations between rosacea, flushing and migraine (figures indicate %)

Part of the whole population (<i>n</i> =809)	Rosacea (ET/PP)	Migraine
Flushing		
yes 19	22 (17/5)	29
no 81	7 (6/1)	11
Migraine		
yes 14	19 (15/4)	
no 86	8 (7/1)	
Rosacea		
yes 10		27
no 90		13

Table III. Comparison between the 81 persons with rosacea and the 253 with facial skin diagnoses other than rosacea

Factor	Rosacea (%)	Facial skin complaints but not rosacea (n=253) (%)	
"Worse after certain kinds of food"	42	20	$p < 0.001$
"Worse in summer"	5	4	
"Worse in winter"	38	47	$p < 0.05$
"No ordinary soap used daily on the face"	31	26	

skin type IV seem to be less prone to develop the symptom pattern. Otherwise, there was no difference of importance, either between the sun-reactive skin types, or between different sun-bathing habits. The latter may of course be due to the possibility that individuals, feeling that they are irritated by sunlight, might choose to avoid it. Only a few individuals with rosacea experienced any impairment (17%) from sunlight, whereas more were improved (26%). The individuals with PP rosacea improved most from exposure to sunlight. Those in the rosacea group also experienced a worsening of their condition more frequently in the winter than in the summer. Thus several results speak against a deleterious effect of sun exposure in rosacea.

It is notable that telangiectasis, which is considered to be one of the main signs of rosacea (1), was also common in the comparison group. These figures show that the occurrence of telangiectases on the face is common among individuals with 'healthy skin' and that it is not pathognomonic for rosacea. The tendency to flush was more common among individuals with rosacea. This supports the theory that flushing is a primary pathogenetic process in rosacea. This lability of the regulatory mechanisms of the blood vessels in rosacea is further substantiated by the association of rosacea and migraine, a finding which was twice as common in the rosacea group as in the comparison group. These figures confirm previous findings (8).

In this study, rosacea sufferers had the same frequency of eye complaints as did the comparison group. This is surprising in view of statements in the literature about a high incidence of eye disorders in rosacea patients (1). It could not be explained by the fact that many VDU workers participated in the

study (eye complaints are assumed to be common among individuals working at VDUs), because the proportions of VDU workers were the same in the two groups. The only explanations we can offer are that the individuals in our rosacea group had less severe disease than the patients who formed the basis for the previously mentioned views, or that the figures for the frequency of eye complaints mentioned in the literature are too high. Another factor which may explain why we did not find any difference in prevalence of eye complaints between the two groups, is that our figures are based on subjective symptoms, not on objective eye signs.

There were no differences between the two groups concerning the use of tobacco, cosmetics, emollient creams or internal drugs. The consumption of hot beverages and coffee was slightly lower among the individuals with rosacea. This is not surprising as it has been shown that increased heat in the oral cavity can cause flushing (13). However, caffeine is not a proven cause of flushing, and thus it is probable that the temperature of the coffee is more important than the caffeine content for the rosacea patients (13).

Not surprisingly, people with rosacea are more disposed than other skin patients to react with flushes and to suffer impairment from different kinds of food, especially hot spices. This is well known and merely confirms the central role of the blood vessels in the face in the pathogenesis of rosacea. In contrast to the reactions from hot beverages (13), the mechanisms of these reactions are not known.

The rosacea group used soaps on the face less frequently than individuals with skin diagnoses other than rosacea, though the difference was not statistically significant. The controversial hypothesis that individuals using cleansing creams and liquids rather than ordinary soaps might be disposed to get a rosacea variant as a result of facilitated colonization of the mite *Demodex folliculorum* (11) gains some support from the present study. However, these theories are vague and there is no firm support for a microbial pathogenesis in the literature (12, 14).

This study gives a figure for the prevalence of rosacea and shows that it really is more common among women. Unilateral rashes are not uncommon. Telangiectases were common in our rosacea group, but also in the comparison group. An association with migraine is common and flushing seems to be an important mechanism in the pathogenesis. Eye complaints are no more frequent in this group, with rather mild rosacea, than in the comparison group. Individuals

with good pigmentation ability may have some protection against the disease, but otherwise we could find no relationship to sunlight in the pathogenesis. Rather, many individuals with rosacea improved with exposure to sunlight.

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